

**VEER NARMAD SOUTH GUJARAT UNIVERSITY**  
**UDHANA-MAGDALLA ROAD**  
**SURAT**



**TENDER DOCUMENT FOR REPAIR,**  
**RENOVATION AND UPGRADATION OF DINING**  
**HALL**

**AT**

**VEER NARMAD SOUTH GUJARAT UNIVERSITY**  
**SURAT**



## LETTER OF ACCEPTANCE

Date :

To,  
The Registrar,  
Veer Narmad South Gujarat University,  
SURAT-395 007.

Dear Sir,

With reference to the tender invited by you on behalf of The registrar, Veer Narmad South Gujarat University, the Owners of the premises at Udhana - Magdalla Road, Surat.

I/We do here offer to execute of work under contract at the respective rates mentioned in the Scheduled of Quantities.

I/We have examined the Drawings, seen the site and read the Articles of Agreements condition of Contract. Specifications & special clauses forming part of the schedule of quantities.

I/We agree to finish the whole of the works within \_\_\_\_\_ months from the date of Handing over possession of the site and Work order being issued.

I/We have deposited as Earnest Money Rs. \_\_\_\_\_ **Demand Draft of 'GOOD FOR PAYMENT'** in favour of **REGISTRAR, VEER NARMAD SOUTH GUJARAT UNIVERSITY** which amount is not to bear any interest.

I/We do hereby agree that this sum shall be forfeited by you in the event our tender is accepted and I/We fail to execute the contract when called upon to do so, I/We Understand that you are not bound to accept the lowest or any tender that you receive.

**yours faithfully,**

Name of the Firm :



**VEER NARMAD SOUTH GUJARAT UNIVERSITY**  
**UDHNA - MAGDALLA ROAD, SURAT.**  
**E-TENDER NOTICE**

Tenders for the works given below are invited from the Government / Semi Government and Municipal registered contractors. Tenders are invited for the following works through online process on <https://tender.nprocure.com>

**1. TENDER FOR REPAIR, RENOVATION & UPGRADATION OF DINING HALL**

1.)	Estimated Amount (Rs.)	:	1,24,72,289=86
2.)	Earnest Money Deposit (Rs.)	:	1,25,000=00
3.)	Tender Fee (Rs.)	:	4,248=00 (3600 Tender Fee + 648 GST)
4.)	Time Limit	:	06 Months
5.)	Registration Class	:	"C" Class
6.)	Solvency Certificate	:	25 Lacs

Tender documents are available on <https://tender.nprocure.com>

1	Date & Time of Downloading of tender documents	From Dt. 24-08-2024 to Dt. 23-09-2024 up to 18.00 hrs.
2	Last Date & Time of online Submission of offer form / price bid	Dt. 23-09-2024 up to 18.00 hrs.
3	Physical submission of tender fee (Non refundable) EMD & Other required tender document etc. (In hard copy) by post only at V.N.South Gujarat University, Udhna - Magdalla Road, Surat-395007.	On or Before Dt. 01-10-2024 on working days.
4	Opening of offer form / price bid (on line)	Dt. 03-10-2024 up to 11.00 hrs. onwards if possible.

Note : Earnest Money Deposit & Tender Fee will be accepted in DD only. The Veer Narmad South Gujarat University reserves the right to reject any or all tenders or part of it which in the opinion of Veer Narmad South Gujarat University.

**REGISTRAR**  
**VEER NARMAD SOUTH GUJARAT UNIVERSITY**



## VEER NARMAD SOUTH GUJARAT UNIVERSITY

### TENDER DOCUMENT :

“ REPAIR, RENOVATION & UPGRADATION OF DINING HALL” of VEER NARMAD SOUTH GUJARAT UNIVERSITY, Udhna - Magdalla Road, Surat.

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Signature of the Applicant :

Registrar  
VEER NARMAD SOUTH GUJARAT UNIVERSITY



## 02. SCOPE OF TENDER :

**Salient features and details of the Work**, for which applications are invited, are as under :

<b>Sr. No.</b>	<b>Name of the Work</b>	<b>Total estimated cost including Steel &amp; Cement Rs.</b>	<b>Period of completion</b>
01.	<b>Repair, Renovation &amp; Upgradation of Dining Hall of Veer Narmad South Gujarat University, Udhna-Magdalla Road, Surat.</b>	<b>1,24,72,289=86</b>	<b>06 Months</b> (Excluding monsoon)

Work shall be executed according to General Conditions of Contract and detailed Technical Specification as per Technical Bid - Volume-I.

**Signature of the Applicant :**

**Registrar**  
**VEER NARMAD SOUTH GUJARAT UNIVERSITY.**



### 03. SET OF DOCUMENTS TO QUALIFY THE APPLICANT / CONTRACTOR :

#### 03. A. INSTRUCTIONS TO THE APPLICANT / CONTRACTOR :

A.	The qualification process shall lay high emphasis on the ability and competency of applicants / contractors to do high quality work within the given time schedule.
B.	The work certificate of sub-contract shall not be considered for evaluation.
C.	All the information shall have to be filled in the prescribed statement, wherever mentioned.
D.	All the details, required in the prescribed statement, shall have to be duly filled up. No information shall be left out. Relevant item without required information shall not be considered for evaluation.
E.	All the required attachments shall have to be invariably attached. Relevant item, without required attachment, shall not be considered for evaluation.
F.	<b>VEER NARMAD SOUTH GUJARAT UNIVERSITY</b> reserves the right to accept or reject any one or all of the offers / tenders without giving any reasons thereof.
G.	<b>VEER NARMAD SOUTH GUJARAT UNIVERSITY</b> reserves the right to restrict the list of qualified applicants to any number deemed suitable by it. Decision of the <b>VEER NARMAD SOUTH GUJARAT UNIVERSITY</b> for qualifying the applicants shall be final and binding to all.
H.	All information has to be typed in English language. All pages of the qualification documents have to be initialed by the applicant. All corrections, erasures or overwriting therein, have to be initialed by the applicant / contractor.

**Note :**

The tenderers are specifically informed that the “THIRD PARTY INSPECTION” & PMC shall be carried out by the agency appointed by the University. All the instructions given by the said agency shall have to be followed and carried out by the successful tenderer. During the execution at any time the University may carry out Quality check/s & Test/s as per applicable IS code & The payment shall be released only subject to satisfactory results of the check/s & Test/s. The opinion of the Consultant shall be considered for the results of Check/s & Test/s.

**Signature of the Applicant with full address**



**03. B. INFORMATION REGARDING THE APPLICANT / CONTRACTOR :**

- A. Name of the applicant / contractor :
- B. Address of the applicant / contractor :
- C. Phone nos. :  
Mobile no. :  
Fax no. :  
E-mail :
- D. Registration no., date & authority :
- E. Name & particulars of the authorized representative :  
for the details furnished hereunder
- F. Type of organization, including particulars of  
Proprietor / Partners / Directors : ( Sole Proprietorship,  
Partnership, Private Ltd., Co-Operative Body, etc. )  
  
(Attested copy of deeds of Memorandum of  
Association shall be enclosed.)  
  
01.  
  
02.  
  
03.
- G. P.F. Registration Certificates :
- H. I. T. PAN no. :
- I. GST Registration No. :





J. Name and address of the bankers :

1. Bank Facilities available

- Overdraft :

:

- Guarantees :

:

- Letters of Credit :

- Solvency Certificate

- Others :

:

**Signature of the Applicant with full address**



### 03. C. DECLARATION :

I / We, hereby, certify that I / we am / are not partner(s) in any firm(s) or am / are not connected with any firm (s), which has / have been blacklisted in any State, C.P.W.D., M.E.S., or Railways or VNSGU.

We, the partners of this firm, give an undertaking, hereby, that we are jointly and severally responsible to meet all the liabilities over and above the business of this firm and make good the above financial loss sustained by the **VEER NARMAD SOUTH GUJARAT UNIVERSITY** as a result of our abandoning the Work entrusted to us, i.e. this firm.

**Signature of the Applicant :**

**Registrar**  
**VEER NARMAD SOUTH GUJARAT UNIVERSITY**

Place :

Date :



### **03. D. STATEMENT-A :**

Statement showing Average Annual Financial Turnover during the last 05 years

Year	Turnover Amount Rs.

**Signature of the Applicant with full address**



**03. E. STATEMENT – B :**

**List of Main Technical Staff Employed by the firm on Date :**

Sr. No.	Name	Designation	Educational Qualification	Experience in the field	Duration of Service in the firm

**Signature of the Applicant with full address**



### 03. F. STATEMENT – B :

**Statement showing similar works completed in the last 03 years,**

Sr. No	Name of Department/ Client with Address	Name of the work	Estimated cost of the work put to tender Rs.	Tendered Amount Rs.	Date of award of the contract	Actual amount of the work completed Rs.
1	2	3	4	5	6	7

**Signature of the Applicant with full address**



**03. F. STATEMENT – C :**

**Statement showing details of Partners of the Firm :**

<b>Sr. No.</b>	<b>Name</b>	<b>Age</b>	<b>Qualification</b>	<b>Address</b>	<b>Telephone No.</b>

**Signature of the Applicant with full address**



### 03. G. STATEMENT – C :

#### Statement showing no. of works on Hand

Sr. No	Name of Department/ Client with Address	Name of the work	Estimated cost of the work put to tender Rs.	Tendered Amount Rs.	Date of award of the contract	Target date of completion of the work as per the contract	Actual amount of the work completed Rs.	Time limit in years and months	Remarks
1	2	3	4	5	6	7	8	9	10

**Signature of the Applicant with full address**



**03. G. STATEMENT – D :**

**LIST OF ARTICLES / MACHINERIES IN WORKING CONDITION, AVAILABLE WITH THE TENDERER :**

<b>Sr. No.</b>	<b>Name of Articles/ Machineries</b>	<b>No. available in working condition (with make)</b>	<b>Location</b>	<b>Value of Articles/ Machineries</b>

**Signature of the Applicant with full address**





### **03. H. UNDERTAKING :**

1. I / We agree, hereby, that the decision of the **VEER NARMAD SOUTH GUJARAT UNIVERSITY** in qualifying & / or selection of the applicant/s / contractor, phasing of the Work and in any other project related matter, shall be final and binding to me/ us.
2. All the information and data, furnished herewith, are correct to my/our best of knowledge.
3. I/We agree that I / we have no objection, if inquiries are made about my / our works, their related areas and any other inquiry regarding all the details, projects and works listed by me / us in the qualifying documents at any stage.

**Signature of the Applicant with seal of the firm**



### **03. I. FORM – V :**

#### **‘DECLARATION OF THE APPLICANT / CONTRACTOR’**

I / We, hereby, declare that I / we have made myself / ourselves thoroughly conversant with the local conditions regarding all Materials : and labour, on which I / we have based my / our rates for this tender. The specifications and leads on this work have been carefully studied and understood before submitting this tender. I / We undertake to use only the best Materials : approved by the Engineer-in-Charge or his duly authorized representative during execution of the work and to abide by his decision.

**Signature of the Applicant**



#### 04. MEMORANDUM :

- (1) General Description of the Work : **“Repair, Renovation & Up gradation of Dining Hall” of Veer Narmad South Gujarat University, Udhna-Magdalla Road, Surat.**
- (2) Estimated Cost : **Rs. 1,24,72,289=86**
- (3) Earnest Money Deposit : **Rs. 1,25,000=00**
- (4) Security Deposit**
- (i) Initial Security Deposit : **Rs. 5% of the Tender Value.**
- (ii) To be deducted from R. A. Bills : **Rs. 5% of each R. A. Bill amount.**
- (5) Time allowed for the completion of the Work from date fixed in Work Order Letter to commence : **06 months, Excluding monsoon.**
- (6) Compensation for delayed Work : **0.1% OF CONTRACT VALUE PER DAY AFTER MENTION TIME LIMIT. OR MAX. 10% OF ESTIMATED AMOUNT PUT TO TENDER. WHICHEVER IS HIGHER.**
- (7) Defect Liability Period : **10 Year**
- (8) **Water Charges deducted from the bill Amount** : **1% OF TOTAL BILL AMOUNT**
- (9) **Construction Cess will be deducted from the bill Amount** :- **1% Of TOTAL BILL AMOUNT**
- (10) **Testing of Material Charges** :- **It should be specifically noted that the material brought by the contractor at site of work and Cube Testing and other testing at the approved laboratory as per direction of the Engineer-in-charge. All the charges for the Trasport and Testing of Material and Sample shall have to be borne by the Contractor, The Frequency of the testing such material and sample shall be accordance to directed by Engineer-in-charrg.**

**Registrar**  
**VEER NARMAD SOUTH GUJARAT UNIVERSITY**



#### **04. A . MINIMUM ELIGIBILITY / TECHNICAL PROPOSAL**

Minimum Eligibility Criteria of **Repair, Ronvation & Up gradation of Dining Hall**

**The Supplier must submit the following documents in Scane in E Formate & Physical Copy for minimum eligibility criteria.**

1. Registratation Cerrtificate – " C " Class
2. Bank Solcency Certificate of Rs. 25 Lacs (Current Year)
3. PAN Number
4. GST Registration No.
5. Tender Fee – DD of Rs. 4,248=00 (Rs. 3600=00 Tender Fee + Rs. 648=00 GST 18%)
6. EMD – DD of Rs. 1,25,000=00
7. Eeperience Certificate.

Experience of having successfully completed Construction work during last 5 years either of following. (Estimated Cost of **Repair, Ronvation & Up gradation of Dining Hall : Rs. 1,24,72,289=86**)

- (a) Three Construction work completed, each costing not less than amount equal to 40% of the estimated cost. (Attached Form 3 (A) or Work Complition Certificate with Amount from the Competent Authority. in case of Private work sufficient authentic proof of work done along with evidence of financial transation shall have to be furnished.) **OR**
- (b) Two Construction work completed, each costing not less than amount equal to 50% of the estimated cost. (Attached Form 3 (A) or Work Complition Certificate with Amount from the Competent Authority. in case of Private work sufficient authentic proof of work done along with evidence of financial transation shall have to be furnished.) **OR**
- (c) One Construction work completed, each costing not less than amount equal to 80% of the estimated cost. (Attached Form 3 (A) or Work Complition Certificate with Amount from the Competent Authority. in case of Private work sufficient authentic proof of work done along with evidence of financial transation shall have to be furnished.)



8. Annual Turn Over :

1. Annual Turn Over of any one of the last five financial years. i.e. from 2018-19 to 2023-24 updated to current financial year shall be more than **50% of the Estimated Cost.** (Please submit CA Certificate)
2. For arriving at updated value, turnover of any financial year shall be multiplied by the enhancement factor corresponding to that year.

No.	Year	Financial Year	Multiplying Factor
1	Base (Year of inviting Tender)	2023-24	1.0
2	-1	2022-23	1.1
3	-2	2021-22	1.21
4	-3	2020-21	1.33
5	-4	2019-20	1.46
6	-5	2018-19	1.61

Date :

**Seal & Signature of the Contractor**



## 05. INSTRUCTIONS TO THE TENDERER :

### IT-01. GENERAL :

The Contract documents may be secured in accordance with the Notice to the Contractors, Inviting Tender for the Work. The Work shall include supply of Materials : necessary for the construction of the Work.

### IT-02. LANGUAGE OF THE TENDER :

Tender shall be submitted in English, and all information in the tender shall also be in English, Information in any other language shall be accompanied by its translation in English. Failure to comply with this may make the tender liable to be rejected.

### IT-03. EXAMINATION BY THE TENDERER :

- A. Prior to submitting his tender, each Tenderer at his own expenses, shall ( a ) examine the Contract Documents, ( b ) visit the site and determine local conditions, which may affect the Work, including the prevailing wages and other pertinent cost factors, ( c ) familiarise himself with all Central, State and local laws, ordinances, rules, regulations and codes, affecting the material supply, including the cost of permits and licenses required for the Work, and ( d ) co-relate his observations, investigations, and determinations with the requirements of the Tender Document.
- B. The tender quantity is approximate and may increase or decrease. Any increase or decrease in quantity shall not entitle the Tenderer to claim any extra over the quoted price.
- C. Tender Document shall be completed legible in ink, checked in a responsible manner, signed, stamped and returned together with the Earnest Money Deposit by the stipulated date, which shall from the Tender.

All the pages, in which entries are required to be made by the Tenderer, are contained in the Tender Document, and the Tenderer shall not take out or add to or amend the text of any of the documents, except in so far as may be necessary to comply with any addenda issued pursuant to Clause IT-17 hereof.

### IT-04. EARNEST MONEY DEPOSIT :

- A. The Tender shall be accompanied by Earnest Money Deposit of 1% of the Estimated Cost. The Earnest Money Deposit shall be deposited by Demand Draft, issued in favour of “ **The Registrar, Veer Narmad South Gujarat University** ”, **Surat**, through a Bank only. The Earnest Money Deposit in the form of FDR or cheque shall not be accepted.
- B. The Earnest Money Deposit shall be forfeited in the event the successful Tenderer fails to accept the Contract, and fails to submit the Security Deposit ( S. D. ) to the Owner as stipulated in this tender document within 10 days after receipt of notice of award of Contract. In such a case, the Owner may disqualify the Tenderer from tendering for further Works, under the jurisdictions of the VNSGU ( VNSGU ).
- C. The Earnest Money Deposit of the successful tender shall be consider as initial security deposit & remaining amount for security deposit is to be paid by the Contractor.
- D. No interest shall be paid by the Owner on any tender guarantee.

### IT-05. SECURITY DEPOSIT :

5.00% of the Tender Amount by Demend Draft of any Bank only or as per Govt. Rules

in favour of “ **The Registrar, Veer Narmad South Gujarat University, Surat** ” by a Bank only. 5.00 % of Retention Money Deposit, deducted from the Running Bills, shall be refunded. **It is important to note that the payment pf final bill and the initial Security Deposit of 5.00% will only be refunded after the expiration of the “Defect Liability Period”, (which is 10 years). The refund process will be as follows : After a period of 5 years of defect liability, 50% of the Security Deposit will be released, and the remaining 50% will be divided into 5 parts of 10% for the next 5 years and after rectifying the defects found, if any, within the Defect Liability Period, as intimated by VNSGU**

If the Security Deposit paid within 10 days from the date of “Work Order”,



#### **IT-06. SUBMISSION OF TENDER DOCUMENT :**

Tenderer is requested to submit the tender as per the following :

- A. The Tenderer shall submit the Tender Document along with demand draft of E.M.D. to **“The Registrar, Veer Narmad South Gujarat University, Surat”**, Veer Narmad South Gujarat University, U-M Road, Surat.
- B. The full name & address of the Tenderer, and the name of the authorized agent delivering the tender, shall be written at the bottom left hand corner of the said sealed envelope. The name of the Work shall be clearly mentioned on the sealed envelope.
- C. Tenders shall be opened by the **Competent Authority, Veer Narmad South Gujarat University, Surat** on the due day & time in the presence of representative of Tenderers, who choose to be present.
- D. Telegraphic tenders shall not be entertained.

#### **IT-07. TENDER VALIDITY PERIOD :**

The validity period of the tender submitted for this Work shall be of one hundred & eighty ( 180 ) calendar days from the date of opening of the “Price Tender”. The Tenderer shall not be allowed to withdraw or modify the tender offer on his own during the validity period. The Tenderer shall not be allowed to withdraw the tender, or make any modifications or additions in the terms and conditions of his own in his tender. If this is done, the Owner shall, without prejudice to any right or remedy, be at liberty to reject the tender and forfeit the Earnest Money Deposit in full.

#### **IT-08. SIGNING OF TENDER DOCUMENT :**

If the Tender is submitted by an individual, it shall be signed with his full name above his current address.

If the tender is submitted by a Proprietary Firm, it shall be signed by the Proprietor above his name and the name of his firm with his current address.

#### **IT-09. WITHDRAWAL OF TENDERS :**

If, during the “Tender Validity Period”, the Tenderer withdraws his Tender, the Earnest Money Deposit shall be forfeited and the Tenderer may be disqualified from tendering for further Work under the jurisdictions of VNSGU

#### **IT-10. INTERPRETATIONS OF THE TENDER DOCUMENT :**

Tenderer shall carefully examine the “Tender Document”, and fully familiarize himself with all the conditions and matters, which may, in any way, affect the Work, or the cost thereof. Should a Tenderer find discrepancies or commission from the Specifications or other documents, or should be in doubt as to their meaning, he shall at once address query to **The Registrar** as the “concerned authority” as referred to in the Tender Document in Clause GC-01 ( Definitions and Interpretations ) of the General Conditions of Contract. Any resultant interpretation of the Tender Document shall be issued to all the Tenderers as an addenda corrigendum. Verbal clarification and / or information given by the Consulting Architect & / or Engineer shall not be binding on the VNSGU.

#### **IT-11. ERRORS AND DISCREPANCIES IN THE TENDER :**

In case of any conflict between the figure and words in the amount, the amount expressed in words shall prevail and apply in such cases.

#### **IT-12. TAXES AND DUTIES :**

**The Tenderer must understand clearly the Rate / Price quoted with considering all Taxes. The charges, on account of Octroi, Terminal Tax or Sales Tax at Pravailling Rate etc., and any other Taxes / duties obtained for the Work from any source, shall be borne by the Contractor. No 'D' or 'C' Form shall be supplied by the VNSGU Moreover, the Contractor shall have to bear any revision of all**



applicable taxes and / or duties implemented by the Authority from time to time, and no extra payment shall be made for the revision of taxes and / or duties on Materials : / work. No extra payment given by the University for any type of Taxes

**IT-13. EVALUATION OF THE TENDERS :**

In comparing the tenders, the VNSGU shall consider such factors as the time of completion, efficiency and reliability of construction method proposed, compliance with the Specifications, relative quality, the operation, maintenance and replacement cost of structure and plant.

**IT-14. PRICES AND PAYMENTS :**

The Tenderer must understand clearly that the price quoted are for the total Work or the part of the total Work quoted for, as the case may be, and include all costs due to all taxes, Materials :, labour, equipment, supervision, other services, royalties and octroi, if any, etc. and to include all extras to cover the cost. No claim for additional payment, beyond the prices quoted shall be entertained and the Tenderer shall not be entitled subsequently to make any claim on any ground, except for the condition laid down in Price Adjustment.

**IT-15. SIGNING OF THE CONTRACT :**

The successful Tenderer shall be required to execute the Contract within ten days of receipt of notice of award of the Contract & / or to execute the Contract, failing which the Veer Narmad South Gujarat University shall be entitled to annul the award and forfeit the Earnest Money Deposit. The person to sign the Contract Document shall be the person as detailed in Article IT-12.

**IT-16. NON-TRANSFERABLE :**

Tender Document are not transferable.

**IT-17. NEW EQUIPMENT AND MATERIAL ;**

All Materials :, equipment and spare parts thereof shall be new, unused and originally coming from manufacturer's plant to the VNSGU. The rebuilt or overhauled equipment / Materials : shall not be allowed to be used on Work.

**IT-18. RIGHTS RESERVED :**

The VNSGU reserves the right to reject any or all tenders, to waive any informality or irregularity in any tender, without assigning any reasons. The VNSGU further reserves the right to withhold issuance of the notice to proceed, after execution of the Contract Agreement, for the period of time stated in the Invitation to the Tender and no additional payment shall be made to the successful Tenderer on account of such withholding. The VNSGU is not obliged to give reasons for any such action.

**IT-19.** The Registrar reserves right to reduce the scope of Work and split the tender in to two or more parts without assigning any reason even after the Award of Contract.

**IT-20. MOBILIZATION ADVANCE :**

No mobilisation advance or advance on machinery shall be given

**IT-21. CONDITIONAL TENDER :**

The scope of Work is clearly mentioned in the Tender Document. The Contractor shall have to carry out the Work in accordance with the detailed Specifications.No conditions shall be accepted. The conditional tender shall be liable to be rejected.

**IT-22. WORK IN ACCRODANCE WITH SPECIFICATIONS GIVEN IN STATE P. W. D. HANDBOOKS ( LATEST EDITION ) :**





The Work shall be carried out strictly according to the Specifications given in state Public Works Department Hand Book ( The latest edition ) whenever applicable as directed by Engineer-in-Charge.

**IT-23. THE WORK TO START AT MULTIPLE PLACES :**

The Work shall have to be started by the Contractor at as many places as ordered by the Engineer-in-Charge.

**IT-24. THE TENDERER LIABLE TO BEAR THE COST OF ANY DAMAGES TO ANY UTILITIES :**

If during excavation or carrying out of any item of the Work, any electric pole, electric cable, telephone cables, telegraph cable, gas line, drain connection pipeline, water service pipeline, sewer main, water mains, etc. is / are damaged by the Contractor, he shall be liable to pay the full expenditure required to repair the same or charges for the same as decided by the concerned utility company namely The Electric Company, The Gas Company, Government Authority or the Veer Narmad South Gujarat University, as the case may be.

**IT-25. WORKMANSHIP :**

The Work shall be carried out in workmanlike manner, and only the best skilled workers shall be employed. If any defect in the Work is found out, the Contractor shall have to rectify within the time fixed by Engineer-in-Charge. If he fails to rectify the defect Engineer-in-Charge, after giving due notice, shall rectify the defect at the risk and cost of the Contractor.

**IT-26. THE WORK IN ACCORDNACE TO THE INSTRUCTIONS OF ENGINEER-IN-CHARGE :**

All the Work shall be done strictly according to the instructions of Engineer-in-Charge.

**IT-27. NO COMPENSATION FOR STOPPAGES DUE TO DEFECTIVE WORK :**

No compensation shall be paid, if the Work is stopped due to either defective work, or as per the instructions from Engineer-in-Charge due to any reasons.

**IT-28. THE RATES IN THE PRICE TENDERTO HOLD GOOD WITHOUT REFERENCE TO QUANTITY & / OR LOCATION :**

The rates given in the Schedule shall hold good for all the Work done under this Contract without reference to quantities or location of the Work.

**IT-29. THE DATE OF COMMENCEMENT OF THE WORK :**

The date of commencement of the Work is considered to be the date Specified in the “Final Work Order”.

**IT-30. NO ARBITRATION :**

If any clause of Arbitration is there in the tender document, it is deleted here with.

**IT-31. EXECUTION UNDER STRICT SUPERVISION OF THE CONSULTANT :**

**The project under this tender shall be executed under strict supervision and instructions of the Consultant deployed by VNSGU The Contractor shall carry out the instructions of the Consultant.**

**IT-32. DISPUTES :**

- A. In case of any dispute, Vice Chancellor of the Veer Narmad South Gujarat University shall be the competent authority and his decision shall be final and binding upon all concerned.
- B. For dispute issues arising from tender, the jurisdiction will be Surat only.
- C. The dispute settlement mechanism to be applied shall be follows.



1. In case of Dispute or difference arising between the Purchaser and a supplier relating to any matter arising out of or connected with this agreement, such disputes or difference shall be settled in accordance with the Arbitration and Conciliation act, 1996 by a Sole Arbitrator. The Sole Arbitrator should be appointed by agreement between the parties; failing such agreement, by the appointing authority namely the Indian Council of Arbitration / President of the Institution of Engineers (India)/The International Center for Alternative Dispute Resolution (India). A certified copy of the appointment Order Shall be supplied to each of the parties.
  2. Arbitration proceedings shall be held to be Surat. Gujarat India, and the language of the arbitration proceedings and that of all documents and communications between the parties shall be English.
  3. The decision of the Arbitrator shall be final and binding upon both parties. The cost and expenses of Arbitration proceedings will be paid as determined by the Arbitrator. However, the expenses incurred by each party in connection with the preparation, presentation etc. of its proceedings shall be borne by each party itself.
- D. The Purchaser (VNSGU) and the supplier shall make every effort to resolve amicably by direct informal negotiation any dispute arising between them under or in connection with the contract.
- E. If, after Sixty (60) days, the parties have failed to resolve their dispute or difference by such mutual consultation, then either the purchaser or the Supplier may give notice to the other party of its intention to commence arbitration, as hereinafter provided, as to the matter in dispute, and no arbitration in respect of this matter may be commenced unless such notice is given.
- F. Any dispute or difference in respect of which a notice of intention to commence arbitration has been given in accordance with this clause shall be finally settled by arbitration. Arbitration may be commenced prior to or after delivery of the Services/Software/Goods under the Contract.
- G. Arbitration Proceedings shall be conducted in accordance with the rules of procedure specified in the SCC.
- H. Notwithstanding any reference to arbitration herein,  
a. The parties shall continue to perform their respective obligations under the Contract unless they otherwise agree.

Any dispute arising out of this Contract shall be subject to SURAT JURISDICTION only.

**Signature of the Applicant :**

**Registrar**  
**VEER NARMAD SOUTH GUJARAT UNIVERSITY.**

Address :



## 06. GENERAL CONDITIONS OF CONTRACT :

### SECTION-I

#### GC-01 DEFINITIONS AND INTERPRETATIONS :

- 01.1 The "Owner / Veer Narmad South Gujarat University, Surat, shall be represented by The Registrar / University Engineer or any officer authorized by the Veer Narmad South Gujarat University.
- 01.2 The "Contractor" shall mean the person or the persons, firm of company, whose tender has been accepted by the Owner and includes his legal representative successors and permitted assignees.
- 01.3 The "Engineer-in-Charge" shall mean the person designated as such by the Owner from time to time, and shall include those, who are expressly authorized by the Veer Narmad South Gujarat University to act for and on its behalf for the operation of this Contract.
- 01.4 "Engineer-in-Charge's Representative" shall mean any Engineer or assistant to the Engineer-in-Charge designated from time to time by the Engineer-in-Charge to perform duties set forth in the Tender Document whose authority shall be notified in writing to the Contractor by the Engineer-in-Charge.
- 01.5 "Tender" shall mean the offer or proposal of the Tenderer, submitted in the prescribed form, setting forth the prices for the Work to be performed, and the details thereof.
- 01.6 "Contract Price shall mean total money payable to the Contractor under the Contract Documents.
- 01.7 "Addenda" shall mean the written or graphic notices prior to submission of the tender, which modify or interpret the Contract documents.
- 01.8 "Contract Time" shall mean the number of consecutive calendar months for the completion of the Work, as stated in the executed Contract Agreement.
- 01.9 "Contract" shall mean Agreement between the parties for the execution of the Work, including all Contract Documents therein.
- 01.10 "Tender Document" shall mean drawings, Specifications, agreed variations, if any, and such other documents constituting the tender, and acceptance thereof.
- 01.11 "The Sub-Contractor" shall mean any person, firm or company other than the Contractor, to whom any part of the Work has been entrusted by the Contractor with the written consent of the Engineer-in-Charge, and the legal personnel, representative, successors and permitted assigness of such person, firm or company.
- 01.12 "The Specifications" shall mean all directions, the various technical Specifications, provisions and requirements attached to the Contract, which pertain to the method and manner of performing the Work to the quality of the Work and the Materials : to be furnished under the Contract for the Work and any order/s or instruction/s thereunder. It shall also mean the latest Indian Standards Institution Specifications for or relative to the particular Work or part thereof, so far as they are not contrary to the Tender Specifications or I.S.I. Specifications, and in absence of any tender Specifications, the Specifications of any other country applied in India as a matter of Standard Engineering practice and approved in writing by the Engineer-in-Charge with or without modifications.
- 01.13 The "Drawings" shall include maps, plans, tracings or prints thereof with any modifications approved in writing by the Engineer-in-Charge and such other drawings, as may, from time to time, be furnished or approved in writing by the Engineer-in-Charge in connection with the Work.
- 01.14 The "Work" shall mean the Work to be executed in accordance with the Contract or the part thereof as the case may be, and shall include extra, additional, altered or substituted Work as required for the purpose of the Contract. It shall mean the totality of the Work by expression or implication envisaged in the



Contract, and shall include all material, equipment and labour required for or relative or incidental to or in connection with the commencement, performance and completion of any Work and/or for inVNSGU in the Work.

- 01.15 The "Permanent Work" shall mean Works, which shall be incorporated in, and form part of the Work to be handed over to the Owner by the Contractor on completion of the Contract.
- 01.16 The "Temporary Work" shall mean all temporary Work of every kind required in or about the execution, completion and maintenance of the Work.
- 01.17 "Site" shall mean the land and other place on, under, on or through which the Work is to be carried out and any other lands or places provided by the Veer Narmad South Gujarat University for the purpose of the Contract, together with any other places designated in the Contract as forming part of the site.
- 01.18 "The Construction Equipment" shall mean all appliance / equipment of whatever nature required in or for execution, completion or maintenance of the Work or temporary Work as hereunder defined, but does not include Materials : or other things intended to form or forming part of the permanent Work.
- 01.19 "Notice in Writing or Written Notice" shall mean a notice in written, typed or printed form, delivered personally or sent by Registered Post to the latest known private or business address of the Registered office of the Contractor.
- 01.20 The "Alteration / Variation Order" shall mean an orders given in writing by the Engineer-in-Charge to effect additions to or deletion from / or and alterations in the Work.
- 01.21 "Final Test Certificate" shall mean the Final Test Certificate, issued by the Owner within the provisions of the Contract.
- 01.22 The "Completion Certificate" shall mean a certificate to be issued by the Engineer-in-Charge when the Work has been completed to his satisfaction.
- 01.23 The "Final Certificate" shall mean the final certificate issued by the Engineer-in-Charge after the Work is finally accepted by the Owner.
- 01.24 "Defect Liability Period" shall mean the specified period between the issue of "Completion Certificate" and the "Final Certificate" as specified in the tender.
- 01.25 "Approved" & "Approval" shall mean approved in writing, including subsequent modification/s in writing of previous verbal approval and "Approval" shall mean approved in writing, including as aforesaid.
- 01.26 "Letter of Acceptance" shall mean an intimation by a letter to the Tenderer that the Tender has been accepted in accordance with provisions contained therein.
- 01.27 "Order" and "Instruction" shall respectively mean any written order or instruction given by the Engineer-in-Charge, within the scope of his powers in terms of the Contract.
- 01.28 "Running Account Bill" shall mean a Bill for the payment of "On Account" money to the Contractor during the progress of Work on the basis of Work done and the non-perishable Materials : to be incorporated in the Work supplied by the Contractor.
- 01.29 "Security Deposit" shall mean the deposit to be held by the Owner as security for the due performance of Contractual obligations.
- 01.30 Retention Money shall mean the money retained from R. A. Bill for due completion of "Net Work".
- 01.31 Unless otherwise Specifically stated, the masculine gender shall include the feminine and natural genders and vice versa and the singular shall include the plural and vice-versa.

**GC-02 LOCATION OF SITE AND ACCESSIBILITY :**



The site of the Work is within the limits of Veer Narmad South Gujarat University. It is served by all weather roads and Western Railway Broad Gauge line. The intending Tenderer shall inspect the site and make himself familiar with site conditions and available communication facilities.

Non availability of access / roads shall in no case be the cause to condon any delay in the execution of the Work or be the cause for any claims or extra compensation.

### **GC-03 SCOPE OF WORK :**

The scope of Work is defined broadly in the Special Conditions of Contract and Specifications. The Contractor shall provide all necessary Materials : equipment and labour etc. for the execution and of the Work till completion. All Materials : required for the Work shall be approved by the Engineer-in-Charge prior to procurement and use.

### **POWER SUPPLY :**

The Contractor shall have to make his own arrangement for power supply.

### **LAND FOR CONTRACTOR'S FIELD OFFICE, GODOWN & WORKSHOP:**

The Owner shall not be in a position to provide land required for the field office, godown, Workshop, etc. of the Contractor. The Contractor shall have to make his own arrangement for the same. No land shall be provided by the Owner to the Contractor for constructing his labour and supervisory camp and other service facilities.

### **GC-04 RULING LANGUAGE :**

The language according to which the Contractor shall be instructed and interpreted shall be English. All entries in the Contract Document and all correspondence between the Contractor and the Veer Narmad South Gujarat University or the Engineer-in-Charge shall be in English. All dimensions for the Materials : shall be given in metric units only.

### **GC-05 INTERPRETATION OF CONTRACT DOCUMENT :**

- 05.01. The provisions of the General Conditions of Contract and Special Conditions of Contract shall prevail over those of any other documents of the Contract, unless Specifically provided otherwise. Shall there be any discrepancy, inconsistency error or omission in the several documents forming the Contract, the matter may be referred to the Engineer-in-Charge for his instructions and decision. The Engineer-in-Charge's decision in such case shall be the final and binding to the Contractor.
- 05.02. Works, shown upon the drawings but not described in the Specifications, or described in the Specific Specifications, without showing the same on the drawings, shall be taken as described in the Specifications and shown on the drawings.
- 05.03. The heading and the marginal notes to the clauses of those General Conditions of Contract or to the Specifications or to any other part of Tender Document are solely for the purpose of giving a concise indication and not a summary of contents thereof or be used in the interpretation or construction thereof of the Contract.
- 05.04. Unless otherwise stated Specifically, in this Contract Document, the singular shall include the plural and vice versa, wherever the context so requires. Work implementing persons shall include relevant corporate companies / registered associations / body of individual / firm of partnership.
- 05.05. Notwithstanding the sub-divisions of the documents into separate sections and volumes, every part of each section shall be supplementary to and complementary of every other part, and shall be read with and into the context so far as it may be practicable to do so.
- 05.06. Where any portion of the General Conditions of Contract is repugnant to or at variance with any provisions of the Special Conditions of Contract, then, unless a different intension appears, the



provisions of the Special Conditions of Contract shall be deemed to override the provisions of General conditions of Contract, and shall to the extent of such repugnancy or variance prevail.

- 05.07. The Materials :, design and Workmanship : shall satisfy the relevant I. S. S. and Codes referred to. If Additional requirements are shown in the Specifications, the same shall be satisfied over and above I.S.S. and Codes.
- 05.08. If the Specifications mention that the Contract shall perform certain Work or provide certain facilities, it shall mean that the Contractor shall do so at his own cost.
- 05.09. The correctness of the details given in the Tender Document is not guaranteed. The Contractor shall independently obtain all necessary information while preparing and submitting the tender. The Contractor shall be deemed to have examined the Contract Documents, to have generally obtained his own information in all matters which may affect the carrying out of the Work or the tendered rates. Any error in description of quantity or commission therefrom shall not vitiate the Contract or release the Contractor from executing the Work comprised in the Contract according to the Drawings and Specifications at the tendered rates. He is deemed to have known the scope, nature and magnitude of the Work, and the requirements of Materials : and labour involved and as to the total Work he has to complete in accordance with the Contract, what so ever be the defects, omissions, or errors that may be found in the Contract documents. The Contractor shall be deemed to have visited the site and the surroundings, to have satisfied himself to the nature of all existing structures, if any, and also as to the nature and the conditions of railways, roads, bridges and culverts, means of transport and communications, whether by land, air or water and as to possible interceptions thereto and the access and egress from the site, to have made inquiries, examined and satisfied himself as to the locations of sources for obtaining sand, stones, bricks and other required Materials :, the sites for disposal of surplus Materials :, the available accommodation as to whatever required, the depicts and such other buildings as may be necessary for executing and completing the Work, to have local independent inquiry as to the subsoil, subsoil water and variation thereof, storms, prevailing winds, climatic conditions and all other similar matters affecting the Work. He is deemed to have acquainted himself as to his liability for payment of government taxes, customs duty and other charges.

Any neglect or failure on the part of the Contractor in obtaining necessary and reliable information about the forgoing or any other matter affecting the Contract shall not relieve him from any risks or liabilities or the entire responsibility from completion of the Work at the tendered rates and time in strict accordance with the Contract Document.

No verbal Agreement or inference from conversation with any officer or employee of the Owner, either before or after the execution of the Contract Agreement shall, in any way effect or modify any of the terms of obligations herein contained.

#### **GC-06 CONTRACTOR TO UNDERSTAND HIMSELF FULLY ;**

The Contractor by tendering shall be deemed to have satisfied himself, as to consideration and circumstances affecting the tender price, as to the possibility of executing the Work as shown and described in the Contract and to have fixed his prices according to his own view on these matters and to have understand that no additional allowances except as otherwise expressly provided, shall be made beyond the Contract Price. The Contractor shall be responsible for any misunderstanding or incorrect information given in writing by the Engineer-in-Charge.

#### **GC-07 ERROR IN SUBMISSION :**

The Contractor shall be responsible for any errors or omissions in the particulars supplied by him. Whether such particulars have been approved by the Engineer or not, provided that such discrepancies, errors or omissions be not due to inaccurate information or particulars furnished in writing to the Contractor by the Owner or the Engineer-in-Charge.

#### **GC-08 SUFFICIENCY OF TENDER :**

The Contractor shall be deemed to have satisfied himself before tendering as to the correctness of the tender rates, which rates shall, except as or other wise provided for, cover all the Contractor's act



liabilities and obligations set forth or implied in the Contract for the proper execution of the Work for compliance with requirements of Article GC-19 thereof.

#### **GC-09 INSPECTION OF THE WORK :**

- 09.01. The Engineer-in-Charge shall have full power and authority to inspect the Work at any time, wherever in progress, either on the site or at the Contractor's any other manufacturers Workshop/s or factories wherever situated, and the Contractor shall afford for Engineer-in-Charge every facility and assistance to carry out such inspection. Contractor or his authorized representative shall, at all time during the usual Working hours and all other times when so notified, remain present to receive orders and instructions, orders given to the Contractor's representative shall be considered to have the same force as if they had been given to the Contractor himself. Contractor shall give not less than seven ( 7 ) days' notice in writing to the Engineer-in-Charge before covering up or otherwise placing beyond reach of inspection and measuring any Work in order that the same may be inspected and measured. In the event of breach of the above, the same shall be reopended & its cost shall be recovered at the Contractor's expense for carrying out such inspection or measurement.
- 09.02. No material shall be dispatched from Contract Store on site of the Work before obtaining approval in writing of the Engineer-in-Charge, Contractor shall provide at all time, during the progress of Work and maintenance period proper means of access with ladders, gangways, etc. and the necessary attendance to move and adopt as directed for inspection or measurement of the Work by Engineer-in-Charge.

#### **GC-10 DEFECT LIABILITY :**

- 10.01 Contractor shall guarantee the Work for a period of 10 years after Completion of Work. Any damage or defect that may arise or that may remain undiscovered at the time of issue of completion certificate connected in any way with the equipment or Materials : supplied by him or in the Workmanship : be rectified or replaced by the Contractor at his own expense as desired by Engineer-in-Charge or in default may cause the same to be made good by other agency and deduct expenses, of which the certificate of Engineer-in-Charge shall be final from any sums that may then or any time thereafter become due to Contractor of sale thereof or of a sufficient portion thereof.
- 10.02. From the commencement to completion of Work Contractor shall take full responsibility for the case of the Work including all temporary Work and in case any damage, loss or injury shall happen to Work or any part thereof or to any temporary Work from any cause whatsoever and shall at his own cost repair and make good the same so that at completion Work shall be in good order and in conformity in every respect with the requirements of Contract and as per the instructions of the Engineer-in-Charge.
- 10.03. If at any time before the Work is taken over, the Engineer-in-Charge shall -
- 10.03.a. Decide that any Work done or Materials : used by the Contractor are defective or not in accordance with Contract or that Work of any portion thereof is defective or do not fulfill the requirements of Contract (all such Materials : being hereinafter called defects in this clause and (b) as soon as reasonably practicable given to Contractor notice in writing of the said defect specifying particulars of the defects alleged to exist or to have occurred, then Contractor shall at his own expenses and with all speed make good the defects so specified.
- 10.03.b. In case, the Contractor fails to do so, the Owner may take, at the cost of the Contractor, such steps as may in all circumstances, be reasonable to make good such defects. The expenditure so incurred by the Owner, shall be recovered from the amount due to the Contractor. The decision of Engineer-in-Charge with regard to the amount to be recovered from the Contractor shall be final and binding on the Contractor.



#### **GC-11 POWER OF ENGINEER TO GIVE FURTHER INSTRUCTIONS :**

The Engineer-in-Charge shall have the power and authority, from time to time and at all times, to give further instructions and directions as may appear to him necessary or proper for the guidance of the Contractor and the Work and efficient execution of the Work according to the terms of the Specifications, and the Contractor shall receive, execute, obey and be bound by the same, according to the true intent and meaning thereof, as fully and effectually, as though the same had accompanied or had been mentioned or referred to in the Specifications. No Work which radically changes the original nature of the Contract, shall be ordered by the Engineer-in-Charge and in the event of any deviation being ordered, which in the opinion of the Contractor changes the original nature of the Contract, shall, nevertheless, carry it out and any disagreement as to the nature of the Work & the rate to be paid thereof shall be resolved. The time of completion of the Work, in the event of any deviations, resulting in additional cost over the Contract sum being ordered, then be extended or reduced reasonably by the Engineer-in-Charge. The Engineer-in-Charge's decision in the cases shall be final and binding to the Contractor.

#### **GC-12 CONTRACT AGREEMENT :**

The successful Tenderer shall when called upon to do so, enter into and execute the Contract Agreement within fifteen (15) days of the Notice of Award, in the form shown in Tender Document with such modifications as may be necessary in the opinion of the The Registrar. It shall be incumbent on the Contractor, to pay the stamp duty and the legal charges for the completion of the Contract Agreement.

#### **BAR CHART :**

The successful Tenderer shall have to submit the Progress Bar-Chart within fifteen ( 15 ) days after the Contract, and the Contractor shall Work as per the approved bar-chart,

#### **GC-13 FORFEITURE OF SECURITY DEPOSIT :**

Whenever any claim arises against the Contractor for the payment of a sum of money out of or under the Contract, the Owner shall be entitled to recover such sum by appropriating in part of whole, the Security Deposit of the Contractor. In case the Security Deposit is insufficient, the balance recoverable shall be deducted from any sum then due or which at any time thereafter, may become due to the Contractor, the Contractor shall pay to the Owner on demand any remaining may balance due.

#### **GC-14 CONTRACTOR'S OFFICE AT SITE :**

The Contractor shall provide and maintain an office at the site for the accommodation of his agent and staff and such office shall be opened at all reasonable hours to receive instructions, notice or other communications.

#### **GC-15 NOTICES :**

Any notice under this Contract may be served on the Contractor or his duly authorised representative at the job site or may be served by registered post direct to the official address of the Contractor proof of issue of any such notice could be conclusive of the Contractor having been duly informed of all contents therein.

#### **GC-16 RIGHT OF VARIOUS INTERESTS :**

The Owner reserves the right to distribute the Work between more than one Contractor. Contractor shall co-operate and afford reasonable opportunity to other Contractors for access to the Work for the carriage and storage of Materials : and execution of their Works.

Wherever the Work being done by any department of the Owner or by other Contractor employed by the Owner is contingent upon Work covered by this Contract, the respective rights of the various





interests shall be determined by Engineer-in-Charge to secure the completion of various portions of the Work in general harmony.

**GC-17 PRICE ADJUSTMENT DUE TO VARIATION :**

Not applicable. **No Price Escalation shall be paid.**

**GC-18 DEFAULT OF CONTRACTOR :**

- 18.01. The Veer Narmad South Gujarat University may upon written notice of default to the Contractor terminate the Contract in circumstance detailed hereunder :
- 18.02. If in the judgement of the Veer Narmad South Gujarat University the Contractor fails to make completion of Work within the time specified in the completion schedule or within the period for which extension has been granted by the Veer Narmad South Gujarat University /Engineer to the Contractor.
- 18.03. If in the judgement of the Veer Narmad South Gujarat University the Contractor fails to comply with any of the provisions of this Contract.
- 18.04. In the event the The Registrar terminates the Contract inwhole or in part as provided in Article GC-48 (Termination of Contract), the Veer Narmad South Gujarat University reserves the right to purchase upon such terms and in such manner as it may deem appropriate, plant similar to that terminated and the Contractor shall be liable to the Veer Narmad South Gujarat University for any additional costs for such similar and / or for liquidated damaged for delay until such resonable time as may be required for the final completion of Works.
- 18.05. If this Contract is terminated as provided in this paragraph GC - 30 Power of entry) (1) the Veer Narmad South Gujarat University in addition to any other rights provided in this clause, may require the Contractor to transfer title and deliver to the Veer Narmad South Gujarat University under any of the following cases in the manual and as directed by the Veer Narmad South Gujarat University.
- 18.06. Any partially completed information and Contract rights as the Contractor has Specifically produced or acquired for the performance of the Contract so termi-nated.
- 18.07. In the event the Veer Narmad South Gujarat University does not terminate the Contract as provided in the paragraph GC-48 (Termination of Contract) the Contractor shall continue performance of the Contract, in which case the shall be liable to the Veer Narmad South Gujarat University for liquidated damages for delay until the Workare accepted.

**GC-19 LAWS GOVERNING THE CONTRACT :**

The Contract shall be co nstitued according to and Subject to the laws of India and the State of Gujarat and under the jurisdiction of the courts of Gujarat at Surat.

**GC-20 EXECUTION OF WORK :**

The whole Work shall be carried out in strict conformity with the provisions of the Contract Documents, detailed drawings, Specifications and the instructions of the Engineer-in-Charge from time to time. The Contractor shall ensure that the whole Work is executed in the most substantial, proper and best Workmanship : using Materials : of best quality in strict accordance with the Specifications to the entire satisfaction of the Engineer-in- charge.

**GC-21 WORK IN MONSOON :**



When the Work continues in monsoon, the Contractor shall maintain minimum labour force required, for the Work and plan and execute the construction and erection Work according to the prescribed schedule. No extra rate shall be considered for such Work in monsoon. During monsoon and entire constructing period the Contractor shall keep the site free from water at his own cost.

**GC-22 RESPONSIBILITIES OF CONTRACTOR FOR CORRECTNESS OF WORK :**

The Contractor shall be entirely and exclusively responsible for the correctness of every part of the Work and shall rectify completely and errors thereon at his own cost when so instructed by Engineer-in-Charge.

**GC-23 POSSESSION PRIOR TO COMPLETION :**

The Engineer-in-Charge shall have the right to take possession of or to use any completed or partly completed Work or part of Work, such possession or use shall not be deemed to be an acceptance of any Work completed in accordance with the Contractor. If such prior possession or use by Engineer-in-Charge delays the progress of Work, equitable adjustment in the time of completion shall be made and the Contract shall be deemed to be modified accordingly.

**GC-24 PROCEDURE FOR MEASUREMENT OF WORK IN PROGRESS :**

1. All measurements shall be in metric system. All the Work in progress shall be jointly measured by the representative of Engineer-in-Charge and Contractor's authorised agent. Such measurements shall be got recorded in the measurement book by the Engineer or his authorised representative and signed by Contractor or his authorised agent in token of acceptance. If the Contractor or his authorised agent fails to be present when even required by the Engineer-in-Charge for taking measurements for any reasons whatsoever, the measurement shall be taken by the Engineer-in-Charge or his authorised representative notwithstanding the absence of Contractor and these measurement shall be deemed to be correct and binding on Contractor.
2. Contractor shall submit a bill in approved proforma in duplicate to the Engineer-in-Charge of the Work giving abstract and detailed measurements of various items executed during a month as mutually agreed. The Engineer-in-Charge shall verify the bill and the claim, far as admissible, adjusted if possible, within 10 days of presentation of the bills.

**GC-25 FINAL BILL :**

The final bill shall be submitted by the Contractor within two ( 02 ) months of the date of physical completion of Work, otherwise the Engineer-in-Charge certificate of the measurement and of total amount payable for the Work shall be finalised binding on all parties.

**GC-26 TAXES, DUTIES, OCTROI, ETC. :**

The Contractor shall be liable to the payment of all the Central/ State/Local Bodie's Levies, taxes or duties etc. The VNSGU shall neither bear it nor reimburse at any time but shall ensure deduction of Central/State/Local levies and taxes at Source at the rate provided under the relevant statutes from time to time in force. Further the Work Contract tax or sale tax, If applicable Service Tax & all applicable Taxes shall be borne by the Contractor as per Rules and Regulations of Government.

**GC-27 INSURANCE :**

Contractor shall at his own expenses carry and maintain with reputable Insurance Companies to the satisfaction of Owner :

**GC-28 LABOUR LAWS AND REGULATIONS :**



1. The Contractor shall be responsible for the strict compliance of and shall ensure strict compliance by his sub Contractor employees and agents of all labours and others laws, rules or regulations having the force of law affecting the relationship of employer and employee between the Contractor/sub-Contractor and their respective employees.
2. No labour below the age of Fourteen (14) year be employed on Work.
3. Contractor shall pay to the labours engaged on Work according the law.
4. The Contractor and sub-Contractors of the Contractor shall obtain proper authority designated in this behalf under any application law, rules or regulations (including but not restricted to the factories Act and Contract Labour Abolition and Regulation Act 1970, ) in so far as applicable) any and all such licences, consents, Registration and /or other authorisation as shall from time to time be or become necessary for relatint to the execution of Work or any part of portion thereof or the storage or supply of any Materials : or otherwise in connection with the performance of the Contract and shall at all times observance by the sub-Contractors, employees and agents of all terms and conditions of the said licences, consents, regulation and other authorisation and laws, rules and regulations applicable thereto.

#### **GC-29 HEALTH AND SANITARY ARRANGEMENTS FOR WORKERS :**

The Contractor shall comply with all the rules and regulations of the local sanitary authorities or as framed by Owner from time to time for the protection of health and sanitary arrangements of all labour directly or indirectly employed on the Work of this Contract.

#### **GC-30 SAFETY CODE :**

##### **GENERAL :**

Contractor shall adhere to safe construction practice and gurard against hazardous and unsafe Working conditions and shall comply with Owner's safety rules and set fourth herein.

##### **1. First Aid and Industrial Injuries :**

- 1.1 The Contractor shall maintain first aid facilities for its employees and chose of his sub-Contractor.
- 1.2 The Contractor shall make outside arrangements for ambulance service and for the treatment of industrial injuries. Name of those providing these services shall be furnished to Engineer-in-Charge prior to start of construction, and their telephone numbers shall be prominently posted in Contractor's field office.
- 1.3 All injuries shall be reported promptly to Engineer- in-charge, and a copy of Contractor's report covering each personal injury requiring the attention of a physician shall be furnished to Owner.

##### **2. General Rules :**

- 2.1 Carrying, striking, matches, lighters inside the project area & smoking within the job site is strictly prohibited Violators of smoking rules shall be discharged immediately. Within the operation area, not hot Work shall be permitted without valid gas safety, fire permits. The Contractor shall also be held liable and responsible for all lapses of his sub-Contractors / employees in this regards.

##### **3. Scaffolding :**

- 3.1 Suitable scaffolding shall be provided for Workmen for all Work that can not safely be done from the ground or from solid construction except such short period Work as can be done safely from ladders. When a ladder is used, an extra mazdoor shall be engaged for holding the



ladder and if the latter is used for carrying Materials : as well, suitable foothold sand handholds shall be provided on the ladder and the same shall be given inclination not steeper than 1 to 4 (1 horizontal and 4 vertical).

3.2 Scaffolding or staging more than 3.6 M (12') above the ground or floor, swing or suspended from an overhead support or erected with stationary support shall have a guard rail properly attached, bolted, braced and otherwise fixed at least 1.0 M (3') high above the floor or platform of scaffolding or staging and extending along the entire length of the outside ends thereof with only such openings as may be necessary for the delivery of Materials : Such scaffolding or staging shall be so fastened as to prevent it from swaying from the building or structure.

**4. Maintenance of Safety Devices :**

4.1 All scaffolds, ladders and other safety devices mentioned or described herein shall be maintained in some conditions and no scaffold, ladder or equipment shall be altered or removed while it is in use. Adequate washing facilities shall be provided at or near place or Work.

**5. Display of Safety Instructions :**

5.1 These safety provisions shall be brought to the notice of all concerned by display on a notice board at a prominent place at the Work-spot. The person responsible for compliance of the safety code shall be named therein by the Contractor.

**6. Enforcement of Safety Regulations :**

6.1 To ensure effective enforcement of the rules and regulations relating safety precautions, the arrangements made by the Contractor shall be open to inspection by the welfare Officer, Engineer-in-Charge of safety Engineer of the Owner or their representatives.

**7. No Exemption :**

7.1 Notwithstanding the above clause 1.0 to 6.0 there is nothing to exempt the Contractor from the operations of any other Act or rules in force in the Republic of India.

7.2 In addition to the above, the Contractor shall adhere by the safety code provision as per C.P.W.D. Safety Code framed from time to time.

**GC-31 SETTLEMENT OF DISPUTES:**

Except or otherwise specifically provided in the contract, all disputes concerning question of fact arising under the contract shall be decided by the Engineer in Charge of VNSGU/Consultant, subjected to a written appeal by the Contractor to the Engineer in Charge of VNSGU/Consultant and these decisions shall be final and binding on the parties hereto. Any disputes or difference including those considered as such by only one of the parties arising out of or in connection with this contract shall be to the extent possible settled amicably between the parties. If amicable settlement cannot be reached then all disputed issues shall be settled as provided in (a).

**(a) DISPUTES OR DIFFERENCE TO BE REFERRED TO:**

If at any time, any question, disputes or differences of any kind whatsoever shall arise between the Engineer in Charge of VNSGU/Consultant and the Contractor upon or in relation to or in connection with this contract, either party may forthwith give to the other, notice in writing of the existence of such question, dispute or difference as to any decision, opinion, instruction, direction certificate or evaluation of the Engineer in Charge of VNSGU/Consultant.

The question or difference shall be settled by the Registrar, VNSGU (or Building Committee of VNSGU), who shall state his decision in writing and give notice of same to the Engineer in Charge of VNSGU/Consultant and to the Contractor such decision shall be final and binding upon both parties



to the contract and work on contract if not already breached or abandoned shall proceed normally unless and until the same shall be revised (or upheld) due to any judicial proceeding.

Should the Registrar, VNSGU (or Building Committee of VNSGU) fail to give a decision within three (3) calendar months after issuance of notice of a question, dispute or difference or if the Contractor is dissatisfied with any such decision of the Registrar, VNSGU, and then the matter may be referred to court of law subject to SURAT JURISDICTION.

**GC-32 TERMINATION OF THE CONTRACT:**

1. If the Contractor finds it impracticable to continue operation owing to Force Manure reasons or for any reason beyond his and/or the Registrar, VNSGU (or Building Committee of VNSGU) find site impossible to continue operation when prompt notification in writing shall be given by the party affected to the other.
2. If the delay or difficulties so caused cannot be expected to cease or become unavoidable or if operations cannot be resumed within six (6) months the party shall have the right to terminate the contract upon Ten (10) days written notice to the other. In the event of such termination of the contract, payment to the Contractor will be made as follows: s
  - a) The Contractor shall be paid for all works approved by the Engineer in Charge of VNSGU/Consultant and found to be as per specification/detail given and can be verified by VNSGU if required through applicable and rational NDT and other tests from NABL accredited agency. Also any other legitimate expenses due to him shall be paid.
  - b) If the Registrar, VNSGU terminates the contract owing to Force Manure or due to any cause beyond its control, the contractor shall additionally be paid for any work done (approved by the Engineer in Charge of VNSGU/Consultant and found to be as per specification/detail given and can be verified by VNSGU if required through applicable and rational NDT and other tests from NABL accredited agency ) during the said Six (6) months period including any financial commitment made for the proper performance of the Contract and which are not reasonable defrayed by payment under (a) above;
  - c) The Registrar, VNSGU also release all bonds and guarantees at its disposal except is cause where the total amount of payments made to the contractor exceeds the final amount due to him in which case the contractor shall refund the excess amount within Sixty (60) days after termination and the Registrar, VNSGU thereafter shall release all bonds and guarantees, should the contractor fail to refund the amount received in excess within the said period such amounts shall be deducted from the bonds or guarantees provided.
3. On the termination of the contract for any cause the contractor shall see the orderly suspension and termination of operations, with due consideration to the interests of the Veer Narmad South Gujarat University with respect to completion, safeguarding or storing of materials procured for the performance of the contract and the salvage and resale thereof.

**Signature of the Applicant :**

**Registrar  
VEER NARMAD SOUTH GUJARAT UNIVERSITY.**



## **07. SPECIAL CONDITIONS OF CONTRACT :**

### **1.1 GENERAL :**

Any clause/s, given under these Special Conditions, shall be read in conjunction with the Conditions of the Contract, and in case of any conflict, the provisions of Special Conditions shall override the provisions of General Conditions of Contract.

The Tenderer shall acquaint himself with the access to site, availability of local facilities such as transport, Materials :, labour and shall price his tender accordingly.

### **1.2 ROAD INFRASTRUCTURE :**

The tenderer shall acquaint himself with the access to site. The successful Tenderer shall have to make road and / or any other infrastructure facility for the easy access to the site at his own cost.

### **1.3 SAFETY :**

All the safety and entry rules shall be strictly followed. The Contractor is fully responsible for the safety of his staff and Workmen and must equip them with safety appliances and tools.

### **1.4 TIME SCHEDULE :**

The Work shall be executed strictly as per the Time Schedule / Bar Chart, submitted along with price tender offer.

### **1.5 PENALTY FOR DELAY :**

If the Contractor fails to complete the whole project by the stipulated completion date, he shall pay liquidated damages

### **1.6 CONSTRUCTION OF STORES AND SITE OFFICE :**

Suitable areas shall be allocated by the VNSGU to the Contractor to build stores for storing his equipment, plant, Materials :, etc., and also to build his site office. He shall be solely responsible for watching and guarding of his stores, office, etc.

Contractor shall have to make storage facilities by making godown for the material specified in Schedule-"B" Part-"A".

The Contractor shall cover all his equipment and Materials : at site with requisite insurance against theft, larceny, decoity, fire, tempest, flood, earthquake, etc.

On completion of the Work undertaken by the Contractor, he shall removed all temporary Work erected by him and have the site cleaned as directed by the Engineer-in-Charge. The VNSGU reserves the right to ask the Contractor any time during the pendency of the Contract to vacate the land by giving 7 days notice on security reasons or in national interest or otherwise.

### **1.7 LABOUR AND SUPERVISORY CAMPS :**

No land shall be provided by the VNSGU to the Contractor for constructing his labour and supervisory camps and other service facility, for which the Contractor shall make his own arrangement outside the site boundary.

### **1.8 CONSTRUCTION EQUIPMENT :**



The Contractor shall make his own arrangement to procure all constructional plant and equipment. He shall also state the type and number of different equipment with their capacities, which are in good Working condition for usage on the site to ensure completion of the Work in the specified time.

All Materials :, construction plant and equipment, once brought by the Contractor to the site, shall not be removed from there without the written authority of the Engineer-in-Charge. Also, the Contractor shall have adequate stock of spare parts for the equipment on the site and Work shall not be delayed on this account. Similarly, all temporary Workbuilt by the Contractor for the main construction undertaken by him, are not be dismantled and removed without the written authority of the Engineer-in-charge.

#### **1.9 CO-OPERATION WITH OTHER CONTRACTORS :**

The Contractor shall execute his Work in phased manner as directed by the Engineer from time to time so as not to obstruct or retard the Work being executed simultaneously by other agencies, if any.

#### **1.10 SAFETY :**

The Contractor shall be responsible for provision of safety arrangement and protective clothing for all operators on the site, whether or not engaged in actual operation of supervision. The Contractor shall also be responsible for safety arrangement of all equipment used for construction, and shall employ trained Workmen conversant with safety regulations. The Contractor shall use only tested equipment and tools, and shall periodically redo tests to the satisfaction of the Engineer-in-Charge. All the tests certificates shall be made available to the Engineer-in-Charge at the site of the Work. If at any time, in the opinion of the Engineer-in-Charge, this provision is not completion with, the Contractor shall forthwith replace such equipment and tools.

The Contractor shall display notices and arrange proper fencing at such places, where hazardous Work is being carried out. The Contractor shall provide at his own expense on the Works to the satisfaction of the Engineer-in-Charge, proper and sufficient fire fighting equipment, first aid, etc., which shall, at all times be available for use.

**1.11** The Contractor shall have to take photographs during various stages of construction activity for each of the Work at no extra cost. The photographs shall be of size 4" x 6" on matt paper. The number of photographs shall be not be less than 200.

**1.12** No mobilisation advance shall be paid.

**1.13** No compensation of any item shall be paid in case any of the item is omitted, i.e., not executed at all.

**1.14** It is clarified once again that the serviceable Materials :, obtained during dismantaling / clearing of the site or the extra excavated stuff, shall have to be carted by the Contractor at the places shown by the Engineer-in-Charge anywhere within city limit.

**1.15** Out of the amount payable / creditable to the Contractor's account, the Central Government/StateGovernment tax/taxes shall be deducted at source in accordance with the relevant laws / rules prevailling from time to time.

**1.16** Surat Veer Narmad South Gujarat University shall not provide `C' form for tax purpose.

**Signature of the Applicant :**

**Registrar  
VEER NARMAD SOUTH GUJARAT UNIVERSITY.**



## 08. MAKE OF MATERIALS

It is compulsory to used by the Contractor / Bidder from the following list of the make of Material / Brand / Company

No.	ITEM	STANDARD MAKE
1	43, 53 grade Portland cement	Ultratech/Ambuja/Binani/ACC/Siddhi/Wonder/J.K.Laxmi/Hathi
2	43-53 grade Portland puzzolana cement	Ultratech/Ambuja/Binani/ACC/Siddhi/Wonder/J.K.Laxmi/Hathi
3	Reiforcing steel	Asian/Kamdhenu/Tata/Sail/Vizag/Electro therm/National
4	Structural Steel	Sail / Tata / Vizag
5	Vitrified Tiles	Asian/City/Nitco/Vermora/Johnson
6	Ceramic Tiles	Asian/City/Nitco/Vermora/Johnson/Somani
7	Glazed Tiles	Somani / Johnson / Kajaria
8	PVC Plumbing & Sanitary fittings	Astral / Supreme / Prince / Jain
9	Plumbing Fixture	Ess-Ess / Essco / Plumber
10	Sanitarywares	Hindustan / Cera / Parryware
11	Paints	Asian / Nerolac / Burger / Dulux
12	Cement based Putty	Birala / J K
13	White Cement	Birla / J K
14	Addmixture & Water proofing Compounds	Sica / Fosroc / MC / Dr. Fixit

Note : Client / Consultant reserved the Right to Select / Change the Make of material from the Above Mentioned Makes.





## MAKE OF ELECTRICAL MATERIALS

It is compulsory to used by the Contractor / Bidder from the following list of the make of Material / Brand / Company

No.	ITEM	STANDARD MAKE
1	LT ACB	SIEMENS / L&T / C&S / HAVELLS/ INDOASIAN
2	L T MCCB	SIEMENS/GE/L&T/C&S GEWISS/INDOASIAN/HAVELLS
3	L T MCB, ELCB	MDS / C&S / INDOAIAN / L&T / HAVELLS
4	CHANG OVER SWITCH	HAVELLS/C&S GEWISS /INDOASIAN/L&T/GE
5	ALLUMINIUM & COPPER CABLE	PRIMCAB/FINOLEX /RRKABLE/HAVELLS/L&T/KEI
6	PVC CONDUITS/OVEL/CASING & CAPAING AND ACCESSORIES	PRECISION/POLYCAB/ AMIT/
7	DWC PIPE & HDPE PIPE	GEMINI, REX
8	MODULAR TYPE SWITCHES, SOCKETS	HAVELLS-CRABTREE/ANCHOR ROMA,WOOD AVE / ABB/C&S GEWISS/PHILIPS
9	TISSION TYPE SWITHCES, PLUG SOCKET & ASSESSORIES	ANCHOR / JAINEX/ORPAT/TOYAMA
10	T.V./TELEPHONE SOCKETS	HAVELLS-CRABTREE/ANCHOR ROMA,WOOD AVE / ABB/C&S GEWISS/PHILIPS
11	PVC JUNCTION BOX	SINTEX / S&S / CLIPSAL
12	FLEXIBLE WIRES & CABLES/FRLS / INDUSTIRES/PVC/CO-AXIAL WIRES/ SUBMERSIBLE CABLE	FINOLEX / HAVELLS / RR CABLE
13	TELEPHONE CABLE	DELTON / FINOLEX/ HAVELLS
14	DATA SINGAL CABLE	ENERCON / LAPP INDIA
15	FLOURESCENT TUBE FITTINGS (ELECTRONICS BALLAST) BOX/ INDUSTRIAL/ MIRROR OPTIC/MIRROR LIGHT/STREET LIGHT FIXTURES	PHILIPS/CROMPTON/WIPRO/HAVELL'S
16	ENERGY SAVING T-5 TUBE FITTING/ CFL (INDOOR TYPE)	HAVELL'S/ WIPRO/SURYA/PHILIPS/BAJAJ
17	INDOOR DECORATIVE LIGHT	ARTLITE / DECON / GEMINI
18	OUTDOOR DECORATIVE LIGHT LUMINAIRE	ARTILITE / DECON / GEMINI / K-LITE
19	FLOOD LIGHTS WITH BC/ES/SV/MH/ LAMPS(POST TOP LANTERN/STREET LIGHT)	CROMPTON/PHILIPS/BAJAJ/HAVELL'S SURYA
20	FLOUROSCENT TUBES	PHILIPS/CROMPTON/WIPRO/SURYA
21	COMPACT FLOURESCENT LAMP	PHILIPS/CROMPTON/WIPRO/HALONIX
22	SODIUM VAPOUR/MERCURY VAPOUR LAMP	HAVELLS / SURYA/ PHILIPS/WIPRO/HALONIX
23	FILAMENT LAMPS	SURYA/PHILIPS / WIPRO / CROMPTON/HALONIX
24	EARTHING	ASH / OR EQUIVALENT, ELECTRO- EARTH
25	MOTOR	LUBI/CROMPTON/KIRLOSKAR/AMRUT
26	PAINT	NEROLAC / SHALIMAR / DULO/DURELEX
27	CEILING FAN / EXHAUST FAN/PEDESTAL FAN/ TABLE FAN/BRACKET FAN	CROMPTON / BAJAJ / HAVELLS
28	ENERGY SAVING 50 WATT CEILING FAN	HAVELL'S CROMPTON/BAJAJ
29	LED LUMINARIES INDOOR/OUTDOOR FITTING	CREE / OSRAM / PHILIPS LUMILEDS/ NICHIA
30	AIR CONDITIONERS & WATER COOLERS	DAIKIN./MISHIBISHU/ONIDA, /O GENRAL/ BLUESTAR/PANANSONIC/VOLTAS/CARRIERS
31.	SUBSTATION EQUIPMENTS	L&T / SKP /HAVELLS/ UNIVERSAL / NATIONAL, CROMPTON/ SIEMENS
32.	SOLAR SYSTEM & WATER HEATER	REDREN/ RACOLD/ JAIN OR EQUIVALENT
33.	PASSENGER/STRETCHER LIFT OR ELEVATORS	OTIS/ JOHANSON/MISTUBISI/OMEGA/SCHINDLER
34.	GENERATING SET	CROMPTON/ KIRLOSKAR/ CUMMINS/ VOLVO

Note : Client / Consultant reserved the Right to Select / Change the Make of material from the Above Mentioned Makes.



## 08. A. STANDARD SPECIFICATIONS OF MATERIALS :

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- M. 37. Plywood.
- M. 38. Glass.
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- M. 97. 10 mm. thick granite tiles.**

**Note :** Consider latest revision of the said I.S. wherever its applicable.

**M-1 WATER :**

- 1.1 Water shall not be salty or brackish and shall be clean, reasonably clear and free from objectionable quantities of silt and traces of oil and injurious alkalies, salts, organic matter and other deleterious material which shall either weaken the mortar or concrete or cause efflorescence or attack the steel in R.C.C. Container for transport, storage and handling of water shall be clean. Water shall conform to the standards specified in I.S. 456-1978.
- 1.2 If required by the Engineer-in-Charge it shall be tested by comparison with distilled water. Comparison shall be made by means of standard cement tests for soundness, time of setting and mortar strength as specified in I.S. 269-1976. Any indication of unsoundness, change in time of setting by 30 minutes or more or decrease of more than 10 percent in strength of mortar prepared with water sample when compared with the results obtained with mortar prepared with distilled water shall be sufficient cause for rejection of water under test.
- 1.3 Water for curing mortar, concrete or masonry shall not be too acidic or too alkaline. It shall be free of elements which significantly affect the hydration reaction or otherwise interfere with the hardening of mortar or concrete during curing or those which produce objectionable stains or other unsightly deposits on concrete or mortar surfaces.
- 1.4 Hard and bitter water shall not be used for curing.
- 1.5 Portable water shall generally be found suitable for curing mortar or concrete.

**M-2 LIME :**

- 2.1 Lime shall be hydraulic lime as per I.S. 712-1973. Necessary tests shall be carried out as per I.S. 6932 (Parts I to X) 1973.
- 2.2 The following field tests for limes are to be carried out ---
  - a] A very rough idea can be formed about the type of lime by its visual examination i.e. fat lime bears pure white colour, lime in form of porous lumps of dirty white colour, indicates quick lime, and solid lumps the unbrunt lime stone.
  - b] Acid tests for determining the carbonate content in lime. Excessive amount of impurities and rough determination of class of lime.
- 2.3 Storage shall comply with I.S. 712-1973. The slaked lime, if stored, shall be kept in a weather proof and damp proof shed with impervious floor and sides to protect it against rain, moisture, weather and



extraneous Materials : mixing with it. All lime that has been damaged in any way shall be rejected and all rejected Materials : shall be removed from site of Work.

2.4 Field testing shall be done according to I.S. 162-1974 to show the acceptability of Materials :

**M-3 CEMENT :**

3.1 Cement shall be ordinary portland slag cement as per I.S. 269-1976 or Portland slag cement as per I.S. 455-1976.

**M-4 WHITE CEMENT :**

4.1 The white cement shall conform to I.S. 8042-1978.

**M-5 COLOURED CEMENT :**

5.1 Coloured cement shall be with white or grey portland cement as specified in the item of the Work.

5.2 The pigments used for coloured cement shall be of approved quality and shall not exceed 10% of cement used in the mix. The mixture of pigment and cement shall be properly ground to have a uniform colour and shade. The pigments shall have such properties as to provide for durability under exposure to sun-light and weather.

5.3 The pigment shall have the property such that it is neither affected by the cement nor detrimental to it.

**M-6 SAND :**

6.1 Sand shall be natural sand, clean, well graded, strong, durable and gritty particles free from injurious amounts of dust, clay, kankar nodules, soft or flaky particles, shale, alkaly, salts, organic mater, loam, mica or other deleterious substances and shall be got approved from the Engineer-in-Charge. The sand shall not contain more than 8% of silt as determined by field tests. If necessary the sand shall be washed to make it clean.

6.2 Coarse Sand : The fineness modulus of coarse sand shall not be less than 2.5 and shall not exceed 3.0. The sieve analysis of coarse shall be as under ---

I.S.Sieve Designation	% by weight passing sieve	I.S.Sieve Designation	% by weight passing sieve
4.75 mm	100	600 Micron	30-100
2.36 mm	90-100	300 Micron	5-70
1.18 mm	70-100	150 Micron	0-60

6.3 Fine Sand : The finess modulus shall not exceed 1.0. The sieve analysis of fine sand shall be as under ---

I.S.Sieve Designation	% by weight passing thru'	I.S.Sieve Designation	% by weight passing thru'
4.75 mm	100	600 Micron	40-85
2.36 mm	100	300 Micron	5-50
1.18 mm	70-100	150 Micron	0-10

**M-7 STONE DUST :**

7.1 This shall be obtained from crushing hard black tray or equivalent, it shall not contain more than 8% of silt as determined by field test with measuring cylinder. The method of determining silt contents by field test is given as under.

7.2 A sample of stone dust to be tested shall be placed without drying in 200 mm measuring cylinder. The quantity of the sample shall be such that it files the cylinder up to 100 mm mark. The clean water shall



be added up to 150 mm mark. The mixture shall be stirred vigorously and the content allowed to settle for 3 hours.

- 7.4 The height of silt visible as settled layer above the stone dust shall be expressed as percentage of the height of the stone dust below. The stone dust containing more than 8% silt shall be washed so as to bring the silt content within the allowable limit.
- 7.5 The fineness modulus of stone dust shall not be less than 1.80.

**M-8 STONE GRIT :**

- 8.1 Grit shall consist of crushed or broken stone and be hard, strong, dense, durable, clean, of proper gradation and free from skin or coating likely to prevent proper adhesion of mortar. Grit shall generally be cubical in shape and as far as possible flaky elongated pieces shall be avoided. It shall generally comply with the provisions of I.S. 383-1970. Unless a special stone of a particularly quarry is mentioned, grit shall be obtained from the best black trap or equivalent hard stone as approved by the Engineer-in-Charge. The grit shall have no deleterious reaction with cement.
- 8.2 The grit shall conform to the following gradation as per sieve analysis :

I.S.Sieve Designation	% passing thru' sieve	I.S.Sieve Designation	% passing thru' sieve
12.50 mm	100%	4.75 mm	0.20%
10.00 mm	85-100%	2.36 mm	0.25%

- 8.3 The crushing strength of grit shall be such as to allow the concrete in which it is used to build-up the specified strength of concrete.
- 8.4 The necessary tests for grit shall be carried out as per the requirements of I.S. 2338 (Parts I to VIII)1963, as per instruction of the Engineer-in-Charge. The necessity of test shall be decided by the Engineering-in-charge.

**M-9 CINDER :**

- 9.1 Cinder is well burnt furnace residue which has been fused or sintered into lumps of varying sizes.
- 9.2 Cinder aggregates shall be well burnt furnace residue obtained from furnace using coal fuel only. It shall be sound clean and free from clay, dirt, ash or other deleterious matter.
- 9.3 The average grading for cinder aggregates shall be as mentioned below :-

20 mm	100
10 mm	86
5.75 mm	70
2.36 mm	52

**M-10 LIME MORTAR :**

- 10.1 LIME : Shall conform to Specification M-2. WATER : Water shall conform to Specification M-1. SAND : Sand shall conform to Specification M-6.
- 10.2 PROPORTION OF MIX Mortar shall consist of such proportions of slaked lime and sand as may be specified in the item. The slaked lime and sand shall be measured by volume.
- 10.3 PREPARATION OF MORTAR Lime mortar shall be prepared by wet process as per I.S. 1625-1971. Power driven mill shall be used for preparation of lime mortar. The slaked lime shall be placed in the mill in an even layer and ground for 180 revolutions with sufficient water. Water shall be added as required during grinding (care being taken not to add more water) that shall bring the mixed





material to a consistency of stiff paste. Thoroughly wetted sand shall then be added evenly and the mixture ground for another 180 revolutions.

- 10.4 STORAGE : Mortar shall always be kept damp, protected from sun and rain till used up, covering it by trapaulin or open sheds.
- 10.5 USE : All mortar shall be used as soon as possible after grinding. It shall be used on the day on which it is prepared. But in no case mortar made earlier than 36 hours shall be permitted for use.

**M-11 CEMENT MORTAR :**

- 11.1 Water shall conform to Specification M-1. Cement shall conform to Specification M-3. Sand shall conform to M-5.
- 11.2 PROPORTION OF MIX : 11.2.1 Cement and sand shall be mixed to specified proportions, sand being measured by measuring boxes. The proportion of cement shall be by volume on the basis of 50 Kg./Bag of cement being equal to 0.0342 cu.m. The mortar may be hand mixed or machine mixed as directed.
- 11.3 PREPARATION OF MORTAR : 11.3.1 In hand mixed mortar, cement and sand in the specified proportions shall be thoroughly mixed dry on a clean impervious platform by turning over atleast 3 times or more till a homogeneous mixture of uniform colour is obtained. Mixing platform shall be so arranged that no deleterious extraneous material shall get mixed with mortar or mortar shall flow out. While mixing, the water shall be gradually added and thoroughly mixed to form a stiff plastic mass of uniform colour so that each particle of sand shall be completely covered with a film of wet cement. The water cement ratio shall be adopted as directed.
- 11.4 The mortar so prepared shall be used within 30 minutes of adding water. Only such quantity of mortar shall be prepared as can be used within 30 minutes.

**M-12 STONE COARSE AGGREGATE FOR NOMINAL MIX CONCRETE :**

- 12.1 Coarse aggregate shall be of machine crushed stone of black trap or equivalent and be hard, strong, dense, durable, clean and free from skin and coating likely to prevent proper adhesion of mortar.
- 12.2 The aggregate shall generally be cubical in shape. Unless special stones of particular quarries are mentioned aggregates shall be machine crushed from the best black trap or equivalent hard stone as approved. Aggregate shall have no deleterious reaction with cement. The size of the coarse aggregate for plain cement concrete and ordinary reinforced cement concrete shall generally be as per the table given below. However, in case of reinforced cement concrete the maximum limit may be restricted to 6 mm. less than the minimum lateral clear distance between bars or 6mm. less than the cover whichever is smaller.

**TABLE**

I.S. Sieve Designation	Percentage passing for single sized aggregates of nominal size			I.S. Sieve Designation	Percentage passing for single sized aggregates of nominal size		
	40 mm	20 mm	16 mm		40 mm	20 mm	16 mm
80 MM	--	--	--	12.5 MM	---	--	---
63 MM	100	--	--	10 MM	0.5	0.20	0.30
40 MM	85-100	100	--	4.75 MM	--	0.50	0.50
20 MM	0-20	85-100	100	2.35 MM	--	--	--
16 MM	--	--	85-100				

**NOTE:-** This percentage may be varied somewhat by the Engineer-in-Charge when considered necessary for obtaining better density and strength of concrete.

- 12.3 The grading test shall be taken in the beginning and at the change of source of Materials : The necessary tests indicated in I.S. 383-1970 and I.S. 456-1978 shall have to be carried out to ensure the



acceptability. The aggregates shall be stored separately and handled in such a manner as to prevent the intermixing of different aggregates. If the aggregates are covered with dust, they shall be washed with water to make, them clean.

#### **M-13 BLACK TRAP OR EQUIVALENT HARD STONE COARSE :**

- 13.1 Aggregate for Design Mix Concrete : Coarse aggregate shall be of machine crushed stone of black trap or equivalent hard stone and be hard, strong, dense, durable, clean and free from skin and coating likely to prevent proper adhesion of mortar.
- 13.2 The aggregates shall generally be cubical in shape, unless special stones of particular quarries are mentioned, aggregates shall be machine crushed from the best, black trap or equivalent hard stones as approved. Aggregate shall have no deleterious reaction with cement.
- 13.3 The necessary tests indicated in I.S. 383-1970 and I.S. 456-1978 shall have to be carried out to ensure the acceptability of the material.
- 13.4 If aggregate is covered with dust it shall be washed with water to make it clean.

#### **M-14 BRICK BATS AGGREGATES :**

- 14.1 Brick bat aggregate shall be broken from well burnt or slightly over burnt and dense bricks. It shall be homogeneous in texture, roughly cubical in shape, clean and free from dirt of any other foreign material. The brick bats shall be of 40 mm to 50 mm size unless otherwise specified in the item. The underburnt or overburnt brick bats shall not be allowed.
- 14.2 The brick bats shall be measured by volume by suitable boxes as directed.

#### **M-15 BRICKS :**

- 15.1 The bricks shall be hand or machine moulded and made from suitable soils and kiln burnt. They shall be free from cracks and flaws not nodules of free lime. They shall have smooth rectangular faces with sharp corners and shall be of uniform colour. The bricks shall be moulded with a frog of 100mm x 40 mm and 10mm to 20mm deep on one of its flat sides. The bricks shall not break when dropped on the ground from a height of 600 mm.
- 15.2 The size of modular bricks shall be 190mm x 90mm x 90mm.
- 15.3 The sie of conventional bricks shall be as under ---  
225 x 110 x 75mm.
- 15.4 Only bricks of one standard size shall be used on one Work. The following tolerances shall be permitted in the conventional size adopted in a particular Work.
- Length : 3.00 mm
  - Width : 1.50 mm
  - Height : 1.50 mm
- 15.5 The crushing strength of the bricks shall not be less than 35 Kg./Sq.Cm. The average water absorption shall not be more than 20% by weight. Necessary tests for crushing strength and water absorption etc. shall be carried out as per I.S. 3495 (Part I to IV)-1976.

#### **M-15A FLYASH BUILDING BRICKS :**

The Flyash building bricks shall conform to Grade-5 of IS-13757. The frog of the 80 to 100 mm x 40 mm x 10 to 20 mm size.

The size of modular bricks shall be 190 mm x 90 mm x 90 mm.

The size of conventional brick shall be 230 mm x 110 mm x 70 mm. Only bricks of one standard size shall used on one Work. The following tolerances shall permitted in the conventional size adopted in a particular Work:



- Length :  $\pm 4$  mm
- Width :  $\pm 2$  mm
- Height :  $\pm 2$  mm

The physical characteristic of bricks shall be as follows.

The minimum compressive strength of Flyash building bricks shall not be less than 70 Kg/Sq.Cm. and the test shall be conform to IS-3495 (Part-I).

The averages water absorption not more than 20 percentage by weight and the test shall conform to IS-3495(Part-3). Sampling of Flyash building bricks and criteria for conformity shall be as per I.S.:5454.

#### **M-16 STONE :**

- 16.1 The stone shall be of the Specified variety such as Granite/Trap stone/Quartzite or any other type of good hard stones. The stones shall be obtained only from the approved quarry and shall be hard, sound, durable and free from defects like cavities, cracks, sand holes, flaws, injurious veins, patches of loose or soft Materials : etc. and weathered portions and other structural defects or imperfections tending to affect their soundness and strength. The stone with round surface shall not be more than 5% of dry weight. When tested in accordance with I.S. 1134-1974. The minimum crushing of the strength of the stone shall be 200 Kg./Sq.Cm. unless otherwise specified.
- 16.2 The samples of the stone to be used shall be got approved before the Work is started.
- 16.3 The khanki facing stone shall be dressed by chisel as specified in the item for khanki facing in required shape and size. The face of the stone shall be so dressed that the bushing on the exposed face shall not project by more than 40 mm. from the general wall surface and on face to be plastered it shall not project by more than 19 mm nor shall it have depressions more than 10 mm from the average wall surface.

#### **M-17 LATERITE STONE :**

- 17.1 Laterite stone shall be obtained from the approved quarry. It shall compacted in texture, sound, durable and free from soft patches. It shall have a minimum crushing strength of 100 Kg/Sq.Cm. in its dry condition. It shall not absorb water more 20% of its own weight, when immersed for 25 hours in water. After quarrying, the stone shall be allowed to weather for some time before using in Work.
- 17.2 The stone shall be dressed into rectangular blocks so that all faces are free from waviness and unevenness and the edges true and square.
- 17.3 Those type of stone in which white clay occurs shall not be used.
- 17.4 Special corner stones shall be provided where so directed.

#### **M-18 MILD STEEL BARS/TMT/CRS BARS :**

- 18.1 Mild steel bars reinforcement TMT/CRS Bars for R.C.C. Work shall conform to I.S. 432 (Part-II)-1982 and shall be of tested quality. It shall also comply with the relevant part of I.S. 456-1978 and revised latest I.S. Code.
- 18.2 All the reinforcement shall be clean and free from dirt, paint, grease, mill scale or loose or thick rust at the time of placing.
- 18.3 For the purpose of payment the bar shall be measured correct up to 10 mm length and weight payable Worked out as per the rate specified below :

i] 6mm	0.22 Kg/Rmt.	viii]	20mm	2.47 Kg/Rmt.
ii] 8mm	0.39 kg/Rmt.	ix]	22mm	2.98 kg/Rmt.
iii] 10mm	0.62 kg/Rmt.	x]	25mm	3.85 kg/Rmt.



iv] 12mm	0.89 kg/Rmt.	xi]	28mm	4.83 kg/Rmt.
v] 14mm	1.21 kg/Rmt.	xii]	32mm	6.31 kg/Rmt.
vi] 16mm	1.58 kg/Rmt.	xiii]	36mm	7.31 Kg/Rmt.
vii] 18mm	2.00 Kg/Rmt.	xiv]	40mm	9.86 Kg/Rmt.

**M-19 HIGH YIELD STRENGTH STEEL DEFORMED BARS :**

- 19.1 High yield strength steel deformed bars shall be either cold twisted or hot rolled and shall conform to I.S. 1739-1978 and I.S. 1139-1966 respectively.
- 19.2 Other provision and requirements shall conform to Specification No. M-18 for Mild Steel Bars.

**M-20 HIGH TENSILE STEEL WIRES :**

- 20.1 The high tensile wires for use in prestressed concrete shall conform to I.S. 2090-1983.
- 20.2 The tensile strength of the high tensile steel bars shall be as specified in the item. In absence of the given strength and minimum strength shall be taken as per para 6-1 of the I.S. 1785-1962. Testing shall be done as per I.S. requirements.
- 20.3 The high tensile steel shall be free from loose mill scale, rust, oil, grease or any other harmful matter. Cleaning of steel bars may be carried out by immersion in solvent solution, wire brushing or passing through a pressure box containing carborundum.
- 20.4 The high tensile wire shall be obtained from manufactures in coils having diameter not less than 350 times the diameter of wire itself so that wire springs back straight on being uncoiled.

**M-21 MILD STEEL BINDING WIRE :**

- 21.1 The mild steel wire shall be of 1.63mm or 1.22mm (16 or 18 guage) diameter and shall conform to I.S. 280-1978.
- 21.2 The use of black wire shall be permitted for binding reinforcement bars. It shall be free from rust, oil, paint, grease, loose mill scale or any other undesirable coating which may prevent adhesion of cement mortar.

**M-22 STRUCTURAL STEEL :**

- 22.1 All structural steel shall conform to I.S. 226-1965. The steel shall be free from the defects mentioned in I.S. 226-1975 and shall have a smooth finish. The material shall be free from loose mill scale, rust pits or other defects affecting the strength and durability. Rivet bars shall conform to I.S. 1148-1973.
- 22.2 When the steel is supplied by the Contractor test certificates of the manufacturers shall be obtained according to I.S. 226-1975 and other relevant Indian Standards.

**M-23 GALVANISED IRON SHEETS :**

- 23.1 The galvanised iron sheets shall be plain or corrugated sheets of gauge as specified in item. The G.I. Sheets shall conform to I.S. 277-1977. The sheets shall be undamaged in carriage and handling either by rubbing off of zinc coating or otherwise. They shall have clean and bright surface and shall be free from dents, bends, holes, rust or white powdery deposit.
- 23.2 The length and width of G.I. sheets shall be as directed as per site condition.

**M-23-A G.I. VALLEYS GUTTER, RIDGES :**

- 23-A.1 The G.I. ridges and hips shall be of plain galvanised sheets class-3 of the thickness as specified in item. These shall be 600 mm width and properly bent up to shape without damage to the sheets in process of bending.



23-A.2 Valleys gutters and flashings shall be also of galvanised sheet of thickness as specified in item. Valleys shall be 900 mm. wide over all and flashing shall be 380 mm wide over all. They shall be bent to the required shape without damage to the sheet in the process of bending.

#### **M-24 ASBESTOS CEMENT SHEETS :**

24.1 Asbestos cement sheets plain, corrugated or semi-corrugated shall conform to I.S. 459-1970. The thickness of the sheets shall be as specified in the item. The sheet shall be free from all defects such as cracks, holes, deformities, chipped edges or otherwise damaged.

24.2 Ridges and Hips :

24.2.1 Ridges and hips shall be of same thickness as that of A. C. sheets. The types of ridges shall be suitable for the type of sheets and locations.

24.2.2 Other accessories to be used in roof such as flashing pieces, eaves filler pieces, valley gutters, north light and ventilator curves, barge boards etc. shall be of standard manufacture and shall be suitable for the type of sheets and location.

#### **M-25 MANGALORE PATTERN ROOF TILES :**

25.1 The Mangalore pattern tiles shall conform to I.S. 654-1972 for Class `AA' or `A' type as specified in item. Samples of the tiles to be provided shall get approved from the Engineer-in-Charge. Necessary tests shall be carried out as directed.

#### **M-26 SHUTTERING :**

26.1 The shuttering shall be either of wooden planking of 30mm minimum thickness with or without steel lining or of steel plates stiffened by steel angles. The shuttering shall be supported on battens and beams and props of vertical ballies properly cross bracked together so as to make the centering rigid. In places of ballie props, bricks pillar of adequate section built in mud mortar may be used.

26.2 The form Work shall be sufficiently strong and shall have camber, so that it assumes correct shape after deposition of the concrete and shall be able to resist forces caused by vibration of concrete, live load of men Working with it and other incidental loads associated with it. The shuttering shall have smooth and even surface and its joints shall not permit leakage of cement grout.

26.3 If at any stage of Work during or after placing concrete in the structure, the form Work sags or bulges out beyond the required shape of the structure, the concrete shall be removed and Work redone with fresh concrete and adequately rigid form Work. The complete form Work shall be got inspected by and approved from the Engineer-in-Charge, before the reinforcement bars are placed in position.

26.4 The props shall consists of bullies having 100mm minimum diameter measured at mid length and 80mm at thin end and shall be placed as per design requirement. These shall rest squarely on wooden sole plates 40 mm. thick and minimum bearing area of 0-10 sq.m. laid on sufficiently hard base.

26.5 Double wedges shall further be provided between the sole plate and wooden props so as to facilitate tightening and easing of shuttering without jerking the concrete.

26.6 The timber used in shuttering shall not be so dry so as to absorb water from concrete and swell or bulge nor so green or wet so as to shrink after erection. The timber shall be properly sawn and planed on the sides and the surface coming in contact with concrete. Wooden form Work with metal sheet lining or steel plates stiffened by steel angles shall be permitted.

26.7 As far as practicable, clamps shall be used to hold the forms together and use of nails and spikes avoided.

26.8 The surface of timber shuttering that would come in contact with concrete shall be well wetted and coated with soap solution before the concreting is done. Alternatively coat of raw linseed oil or oil of approved manufacture may be applied in place of soap solution. In case of steel shutteirng either soap solution or raw linseed oil shall be applied after thoroughly cleaning the surface. Under no circumstances black or burnt oil shall be permitted.



26.9 The shuttering for beams and slabs shall have camber of 4mm per metre (1 in 250) or as directed by the Engineer-in-Charge so as to offset the subsequent deflection. For cantilevers, the camber at free end shall be 1/50 of the projected length or as directed by the Engineer-in-Charge.

**M-27 EXPANSION JOINTS - PREMOULDED FILLER :**

27.1 The item provided for expansion joints in R.C.C. frame structures for internal joints, as well as exposed joints, with the use of premoulded bituminous joint filler.

27.2 Premoulded bituminous joint filler, i.e. performed stirp of expansion joint filler shall not get deformed or broken by twisting, bending or other handling when exposed to atmospheric condition. Pieces of joint filler that have been damaged shall be rejected.

27.3 Thickness of the pre moulded joint filler shall be 25 mm unless otherwise specified.

27.4 Premoulded bituminous joint filler shall conform to 1.5 1838-1961.

**M-28 EXPANSION JOINTS - COPPER STRIPS AND HOLD FASTS :**

28.1 The item provides for expansion joints in R.C.C. frame structure for internal joints as well as for exposed joints with the use of necessary copper strip and holdfasts.

28.2 Copper sheet shall be 1.25 mm thick and of 1.25 mm with 'U' shape in the middle, copper strip shall have holdfast of 3 mm diameter copper rod fixed to the plate soldered on strip at intervals of about 30 cm. or as shown in the drawing or as directed. The width of each flange (horizontal side) of the copper plate to be embedded in the concrete Work shall be 25 mm Depth of 'U' to be provided in the expansion joint, in the copper plate shall be of 25 mm.

**M-29 TEAK WOOD :**

29.1 The teak wood shall be of good quality as required for the item to be executed. When the kind of wood is not Specifically mentioned, good Indian teak wood as approved shall be used.

29.2 Teak wood shall generally be free from large, loose, dead or cluster knots, flaws, warps, twists, shakes, bends or any other defects. It shall generally be uniform in substance and of straight fibres as far as possible. It shall be free from rot, decay, harmful fungi and other defects of harmful nature, which shall affect the strength, durability or its usefulness for the purpose for which it is required. The colour shall be uniform as far as possible. Any effort like painting, using any adhesive or resinous Materials : made to hide the defects shall render the pieces liable to rejection by the Engineer-in-Charge.

29.3 All scantlings, planks etc. shall be sawn in straight lines and planes in the direction of grains and of uniform thickness.

29.4 The tolerances in the dimensions shall be allowed at the rate of 1.5 mm per face to be planed.

29.5 First Class Teak Wood :

First class teak wood shall have no individual hard and sound knots, more than 6 sq.cm. in size and the aggregate area of such knots shall not be more than 1% of area of piece. The timber shall be closed grained.

29.6 Second Class Teak Wood :

No individual hard and sound knots shall be more than 15 sq.cm. in size and aggregate area of such knots shall not exceed 2% of the area of piece.

**M-29-A NON-TEAK WOOD :**



The non teak wood shall be chemically treated, seasoned as per I.S. Specifications and of good quality. The type of wood shall be got approved before collecting the same on site. Fabrication of wooden members shall be started only after approval. For this purpose wood of Bio, Kalai, Sires, Saded, Behda, Jamun, Sisoo shall be used for door frames whereas only Kalai, Siras, Halda, Kalam etc. shall be permitted for shutters after proper seasoning and chemical treatment.

The non teak wood shall be free from large, loose dead of cluster knots, flows, shakes, warps, bends, or any other defect. It shall be uniform in substance and of straight fibres as far as possible. It shall be free from rots, decay, harmful fungi and other defects of similar nature which shall affect the strength, durability or its usefulness for the purpose for which it is required. The colour of the wood shall be uniform as far as possible. The scantlings, planks etc. shall be sawn in straight lines and planes in the direction of grain and of uniform thickness.

The department shall use the Agency to produce a certificate from the Forest Department in the event of a dispute and the decision of the Department shall be final and binding to the Contractor.

The tolerance in the dimension shall be allowed at 1.5 mm. per face to be planed.

### **M-30 WOODEN FLUSH DOOR SHUTTERS (SOLID CORE) :**

30.1 The solid core type flush door shutters shall be of decorative or non-decorative type as specified in the drawing. The size and thickness of the shutter shall be as specified in drawings or as directed. The timber species for core shall be used as per I.S. 2202-(Part-I)-1980. The timber shall be free from decay and insect attack. Knots and knot holes less than half the width of cross-section of the members, pitch streaks and harmless pin holes shall be permissible except in the exposed edges of the core members. The commercial plywood, cross bands shall conform to I.S. 303-1275.

30.2 The face panel of the shutters shall be formed by gluing by the hot press process on both faces of the core with either plywood or corss bands, and face veneers. The lipping, rebating, opening of glazing, venetion etc. shall be provided if specified in the drawing.

30.3 All edges of the door shutters shall be square. The shutters shall be free form twist or warp in its plane. Both faces of the shutters shall be sand papered to smoot even texture.

30.4 The shutters shall be tested for ---

i] End Immersion Test : The test shall be carried out as per I.S. 2202 (Part-I) 1980. There shall be no delamination at the end of the test.

ii] Glue Adhesion Test : The flush door shall be tested for glue adhesive test in accordance with I.S. 2202(Part-I)-1980. The shutters shall be considered to have passed the test if no delamination occurs in the glue lines in the plywood and if no single delamination more than 80 mm. in length and more than 3 mm. in depth has occured in the assembly glue lines between the plywood face and the style and rail. Delamination at the corner shall be measured continously around the corner. Delamination at the knots knot, hole and other permissible wood defects shall not be considered in assessing the sample.

30.5 The tolerance in size of solid core type flush door as under:-

In nominal thickness # 1.2 mm. In nominal height # 3 mm. The thickness of the shutters shall be uniform throughout with a permissible variation of not more than 0.8 mm. when measured at any two points.

### **M-31 ALUMINIUM DOORS, WINDOWS, VENTILATORS :**

31.1 Aluminium alloy used in the manufacture of extruded window sections shall conform to I.S. designation HEA-WP of I.S. : 733-1975 and also to I.S. Designation WVG - WP OF I.S. : 1285-1975. The sections shall be as specified the drawing and design. The fabrication shall be done as directed.

31.2 The hinges shall be cast or excluded aluminium hinges of same type as in window but or large size.



- 31.3 The hinges shall normally be of 50 mm projecting type non projecting type of hinges may also be used if directed. The handles of door shall be of specified design. A suitable lock for the door operable either from outside shall be provided. In double shutter door, the first closing shall have a concealed aluminium alloy bolt at top and bottom.

#### **M-32 ROLLING SHUTTERS :**

- 32.1 The rolling shutters shall conform to I.S. 6248-1979. Rolling shutters shall be supplied of specified type with accessories. The size of the rolling shutters shall be specified in the drawings. The shutters shall be constructed with interlocking lath sections formed from cold rolled steel strips not less than 0.9 mm. thick and 80 mm. wide for shutters up to 3.5 m. Width not less than 1.25 mm. thick and 80 mm. wide for shutters 3.5 m. in width and above unless otherwise specified.
- 32.2 Guide channels shall be of mild steel deep channel section and of rolled pressed or built up (fabricated) jointless construction. The thickness of sheet used shall not be less than 3.15 mm.
- 32.3 Hood covers shall be made of M.S. sheets not less than 0.92 mm. thick. For shutters having width 3.5 mts. and above, the thickness of M.S. sheet for the hood covers shall be not less than 1.25 mm.
- 32.4 The spring shall be of best quality and shall be manufactured from tested high tensile spring steel wire or strip of adequate strength to balance the shutters in position. The spring pipe shaft etc. shall be supported on strong M.S. or malleable C.I. brackets. The brackets shall be fixed on the or under the lintel as specified with rawl plugs and screws bolts etc.
- 32.5 The rolling shutters shall be of self rolling type up to 8 sq.m. clear area without ball bearing and up to 12 sq.m. clear area with ball bearing. If the rolling shutters are of larger then gear operated type shutters shall be used.
- 32.6 The locking arrangement shall be provided at the bottom of shutter at both ends. The shutters shall be opened from outside.
- 32.7 The shutters shall be completed with door suspension, shafts, locking arrangements, pulling hooks, handles and other accessories.

#### **M-33 COLLAPSIBLE STEEL GATE :**

- 33.1 The collapsible steel gate shall be in one or two leaves and size as per approved drawings or as specified. The gate shall be fabricated from best quality mild steel channels, flats etc. Either steel pulleys or ball bearings shall be provided in every double channel. Unless otherwise specified the particulars of collapsible gate shall be as under ---
- i] Pickets : These shall be of 20 mm. M.S. channels of heavy sections unless otherwise shown on drawings. The distance centre to centre of pickets shall be 12 cms. with an opening of 10 cms.
  - ii] Pivoted M.S. flats shall be 20 mm. x 6 mm.
  - iii] Top and bottom guides shall be from tee or flat iron of approved size.
  - iv] The fittings like stoppers, fixing hold fasts, locking cleats, brass handles and cast iron rollers shall be of approved design and size.

#### **M-34 WELDED STEEL WIRE FABRIC :**

- 34.1 Welded steel wire fabric for general purpose shall be manufactured from cold drawn steel 'as drawn' or galvanised steel conforming to I.S. 226-1975 With longitudinal and transverse wire seurely connected at every intersection by a process of electrical resistance welding and conforming to I.S. 4948-1974. It shall be fabricated and finished in a Workman like manner and shall be free from injurious defects and shall be rust proof. The type of mesh shall be oblong or square as directed. The mesh sizes and sizes of wire for square as well as oblong welded steel wire fabric shall be as directed. The steel wire fabric in panels shall be in one whole piece in each panel as far as stock sizes permit.





**M-35 EXPANDED METAL SHEETS :**

- 35.1 The expanded metal sheets shall be free from flaws, joints, welds, broken, stands, laminations and other harmful surface defects Expanded metal steel sheet shall conform to I.S. 412 -1975 except that blank sheets need not be with guaranteed mechanical properties. The size of the diamond mesh of expanded metal and dimensions of strands (width and thickness) shall be as specified. The tolerance on nominal weight of expanded metal sheets shall be of + 10 per cent.
- 35.2 Expanded metal in panels shall be in one whole piece in each panel as far as stock sizes permit. The expanded metal sheets shall be coated with suitable protective coating to prevent corrosion.

**M-36 MILD STEEL WIRE (Wire Gauze Jali) :**

- 36.1 Mild steel wire may be galvanised, as indicated. All finished steel wire shall be well cleanly drawn to the dimensions and size of wire as specified in item. The wire shall be sound, free from slits, surface flaws, rough jagged and imperfect edges and other harmful surface defects and shall conform to I.S. 280-1978.

**M-37 PLYWOOD :**

- 37.1 The Plywood for general purpose shall conform I.S. 303-1975. Plywood is made by cementing together thin boards or sheets of wood into panels. There are always an odd number of layers 3, 5, 7, 9 ply etc. The plies are placed so that the grain of each layer is at right angles to the grain in the adjacent layers.
- 37.2 The chief advantage of plywood over a single board of the same thickness is the more uniform strength of the plywood along the length and width of the plywood and greater resistance to cracking and slitting with change in moisture content.
- 37.3 Usually synthetic resins are used for glueing. Phenolic resins are usually cured in a hot press which compresses and simultaneously heats the plies between hot plates which maintain a temperature of 90 degree C. to 140 degree C. and a pressure of 11 to 14 Kg./Sq.cm. on the wood. The time of heating may be any thing from 2 to 60 minutes depending upon thickness.
- 37.4 When water glue are used the wood absorbs so much Water that the finished plywood must be dried carefully, When synthetic resins are used as adhesive the finished plywood must be exposed to atmosphere of controlled humidity until the proper amount of moisture has been absorbed.
- 37.5 According to I.S. : 303-1975 the plywood for general purpose shall be of three grades namely BWR.WWR and CWR depending upon the adhesives used for bonding the veneers and it shall be further classified into six types namely AA, AB, AC, BB, BC and CC based on the quality of the two faces, each face being of three kinds namely A, B and C. After pressing, the finished plywood shall be reconditioned to a moisture content not less than 8 percent and not more than 16 percent.

**TABLE**

**37.6 THICKNESS OF PLYWOOD BOARDS**

Board	Thickness
3 Ply	3 mm
	4 mm
	5 mm
	6 mm
5 Ply	5 mm
	6 mm
	8 mm
	9 mm
7 Ply	9 mm
	13 mm
	16 mm



9 Ply	13 mm
	16 mm
	19 mm
11 Ply	19 mm
	22 mm
	25 mm

### M-38 GLASS :

38.1 All glass shall be of the best quality, free from specks, bubbles, smokes, veins, air holes blisters and other defects. The kind of glass to be used shall be as mentioned in the item or Specification or in the special provisions or as shown in detailed drawings. Thickness of glass panes shall be uniform. The Specifications for different kinds of glass shall be as under ----

#### 38.2 Sheet Glass :

38.2.1 In the absence of any specified thickness or weight in the item or detailed Specifications of the item of Work, sheet glass shall be weighing 7.5 Kg./Sq.m. for panes up to 600 mm. x 600 mm.

38.2.2 For panes larger than 600 mm. x 600 mm. and up to 800 mm. x 800 mm. glass weighing not less than 8.75 Kg./Sq.m. shall be used. For bigger panes up to 900 mm. x 900 mm. glass weighing not less than 11.25 Kg./Sq.m. shall be used.

38.2.3 Sheet glass shall be patent flattened glass of best quality and for glazing and framing purposes shall conform to I.S. 761-1960. Sheet glass of the specified colours shall be used, if so shown on detailed drawings or so specified. For important buildings and for panes with any dimensions over 900 mm. plate glass of specified thickness shall be used.

#### 38.3.0 Plate Glass :

38.3.1 When plate glass is specified it shall be "Polished Patent Plate Glass" of best quality. It shall have both the surface ground flate and parallel and polished to obtain clear undistured vision and reflection. The plate glass shall be of the thickness mentioned in the item or as shown in the detailed drawing or as specified. In the absence of any specified thickness, the thickness of plate glass to be supplied shall be 6 mm. and a tolerance of 0.20 mm. shall be admissible.

#### 38.4.0 Obscured Glass :

38.4.1 This type of glass transmits light so that vision is partially or almost completely obscured. Glass shall be plain rolled, figured, ribbed or fluted, or frosted glass as may be specified as required. The thickness and type of glass shall be as per details on drawings or as specified or as directed.

#### 38.5.0 Wired Glass :

Glass shall be with wire netting embedded in a sheet of plane glass. Electrically welded 13 mm. Geogain square mesh shall be used. Thickness of glass shall not be less than 6 mm. wired glass shall be of type and thickness as specified.

### M-39 ACRYLIC SHEETS :

39.1 Acrylic sheets shall be of thickness as specified in the item and of a specified shape and size as the case may be. Panels may be flat or curved. It shall be light in weight. It shall be colourless or coloured or opaque as specified in the item. Colourless sheet shall be as transparent as the finest optical glass. Its light transmission rate shall be about 95%. Transparency shall not be affected for the sheets of larger thickness. It shall be extremely resistant to sunlight, weather and low temperatures. It shall not show any significant yellowing or change in physical properties or loss of light transmission over a longer period of use.

The sheet shall be impact resistant also. Sheets shall be available in complete range of standard transparent, translucent and opaque colours. Sheets shall be available in complete range of standard



transparent, translucent and opaque colours. Sheets shall be of such quality that they can be cut, bent and jointed as desired. Solution for the joints shall be used as per the requirement of manufacture.

#### **M-40 PARTICLE BOARD :**

40.1 The particle boards used for face panels shall be of best quality free from any defects. The particle boards shall be made with phenolmaldehyde adhesive. The particle boards shall conform to I.S. 3087-1965. "Specification for wood particle board for general purpose." The size and the thickness of the particle board shall be as specified.

#### **M-41 EXPANDED POLYSTYRENE OR FRAMES STYROPER SLEBS :**

41.1 The expanded polystyrene ceiling boards and tiles shall be of approved make and shall be of size, thickness, finish and colour as indicated. It shall be of high density and suitable for use as insulating material. The insulating material shall be like slab of thermocole etc.

#### **M-42 RESIN BONDED FIBRE GLASS :**

42.1 The resin bonded fibre glass tiles or rools shall be of approved make and shall be sizes, thickness and finish as indicated.

42.2 For test of Mineral wool thermal insulation Blanket I.S. 3144-1965 followed.

42.3 Insulation wool blanket shall be with the following coverings on one or both sides as indicated.

- (1) Bituminised jessian kraft paper suitable for use in position where moisture has to be excluded.
- (2) Hessain cloth or Kraft paper for keeping out dust.
- (3) G. I. wire netting, suitable or surfaces to be plastered over.

#### **M-43 FIXTURES & FASTENINGS :**

##### **General ---**

- i] The fixtures and fastenings, that is, butt, hinges, tee and strap hinges, sliding door bolts, tower bolts, door latch, bath-room latch, handles, door stoppers, casement window fasteners, casement stays and ventilator catch shall be made of the metal as specified in the item or its Specifications.
- ii] They shall be of iron, brass, aluminium, chromium plated iron, chromium plated brass, copper oxidised iron, copper oxidised brass or anodised aluminium as specified.
- iii] The fixtures shall be heavy, medium or light type. The fixtures and fastenings shall be smooth finished and shall be such as shall ensure ease of operation.
- iv] The samples of fixtures and fastenings shall be got approved as regards quality and shape before providing them in position.
- v] Brass and anodised aluminium fixtures and fastenings shall be bright finished.

##### **Holdfasts :**

- i] Holdfasts shall be made from mild steel flat 30 cm. length and one of the holdfasts shall be bent at right angle and two nos. of 6 mm. dia. hooles shall be made in it for fixing it to the frame with screws. At the other end, the holdfast shall be forked and bent at right angles in opposite directions.

##### **Butt Hinges :**

- i] Railway standard heavy type butt hinges shall be used when so specified.



- i] Tee and strap hinges shall be manufactured from M.S. sheet.

**Sliding Door Bolts (Aldrops) :**

- i] The aldrops as specified in the item shall be used and shall be got approved.

**Tower Bolts (Barrel Type) :**

- i] Tower bolts as specified in the item shall be used and shall be got approved.

**Door Latch :**

- i] The size of door latch shall be taken as the length of latch.

**Bathroom Latch :**

- i] Bathroom latch shall be similar to tower bolt.

**Handle :**

- i] The size of the handles shall be determined by the inside grip length of the handles. Handles shall have a base plate of length 50 mm. more than the size of the handle.

**Door Stoppers :**

- i] Door stoppers shall be either floor door stopper type or door catch type. Floor stopper shall be of overall size as specified and shall have a rubber cushion.

**Door Catch :**

- i] Door catch shall be fixed at a height of about 900 mm. from the floor level such that one part of the catch is fitted on the inside of the shutter and other part is fixed in the wall with necessary wooden plug arrangements for appropriate fixity. The catch shall be fixed 20 mm. inside the face of the door for easy operation of catch.

**Wooden Door Stop With Hinge :**

- i] Wooden door stop of size 100 mm. x 60 mm. x 40 mm. shall be fixed on the door frame with a hinge of 75 mm. size and at a height of 900 mm. from the floor level. The wooden door stop shall be provided with 3 coats of approved oil paint.

**Casement Window Fastner :**

- i] Casement window fastener for single lead window shutter shall be left or right handed as directed.

**Casement Stays (Straigot Peg,Stay) :**

- i] The stays shall be made from a channel section having three holes at appropriate position so that the window can be opened either fully or partially as directed.

Size of the stay shall be 250 mm. to 300 mm. as directed.

**Ventilator Catch :**

- i] The pattern and shape of the catch shall be as approved.

**Pivot :**

- i] The base and socket plate shall be made from minimum 3 mm. thick plate, and projected pivot shall not be less than 12 mm. dia. and 12 mm. length and shall be firmly riveted to the base plate case of iron pivot and in single piece base in the case of brass pivot.



#### **M-44 PAINTS :**

##### **44.1 Oil Paints :**

Oil paints shall be of the specified colour and shade, and as approved. The ready mixed paints shall only be used. However, if ready mixed paint or specified shade or tint is not available white ready mixed paint with approved stainer shall be allowed. In such a case, the Contractor shall ensure that the shade of the paint so allowed shall be uniform. All the paints shall meet with the following general requirements ---

- i] Paint shall not show excessive setting in a freshly opened full can and shall easily be redispersed with paddle to a smooth homogeneous state. The paint shall show no curdling, livering, caking or colour separation and shall be free from lumps and skins.
- ii] The paint as received shall brush easily, possess good levelling properties and show no running or sagging tendencies.
- iii] The paint shall not skin within 48 hours in a three quarters filled closed container.
- iv] The paint shall dry to a smooth uniform finish free from roughness, grit unevenness and other imperfections.

Ready mixed paint shall be used exactly as received from the manufacturers and generally according to their instructions and without any admixtures whatsoever.

##### **44.2 Enamel Paints :**

The enamel paint shall satisfy in general requirements as mentioned in Specification of oil paints. Enamel paints shall conform to I.S. 2933-1975.

#### **M-45 FRENCH POLISH :**

The french polish of required tint and shade shall be prepared with the below mentioned ingredients and other necessary Materials :

- i] Denatured spirit of approved quality.
- ii] Shellac.
- iii] Chandras.
- iv] Pigment.

The french polish so prepared shall conform to I.S. 348- 1968.

#### **M-46 MARBLE CHIPS FOR MARBLE MOSAIC TERRAZZO :**

46.1 The marble chips shall be of approved quality and shades. It shall be hard, sound, dense and homogeneous in texture with crystalline and coarse grains. It shall be uniform in colour and free from stains, cracks, decay and weathering.

46.2 The size of various colours of marble chips ranging from the smallest up to 20 mm. shall be used where the thickness of top wearing layers is 6 mm. in size. The marble chips of approved quality and colours only as per grading as decided by the Engineer-in-Charge shall be used for marble mosaic tiles or Works.

46.3 The marble chips shall be machine crushed. They shall be free from foreign matter, dust etc. Except as above the chips shall conform to I.S. 2114-1962.

#### **M-47 FLOORING TILES :**



A] Plain Cement Tiles –

- 47.1.1 The plain cement tiles shall be of general purpose type. These are the tiles in the manufacture of which no pigments are used. Cement used in the manufacture of tiles shall be as per Indian Standards.
- 47.1.2 The tiles shall be manufactured from a mixture of cement and natural aggregates by pressure process. During manufacture, the tiles shall be subjected to a pressure of not less than 140 Kg./Sq.cm. The proportion of cement to aggregate in the backing of the tiles shall be not leaner than 1:3 by weight. The wearing face, though the tiles are of plain cement, shall be provided with stone chips of 1 to 2 mm size. The proportion of cement to the marble chips aggregate in the wearing layer of the tiles shall be three parts of cement to one part of chips by weight. The minimum thickness of wearing layer shall be 3 mm. The colour and texture of wearing layer shall be uniform throughout its face and thickness. On removal from mould, the tiles shall be kept in moist condition continuously at least for seven days and subsequently, if necessary, for such long period as would ensure their conformity to requirements of I.S. 1237- 1980 requiring resistance to wear and water absorption.
- 47.1.3 The wearing face of the tiles shall be plain, free from projections, depressions and cracks and shall be reasonably parallel to the back face of the tile. All angles shall be right angle and all edges shall be sharp and true.
- 47.1.4 The tile sizes shall generally be square shape 24.85cm. x 24.85cm. or 25cm. x 25cm. The thickness of the tiles shall be 20 mm.
- 47.1.5 The tolerance of length and breadth shall be plus or minus 1 mm. The tolerance on thickness shall be plus 5 mm.
- 47.1.6 The tiles shall satisfy the tests as regards transverse strength, resistance to wear and water absorption as per I.S. 1237-1980.

47.2 B] Plain Coloured Tiles :

- 47.2.1 These tiles shall have the same Specifications as for plain cement tiles as per (A) above except that they shall have a plain wearing surface wherein pigments are used. They shall conform to I.S. 1237-1980.
- 47.2.2 The pigment used for colouring cement shall not exceed 10% by weight of cement used in the mix. The pigments, synthetic or otherwise, used for colouring tiles shall have permanent colour and shall not contain Materials : detrimental to concrete.
- 47.2.3 The colour of the tiles shall be specified in the item or as directed.

47.3 C] Marble Mosaic Tiles :

- 47.3.1 These tiles have the same Specifications as per plain cement tiles except the requirements as stated below ---
- 47.3.2 The marble mosaic tiles shall conform to I.S. 1237-1980. The wearing face of the tiles shall be mechanically ground and filled. The wearing face of tiles shall be free of projections, depressions and cracks and shall be reasonably parallel to the back face of the tiles. All angles shall be right angles and all edges shall be sharp and true.
- 47.3.3 Chips used in the tiles be from smallest up to 20 mm. size. The minimum thickness of wearing layer of tiles shall be 6 mm. For pattern of chips to be laid on the wearing face, a few samples with or without their full size photographs as directed shall be presented to the Engineer-in-Charge for approval.
- 47.3.4 Any particular samples, if found suitable shall be approved by the Engineer-in-Charge, of he may ask for particular sized chips to be more or less in the sample presented. The samples shall have to be made by the Contractor till a suitable sample finally approved for use in the Work. The Contractor shall ensure that the tiles supplied for the Work shall be in conformity with the approved sample only,



in terms of its dimensions, thickness of backing layer and wearing surface, Materials :, ingredients, colour shade, chips, distribution etc. required.

47.3.5 The tiles shall be prepared from cement conforming to Indian Standards or coloured portland cement generally depending upon the colour of tiles to be used or as directed.

47.4 D] Chequered Tiles :

47.4.1 Chequered tiles shall be plain cement tiles or marble mosaic tiles. The former shall have the same Specification as per (A) above and the latter as per marble mosaic tiles as per (C) except as mentioned below.

47.4.2 The tiles shall be of nominal size of 250mm. x 250mm. or as specified. The centre to centre distance of the chequer shall not less than 25mm. and not more than 50mm. The overall thickness of the tile shall be 22mm.

47.4.3 The grooves in the chequers shall be uniform and straight. The depth of the grooves shall not be less than 3mm. The chequered tiles shall be plain, coloured or mosaic as specified. The thickness of the upper layer measured from the top of the chequers shall not be less than 6mm. The tiles shall be given the first grinding with machine before delivery to site.

47.4.4 Tiles shall conform to relevant I.S. 1237-1980.

47.5 E] Chequered Tiles for Staircases :

47.5.1 The requirements of these tiles shall be the same as chequered tiles as per (D) above except in following respects :

- i] The length of a tile including nose shall be 330 mm.
- ii] The minimum thickness shall be 28 mm.
- iii] The nosing shall have also the same wearing layer at the top.
- iv] The nosing edge shall be rounded.
- v] The front portion of the tile for a minimum length of 75mm. from and including the nosing shall have grooves running parallel to nosing and at centres not exceeding 25mm.

Beyond that the tiles shall have normal chequer pattern.

#### **M-48 ROUGH KOTAH STONE :**

48.1 The kotah stones shall be hard, even, sound and regular in shape and generally uniform in colour. The colour of the stone shall generally be green. Brown coloured stones shall not be allowed for use. They shall be without any soft veins, cracks or flaws.

48.2 The size of the stones to be used for flooring shall be size 600mm. x 60mm. and/or size 600mm. x 450mm. as directed. However, smaller sizes shall be allowed to be used to the extent of maintaining the required pattern. Thickness shall be as specified.

48.3 Tolerance of minus 30 mm on account of chisel dressing of edges shall be permitted for length as well as breadth. Tolerance in thickness shall be plus 3mm.

48.4 The edges of stones shall be truly chiselled and table rubbed with coarse sand before paving. All angles and edges of the stone shall be true, square and free from chipping and the surface shall be true and plain.

48.5 When machine cut edges are specified, the exposed edges and the edges at joints shall be machine cut. The thickness of the exposed machine cut edges shall be uniform.

#### **M-49 POLISHED KOTAH STONES :**

49.1 Polish kotah stone shall have the same Specifications as per rough kotah stone except as mentioned below.



- 49.2 The stone shall have machine polished smooth surface. When brought on site, the stones shall be single polished or double polished depending upon its use. The stones for paving shall generally be single polished. The stones to be used for dedo, skirting, platforms, sills, steps etc. where machine polishing after the stones are fixed in situ is not possible shall be double polished.

**M-50 DHOLPUR STONE SLAB :**

- 50.1 Dholpur stone slab shall be of best quality as approved by the Engineer-in-Charge. The stone slab shall be without any veins, cracks, and flaws. The stone slab shall be even, sound and durable, regular in shape and uniform colour.
- 50.2 The size of the stone shall be as specified in the item or detailed drawing or as approved by the Engineer-in-Charge. The thickness of the stone shall be as specified in the item of Work with the permissible tolerance of plus or minus 2 mm. The provisions in respect of polishing as for polished kotah stone shall apply to polished Dholpur stone also. All angles and edges of the face of stone slab shall be fine chiselled or polished as specified in the item of Work and all the four edges shall be machine cut. All angles and edges of the stone slab shall be true and plane.
- 50.3 The sample of stone shall be got approved from the Engineer-in-charge for shade and tint for a particular Work. It shall be ensured the stones to be used in a particular Work shall not differ much in shade or tint from the approved sample.

**M-51 MARBLE SLAB :**

Marble slabs shall be white or of other colour and of best quality as approved by the Engineer-in-Charge. Slab shall be hard, close, uniform and in texture. They shall also be free defects and cracks. The surface shall be machine polished to an even and perfectly plane surface and the edges, machine cut true and square. The rear face shall be rough enough to provide key for the mortar.

Marble slabs with natural veins, if selected shall have to be laid as per the pattern given by the Engineer-in-Charge. Size of the slabs shall be minimum 450mm. x 450mm. and preferably 600mm. x 600mm. However, smaller sizes shall be allowed to be used to the extent of maintaining required pattern.

The slab shall not be thinner than the specified thickness at its thinnest part. A few specimen of finished slab to be used shall be deposited by the Contractor in the office for reference.

Except as above, the marble slabs shall conform to I.S. 1130-1969 or as revised from time to time.

**M-52 GRANITE STONE SLAB :**

- 52.1 Granite shall be of approved colour and quality, The stone shall be hard even, sound and regular in shape and generally uniform in colour. It shall be without and soft veins, cracks or flaws.
- 52.2 The thickness of the stone shall be specified in the item.
- 52.3 All exposed faces shall be double polished to tender truly smooth and even reflecting surface. The exposed edges and corners shall be rounded off as directed. The exposed edges shall be machine cut and shall have uniform thickness.

**M-53 P.V.C. FLOORING :**

- 53.1 P.V.C. sheets for P.V.C. floor covering shall be homogenous flexible type, conforming to I.S. 3462-1966. The P.V.C. covering shall neither develop any toxic effect while put to use nor shall give off any disagreeable odour.
- 53.2 Thickness of flexible type covering or tiles shall be as specified in the description of the item.





53.3 The flexible type shall be backed with hessain or other woven fabric. The following tolerance shall be applicable on the nominal dimensions of the sheet rolls or tiles :

- |     |                         |                   |
|-----|-------------------------|-------------------|
| (a) | Thickness               | +/- 0.15 mm       |
| (b) | Length or width         |                   |
|     | 1. 300 mm Square tiles  | +/- 0.20 mm       |
|     | 2. 600 mm Square tiles. | +/- 0.40 mm       |
|     | 3. 900 mm Square tiles. | +/- 0.60 mm       |
|     | 4. Sheets and rolls.    | +/- 0.10 percent. |

53.4 Adhesive :

53.4.1 The adhesive for PVC flooring shall be of the type and make recommended by the manufacturers of PVC sheets tiles.

#### M-54 FACING TILES :

54.1 The facing tiles (burnt clay facing bricks) shall be free from cracks, flaws, and nodules of free lime. They shall be thoroughly burnt and shall have plane rectangular faces with parallel sides and sharp straight right angled faces. The texture of the finished surface that shall be exposed when in place, shall conform to an approved sample consisting not less than four stretcher bricks each representing resistance to penetration by rain and greater durability than common bricks. The tiles shall conform to I.S. 2691-1972.

54.2 The standard size of facing brick tiles shall be 19 x 9 x 4 cms. The facing brick tiles shall be provided with frog which shall conform to I.S. 1077-1976.

54.3 The permissible tolerance in dimensions specified above shall be as follows.

Size	Tolerance for	
	1st class Brick	2nd Class Brick
19 cm	+/- 6 mm	+/- 10 mm
9 cm	+/- 2 mm	+/- 7 mm
4 cm	+/- 1.5 mm	+/- 3 mm

The tolerance for distortion or warpage of face or edges of individual brick from a plane surface and from a straight line respectively shall be as follows :

Facing dimensions.	Permissible tolerance.
--------------------	------------------------

Max. below 19 cms.	Max. 2.5 mm.
Max. above 19 cms.	Max. 3.0 mm

54.5 The average compressive strength obtained as a sample of five tiles when tested in accordance with the procedure as per I.S. 1077-1976 shall be not less than 175 Kg/Sq.cm. The average compressive strength of any individual brick shall not less than 160 Kg/Sq.cm.

54.6 The average water absorption for five brick tiles shall not exceed 12 percent of average weight of brick before testing. The absorption for each individual brick shall not exceed 25 percent.

54.7 The brick tiles when tested in accordance with I.S. 1077-1976 the rate of efflorescence shall not be more than "Slightly effloresced".

#### M-55 White Glazed Tiles :

55.1 The tiles shall be of best quality as approved by the Engineer-in-Charge. They shall be flat and true to shape. They shall be free from cracks, crazing, spots, chipped edges and corners. The glazing shall be of uniform shade.

55.2 The tiles shall be of nominal size of 150mm. x 150mm. unless otherwise specified. The maximum variation from the stated sizes, other than the thickness of tile, shall be plus or minus 1.5mm. The thickness of the tile shall be 6mm. except as above the tiles shall conform to I.S. 777-1970.



**M-56 GALVANISED IRON PIPES AND FITTINGS :**

Galvanized iron pipe shall be of the medium type and of required diameter and shall comply with I.S. 1239-1979. The specified diameter of the pipes shall refer to the inside diameter of the bore. Clamps, screw and all galvanised iron fittings shall be of the standard 'R' or equivalent make.

**M-57 BIB COCK AND STOP COCK :**

57.1 A bib cock is a draw off tap with a horizontal inlet and a free outlet. A stop cock is a valve with a suitable means of connection for insertion in a pipe line for controlling or stopping the flow.

57.2 They shall be of screw down type and or brass chromium plated and of diameter as specified in the description of the item. They shall conform to I.S. 781-1977 and they shall be of best Indian make. They shall be polished bright.

57.3 The minimum finished weight of bib cock and stop shall be as given below ---

Dia.	Bib Cock	Stop Cock	Dia.	Bib Cock	Stop Cock
8 mm.	0.25 Kg.	0.25 Kg.	15 mm.	0.40 Kg.	0.40 Kg.
10 mm.	0.30 Kg.	0.35 Kg.	20 mm.	0.75 Kg.	0.75 Kg.

**M-58 GUN METAL WHEEL VALVE :**

58-1 The gun metal wheel valve shall be of approved quality. These shall be of gun metal fitted with wheel and shall be of gate valve opening full way and of the size as specified. These shall conform to I.S. 778-1971.

**M-59 WHITE GLAZED PORCELAIN WASH BASIN :**

59.1 Wash basin shall be of white porcelain first quality best Indian make and it shall conform to I.S. 2556-(Part-IV)-1972 and I.S. 771-1979. The size of the wash basin shall be as specified in the item. The wash basin shall be of one piece construction with continued over-flow arrangements. All internal angles shall be designed so as to facilitate cleaning. Wash basin shall have single tap hole or two holes as specified. Each basin shall have a circular waste hole which is either rebated or bevelled internally with 65 mm. dia. at top and 10 mm. depth to suit the waste fitting. The necessary stud slot to receive the bracket on the under side of the basin shall be provided. Basin shall have an internal soap holder recess which shall fully drain into the bowl.

59.2 White glazed pedestal of the quality and colour as that of 59.2 White glazed pedestal; pf the quantity and colour as that of the basin shall be provided where specified in the item. It shall be completely recessed at the back for reception of supply and water pipe. It shall be capable of supporting the basin rigidly and adequately and shall be so designed as to make the height from the floor to top of the rim of basin 750 mm. to 800 mm. as directed.

**M-60 EUROPEAN TYPE WATER COLSET / WITH LOW LEVEL FLUSHING :**

60.1 The European type water closet shall be white glazed conforming to I.S. 2556-1973 and I.S. 771-1679.

60.2 'S' trap shall be provided as required with water seal not less than 50 mm. The solid plastic seat and cover shall be of the best Indian make conforming to I.S. 2548-1980. They shall be made of moulded synthetic Materials : which shall be tough and hard with high resistance to solvents and shall be free from blisters and other surface defects and shall have chromium plated brass hinges and rubber butter of suitable size.

**M-61 ORISSA TYPE WATER CLOSED :**

The Specification of Orissa type white glazed water closet of first quality shall conform to I.S. 2556 (Part-III) 1981 and relevant Specification of Indian type water closet except that pan shall be with the integral squaring pan of size 580 mm x 440 mm. with raised footrest.



#### **M-62 INDIAN TYPE WATER CLOSET :**

The Indian type white glazed water closet of first class quality, size as specified in the item and conforming to I.S. 771-1979 and I.S. 2556-(Part-II)-1981. Each pan shall have integral flushing ring of suitable type with adequate number of holes all around as directed to have satisfactory flushing. It shall also have an inlet at back of front for connecting flush pipe as directed. The inside of the bottom of the pan shall have sufficient slope from the front towards the outlet and the surface shall be uniform and smooth. Pan shall be provided with 100 mm. diameter 'P' or 'S' trap with approximately 50 mm. water seal and 50 mm. diameter vent horn.

#### **FOOT RESTS :**

A pair of white glazed earthen ware rectangular foot rests of minimum size 250 mm. x 130 mm. x 20 mm. shall be provided with the water closet.

#### **M-63 GLAZED EARTHEN WARE SINK :**

The glazed earthenware sink shall be of specified size, colour and quality. The sink shall conform to I.S. 771- Part-II-1979. The brackets for sinks shall conform to I.S. 775-1970.

The pipes shall conform to I.S. 1239-Part-I-1973 and I.S. 404-1962 for steel and lead pipes respectively. 32 mm. brass waste coupling of standard pattern with brass chain and rubber plug shall be provided with sink.

#### **M-64 GLAZED EARTHEN WARE LIPPED TYPE FLAT BACK URINAL/CORNER TYPE URINAL :**

The lipped type urinal shall be flat back or corner type as specified in the item and shall conform to I.S. 771-1979. It shall be of best Indian make and size as specified and approved by the Engineer-in-Charge. The flat back or corner type urinal must be of first class quality, free from any defects, cracks etc.

#### **M-65 LOW LEVEL ENAMEL FLUSHING TANK :**

65.1 The low level enamel flushing tank shall be of 15 litres capacity. It shall conform to I.S. 774-1971. The flushing cistern shall be of best quality and free from any defects. The flushing tank shall have outlet 32 mm diameter. The outlet shall be connected with W.C. Pan by lead pipe of P.V.C. pipe as specified. The flushing tank shall be provided with inlet and outlet for fixing G.I. inlet pipes and over flow pipes. The flushing cistern shall be provided with chromium plated handle for flushing. The flushing tank shall be provided with bracket of cast iron so that it can be fixed on wall at specified height. The brackets shall conform to I.S. 775-1970.

#### **M-66 CAST IRON FLUSHING CISTERN :**

66.1 The cast iron flushing cistern shall be of 15 litres capacity. It shall conform to I.S. 774-1971. The flushing cistern shall be of best quality free from any defects.

66.2 The flushing cistern shall have outlet of 32 mm diameter. The outlet shall be connected to lead pipe of 32 mm diameter. The lead pipe shall conform to I.S. 404 (Part-I) 1962. For fixing G.I. inlet pipes and overflow pipe 20 mm dia. inlet and outlet shall be provided. The flushing cistern shall be provided with galvanised iron chain and pull of sufficient length and shall be got approved from the Engineer-in-Charge. The cast iron flushing cistern shall be painted with one coat of anticorrosive paint and two coats of paints. The flushing cistern shall be fixed on to C.I. brackets. The brackets shall conform to I.S. 775-1970.

#### **M-67 FLUSH COCK :**

Half turn flush cock (heavy weight) shall be of gun metal chromium plated of diameter as specified in the description of the item. The flush cock shall conform to relevant Indian Standards.



**M-68 CAST IRON PIPES AND FITTINGS :**

- 68.1 All soil, waste, vent and antisiphonage pipes and fittings shall conform to I.S. 1729-1964. The pipes shall have spigot and socket ends with head on spigot end. The pipes and fittings shall be true to shape, smooth, cylindrical their inner and outer surfaces being as nearly as practicable concentric. They shall be sound and nicely cast and shall be free from cracks, laps, pin holes or other imperfections and shall be neatly dressed and carefully fettled.
- 68.2 The end of pipes and fittings shall be reasonably square to their axis.
- 68.3 The sand cast iron pipes shall be of the diameter as specified in the description and shall be in length of 1.5 M., 1.8 M. & 2.0 M. including socket ends of the pipe unless shorter length are either specified or required at junction etc. The pipes and fittings shall be supplied without ears unless specified or directed otherwise.
- 68.4 Tolerances : The standard weights and thickness of pipes shall be as shown in the table below. A tolerance up to minus 10% may however be allowed against these standard weights.

Sr.No.	Nominal Dia. Of bore	Overall thickness	Weight of pipes excluding Ears		
			1.5 M.long	1.8 M.long	2 M.long
1.	75 mm	5.0 mm.	12.83 Kg.	16.52 Kg.	16.37 Kg.
2	100 mm	5.0 mm	19.14 Kg.	21.67 Kg.	24.15 Kg.
3	150 mm				
4	250 mm				

A tolerance up to minus 15% in thickness and 20 mm. in length shall be allowed. For fittings tolerance in lengths shall be plus 25 mm. and minus 10 mm. The thickness of fittings and their socket and spigot dimensions shall conform to the thickness and dimensions specified for the corresponding sizes of straight pipes. The tolerance in weights and thickness shall be the same as for straight pipes.

**M-68-A P.V.C. Pipes & Fittings :**

- 1. All soil, waste and vent pipes & fittings shall conform to I.S. 4985-1988 & I.S. 13592:1992. The pipes are provided with an integral rubber ring type socket at one end while the other end in kept plain, smooth & free from burrs. The pipes and fittings shall be true to shape, smooth & cylindrical. They shall be free from cracks, laps, pinholes or other imperfection and shall be nearly dressed and carefully fettled.
- 2. The P.V.C. Pipes shall be of the diameter as specified in the description and shall be in length of 6.0, 3.0 & 1.8 m including socket ends of the pipe unless shorter length are either specified or required at junction etc. Tolerances on specified length shall be + 10 mm and - 0 mm.
- 3. Rubber real rings for joints and Access Doors shall be manufactured in accordance with IS: 5382. There are made out of natural rubber with a shore 'A' hardness of 40+5.
- 4.1 The mean outside diameter, outside diameter at any point and wall thickness manufactured plain or with socket shall be as shown in the following table:-

- All dimensions in millimeters.

Sr.No.	Nominal / Outside dia.	Mean Outside Diameter		Out side Diameter at any point		Wall thickness	
		Min.	Max.	Min.	Max.	Min.	Max.
1.	75	75.0	75.3	74.1	75.9	3.2	3.8
2.	110	110.0	110.4	108.6	111.4	3.2	3.8

- 4.2 Minimum Wall thickness of sockets on pipes & Dimensions of sliding socket of pipes shall be as shown in following table.

- All dimensions in millimeters.



Sr.No.	Nominal / Outside dia.	Minimum wall thickness of sockets on pipes		Socket Depth Min.	Mean inside Diam. Of socket at Mid point	
		S2, Min.	S3, Min.		Min.	Max.
1.	75	2.9	2.4	40.0	75.1	75.3
2.	110	2.9	2.4	48.0	110.1	110.4

\* The outside diameter of pipe shall be obtained by the method given in IS: 12235(Part-1)-1986, wall thickness shall be measured by the method given in IS:12235(Part-2)1986.

- 4.3 The permissible variation between the mean outside diameter & the nominal outside diameter of a pipe shall be positive in the form + x, where x is less than or equal to greater of the following two values.  
a) 0.03 mm, and  
b) 0.003 x nominal outside diameter- rounded off to the next higher 0.1 mm.
- 4.4 The permissible variation between the outside diameter at any point (d1) & the nominal outside diameter (de) of a pipe shall not exceed the greater of the following two values.  
a) 0.5mm, and  
b) 0.012 de rounded off to the next higher 0.1
- 4.5 The thickness of fittings and their socket & spigot dimensions shall conform to the thickness and dimensions specified for the corresponding sizes of straight pipes.

**M-69 NAHNI TRAP :**

Nahni trap shall be of cast iron and shall be sound and free from porosity or other defects which affect serviceability. The thickness of the base metal shall not be less than 6.5 mm. The surface shall be smooth and free from crack, chips and other flaws or any other kind of defects which affect serviceability. The size of nahni trap shall be as specified and shall be of self cleansing design.

The nahni trap shall be of quality approved by the Engineer- in-charge and shall generally conform to the relevant Indian Standards.

The nahni trap provided shall be with deep seal, minimum 50 mm. except at places where trap with deep seal can not be accommodated. The cover shall be cast iron. Perforated cover shall be provided on the trap of appropriate size.

**M-70 GULLY TRAP :**

Gully trap shall conform to I.S. 651-1960. It shall be sound, free from defects such as fire cracks or hair cracks. The glaze of the traps shall be free from crazing. They shall give a sharp clear note when struck with light hammer. There shall be no broken blisters. The size of the gully trap shall be as specified in the item.

Each gully trap shall have one C.I. grating of square size corresponding to the dimensions, of inlet of gully trap. It shall also have a water tight C.I. cover with frame inside dimensions 300mm. x 300mm. the cover weighing not less than 4.53 Kg. and the frame not less than 2.72 Kg. The grating cover and frame shall be of sound and good casting and shall have truly square machined seating faces.

**M-71 GLAZED STONE WARE PIPE AND FITTINGS :**

The pipes and fittings shall be of best quality as approved by the Engineer-in-Charge. The pipe shall be of best quality manufactured from stone-ware of fire clay, salt glazed thoroughly burnt through the whole thickness, of a close even texture, free from air blows, fire blisters, cracks and other imperfections, which affect the serviceability. The inner and outer surfaces shall be smooth and perfectly glazed. The pipe shall be capable to withstand pressure of 1.5 m. lead without showing signs of leakage. The thickness of the wall shall not be less than (1/12)th of the internal dia. The depth of socket



shall not be less than 38 mm. The socket shall be sufficiently large to allow a joint of 6 mm. around the pipe. The pipes shall generally conform to relevant I.S. 651-1980.

**M-72 WALL PEG RAIL :**

72.1 The aluminium wall peg rail shall have three aluminium pegs of approved quality and size. It shall be fixed on teakwood plank of size 450 mm x 75 mm x 20 mm. The teak wood shall be french polished or oil painted as specified.

**M-73 G.I. WATER SPOUT :**

73.1 The G.I. pipes of 40 mm dia shall be of medium quality and specials shall be of 'R' brand or equivalent brand of best quality.

73.2 The pipe shall have length as required for the thickness of well in which it is fixed, and at the outside end tee and bend cut at half the length shall be provided and at either end coupling shall be provided and the have better fixing. The water spout shall be provided as per detailed drawings or as directed.

**M-74 ASBESTOS CEMENT PIPE (A.C. PIPE) :**

74.1 The asbestos cement pipe of diameter as specified in the description of the item shall conform to I.S. 1926-1980. Special like bends, shoes cowls, etc. shall conform to relevant Indian Standards. The interior of pipe shall have a smooth finish, regular, surface and regular internal diameter. The tolerance in all dimensions shall be as per I.S. 1926-Part-I-1980.

**M-75 CRYDON BALL VALVE :**

Ball valve of screwed type including polythene float and necessary lever etc. shall be of the size as mentioned in the description of item and shall conform to I.S. 1703-1977.

**M-76 BITUMEN FELT FOR WATER PROOFING AND DAMP PROOFING :**

76.1 Bitumen felt shall be on the fibre bases and shall be of type 2, self finished felt grade-2 and shall conform to I.S. 1322-1970.

**M-77 SELECTED EARTH :**

77.1 The selected earth shall be that obtained from excavated material or shall have to be brought from outside as indicated in the item. If item does not indicate anything, the selected earth shall have to be brought from outside.

77.2 The selected earth shall be good yellow soil and shall be got approved from the Engineer-in-Charge. In no case black cotton soil or similar expansive and shrinkable soil shall be used. It shall be clean and free from all rubbish and perishable Materials, stones or brick bats. The clods shall be broken to a size of 50 mm. or less. Contractor shall make his own arrangements at his own costs for land for borrowing selected earth. The stacking of Materials shall be done as directed by the Engineer-in-Charge in such a way as not to interfere with any constructional activities and in proper stacks.

77.3 When excavated material is to be used, only selected stuff got approved from the Engineer-in-Charge shall be used. It shall be stacked separately and shall comply with all the requirements of selected earth mentioned above.

**M-78 CRACK SEAL :**

Crack seal manufactured by Chemistik / Chemisol Indian Ltd., is an acrylic base ready application compound.

**M-79 CAST IRON STEPS :**



The cast iron steps shall be clean, well-cast and they shall be free from air and sand holes, cold shuts and warping which are likely to impair the utility of the castings. The portion of the step which projects from walls of the manhole shall have a raised required designed above the general plane of the top surface of the step along the edges of the tread to provide adequate non-slip grip. The steps shall be of dimensions 375 mm x 150 mm x 25 mm with necessary holding arrangement and carting minimum weight of 4.5 Kg. confirming to I.S. 5455-1969 or its latest version..

The cast iron steps shall be coated with a material having tar base or a place bituminous composition of cashew-nut shall liquid. The coating shall be smooth and tenacious. It shall not flow when exposed to a temperature of 63 degree C and shall not be brittle as to chip of at temperature of 0 degree C.

**M. 80. Medium duty black Polyethylene sheet :**

80.1. The medium duty black polyethylene sheet shall be from “Om Agor Industrial Plastics Pvt. Ltd.”, or “Profeel”, “Ramplast” or as approved by the Architect or Engineer-in-Charge.

It shall be produced by using a continuous, smooth chemical process, at constant pressure and temperature. The polyethylene sheets should be light weight, soft, smooth and flexible, which can be easily handled and laid. It shall be 100 % waterproof, acid proof, alkali proof, resistant and fully opaque.

It shall be fully impervious to provide a complete water barrier system. The tensile strength of the film shall not be less than 450 kg./cm<sup>2</sup>. The tear resistance of the film shall not be less than 3,200 gm/100/micron having 650 % ultimate elongation. The impact tensile strength & temperature resistance shall not be less than 2,000 kg./cm<sup>2</sup> and 90 degree C respectively.

The film shall be flexible having uniform thickness as specified in the respective item. It shall have long life in buried condition. Saline or mineral water and alkali content in soil or cement of most of the chemicals shall have no effect on the film. The shall discourage weed growth under the lining.

It shall be resistant to fungus, moth, toxic gases and agents having affinity to water. It shall have excellent bonding strength and thermal conductivity shall be 0.023 Kcal/m hr C. It shall conform to IS : 5913 and IS : 3792, wherever applicable. It shall prevent corrosion, chemical action, leakage,

**M. 81. AAC Block Building Element :**

81.1 The Aerated Autoclaved Blocks - building elements shall be machine molded, made in a factory. It shall be made from fine fly ash, together with lime, gypsum and cement binding agents, water and aluminum powder acting as a foaming agent.

The AAC cakes shall be steam cured for about 10-12 hours in auto claves at a temperature of 190 degrees C and a saturated steam pressure of 12 bars.

The blocks shall be machine cut into rectangular shape. They shall have smooth rectangular faces with sharp corners and shall be uniform in color. They shall be free from cracks, flaws and nodules of free lime.

81.2 The dimensions of AAC blocks shall be 625 mm. lengths with  $\pm 5$  mm. tolerances, 250 mm height and 100 mm. & 200 mm. thicknesses as specified. The AAC blocks shall be consistent and constant in dimensions, having minimum variations.

The only AAC blocks of one standard size shall be used on one work.

81.3 The AAC blocks shall have a density of 550 to 650 Kgs./Cmt. ( dry density ). The design density shall be 800 Kgs./Cmt. They shall be lightweight, having density which is 1/3<sup>rd</sup> the density of bricks and 1/4<sup>th</sup> the density of RCC, resulting in the reduction of dead loads on the structure, and consequently in the reduction in the size of the RCC structural elements, when compared to conventional Materials :



- 81.4 The AAC blocks shall have compressive strength as per IS 2185 part ( III), ( 1984 ), and its masonry is carried out as per IS 6041 ( 1985 ) and IS 1905 ( 1987 ).
- 81.5 The AAC blocks shall have Thermal Conductivity of 0.142 Kcal/ ( hr. ) ( deg C ) (M) and Sound Reduction Index of 37-49 dB depending upon thickness. The cellular structure, having millions of tiny air cells created during their manufacturing process, shall precise good thermal resistance and sound insulation, reducing the load on the air-conditioning systems, if provided, and making the living environment inside the building more comfortable both during summer and winter. The thermal resistance combined with the benefits of thermal mass inertia, low air in filtration shall reduce the need for additional insulation.
- 81.6 The AAC blocks shall be inorganic and totally incombustible providing 6 hours of fire rating for 200 mm. thick walls.
- 81.7 The AAC blocks shall be impervious to rot, insects and other pests.
- 81.8 The AAC blocks shall be inert, non-toxic and recyclable, causing no air pollution and illnesses indoors because of not being a source off gassing.
- 81.9 The AAC blocks shall have very easy workability, and they shall be easily cut, drill and nail by using normal hand tools or power tools. They can be cut into virtually any shape or angle, making them extremely adoptable.

**M. 82. MOLDED PANEL DOOR SHUTTERS :**

- 82.1 The molded panel door shutter shall be of the best quality from manufacturers such as Gujcon Molded Panel Doors or Masonite or .

The paneled door shutters shall be as per IS 2202 and IS 1003 The door shutters shall be of 32 mm. thickness, having two panels, the top panel being having an arch at the top, manufactured from Green Teak ( Non-teak ) wood duly processed under various treatments. The wood shall be seasoned in a modern seasoning plant as per IS 1141 and treated in high tech vacuum pressure chemical treatment plant, as per IS 401 and manufactured using latest wood working machinery, having strict quality control with latest electronic equipment, resulting in high level craftsmanship.

- 82.2 The door shutters shall be equivalent to teak wood doors in strength and durability.
- 82.3 The door shutters shall be 100 % termite & water resistant and absolutely free from fungal effects.
- 82.4 The molded panel door facing shall be of densified wood fiber plate, having 3.0 mm. thickness 3.33 Kgs./ S.Mt. base weight, 1.05 Gms/CC. density 20.7 Mpa modulus of structure matching the ASTM standard, D1037 Sec. 150-153, modulus of elasticity 3,800 Mpa, Cleavage ( Minimum load value ) 27 Kg., Minimum fiber/wood failure 75 %, 24 hour water soak absorption ( Maximum ) 45 % matching the ASTM standard 1037 Sec. 158-159, thickness swell ( Maximum ) 35 % modulus of structure matching the ASTM standard 1037 Sec. 158-159, tensile strength parallel to surface ( Minimum Value ) 10.3 Mpa modulus of structure matching the ASTM standard, D1037 Sec. 154-155 and Perpendicular to surface ( Minimum value ) 0.34 Mpa modulus of structure matching the ASTM standard, D1037 Sec. 156-157, immersion in boiling water no disintegration @ 100 + / - 3 degree C for 4 hours.





**M. 83. PEBBLES :**

- 83.1 The pebbles shall be brought in from riverbank, well rounded, without sharp edges, nearly white in color and having diameter of approximately 20 mm. to 50 mm.
- 83.2 The pebbles shall be free of pinholes and other impurity, and shall be approved by the architect.

**M. 84. CERAMIC TILES :**

- 84.1 Ceramic tiles shall be of 1<sup>st</sup> quality from manufacturers such as Siddharth, Spartek, Regency, Romano, Nitco or equivalent, as approved by the Architect.
- 84.2 Ceramic tiles shall be lightweight, with 8 mm. thickness with +- 5.0 % deviation. Therefore, they require thinner floor bedding compare to mosaic/stone flooring. On laying, they require no further polishing making the floor ready to live and use.
- 84.3 Ceramic tiles shall be of dimensions of 300 mm. x 300 mm. with +- 0.50 % deviation. All the sides shall be straight & square and the deviation allowed shall be maximum + - 0.40 %.
- 84.4 Ceramic tiles shall have plain and smooth surface quality, free of visual defects to the extent of minimum 95 % of tiles.
- 84.5 Ceramic tiles shall have no warping; their surface shall be flat, with maximum +- 0.5% deviation allowed.
- 84.6 Ceramic tiles shall have water absorption of no more than 4.0 %.
- 84.7 The bending strength of the ceramic tiles above 300 Kgs./Cm<sup>2</sup>.
- 84.8 The scratch resistant as per Moh's scale shall be minimum 5. The tiles shall be of group III quality abrasion resistant.
- 84.9 The crazing resistance of the ceramic tiles shall be in conformity with norms.
- 84.10 The resistance to staining of the ceramic tiles shall be minimum class II.
- 84.11 Ceramic tiles shall be resistant to all acids and alkalis except hydrofluoric acid and its compounds.
- 84.12 The thermal shock resistance shall be up to 10 cycles.



**M. 85. VITRIFIED FLOOR TILES :**

- 85.1 Vitrified floor tiles shall be of the best quality from manufacturers such as “Endura” by H. & R. JOHNSON ( INDIA ) LTD., Granamite or equivalent, as approved by the Architect and Engineer-in-Charge. They shall conform to the IS 4457.
- 85.2 They shall be monolithic and available in anti-skid finish, having the size of 300 mm. x 300 mm. x 10 mm. thick.
- 85.3 They shall be rectified, which is the process of sizing & squaring, leading to almost perfect edges and enabling tile installation with very minor joints, giving the installed tiles a joint-free look. They shall be pre-sized and pre-polished.
- 85.4 Maximum deviation in length  $\pm 0.3\%$ , maximum deviation in thickness  $\pm 2.0\%$ , maximum wedging allowed  $\pm 0.2\%$ , maximum surface flatness shall be  $\pm 0.2\%$ , water absorption capacity  $< 0.5\%$ , maximum Mohs hardness 8.0, flexural strength shall be of  $> 45 \text{ N/mm}^2$ , maximum Abrasion resistance  $< 144 \text{ mm}^3$ , maximum thermal expansion  $< 6 \times 10^{-6}$ , maximum thermal shock resistance shall be of no damage, resistance to acid ( wt. loss )  $< 0.4\%$ , Skid resistance ( friction coefficient )  $> 0.6$ , breaking strength shall be 2600 N, density of (  $\text{g/cm}^3$  ) shall be 2.4 & no moisture expansion.

**M. 86. CONCRETE TILES :**

- 86.1 The plain cement concrete tiles shall be manufactured using the basic raw material of white cement with the addition of special chemical & quartz chips, which give the tiles extra strength. The concrete tiles shall be highly durable having very superior structure properties such as high transverse and compressive strength, very low water absorption and very low surface abrasion, supplied by manufacturer such as Roughwalk series, “Mozzattera” by “Vyara Tiles”, or Terrarock Tiles by Super Tiles & Marble Pvt. Ltd. or equivalent, as approved by the Architect and Engineer-in-Charge.
- The tiles shall be manufactured using a vibration system and rubber moulds, under pressure. The tiles shall be subjected to a pressure of not less than 140 Kg./Cm<sup>2</sup>. The proportion of cement to aggregate, in the backing of the tiles shall be not less than 1 : 3, by weight.
- The tiles shall be shot blasted to give it a special texture. The top shall be treated the two coats of acrylic coating, and factory polished and honed, ready to be fix in the exterior.
- 86.2 The concrete tiles shall be generally square in shape having all angles at perfect right angles and all the edges being sharp & true, having a size of 400 mm. x 400 mm. x 34 mm. thick. The tolerance allowed in length & breadth shall be  $\pm 1.0 \text{ mm.}$  & tolerance allowed in thickness shall be  $+ 5 \text{ mm.}$
- 86.3 The tiles shall satisfy the test as regards transverse strength, resistance to wear absorption as per IS : 1237.

**Water Absorption :**

Sampling : 6 tiles out of every 3,000 tiles are taken for testing.

Result : Absorption permissible, shall be at the most 10 %.

**Transverse strength test :**

Sampling : 12 tiles out of every 3,000 tiles are taken for testing.

Result : When wet : 80 Kg./Cm<sup>2</sup>.

: When dry : 120 Kg./Cm<sup>2</sup>.

**Abrasion test :**

Sampling : 6 tiles out of every 3,000 tiles are taken for testing.

Result : Average abrasion shall not be more than 3.5 mm.



These tiles shall have plain wearing surface, wherein pigments are used. They shall conform to IS : 1237. The pigments used for coloring cement shall not exceed 10 % by weight of cement used in the mix. The pigments, synthetic or otherwise, used for coloring tiles shall have permanent color and shall not contain Materials : detrimental to concrete.

**M. 87. ASSAM PINE WOOD :**

87.1 Assam Pine wood shall be of first quality as required for the item to be executed, and shall be as approved by the Architect or Engineer-in-Charge. It shall be used only after kiln seasoning.

87.2 Assam Pine wood shall generally be free from large, loose, dead or cluster knots, flaws, shakes, warps, twists, bends, or any other defects.

It shall generally be uniform in substance and of straight fibers, as far as possible. It shall be free from decay, harmful fungi and other defects of harmful nature, which will affect the strength, durability and its usefulness for the purpose for which it is required. The color shall be uniform, as far as possible, with no white grains. Any efforts like painting, using any adhesive or resins Materials :, made to hide the defects, shall render the pieces liable to be rejected by the Engineer-in-Charge and the Architect.

All scantling, planks, etc. shall be sawn in straight lines and planes, in the direction of grains and shall be of uniform thickness.

Assam pine wood shall have no individual hard and sound knots, more than 6 cm<sup>2</sup>. in size and the aggregate area of such knots shall not be more than 1 % of the area of the piece. The timber shall be closed grained.

The Assam pine wood shall be applied with linseed oil without any color pigment or powder.

**M. 88. STAINLESS STEEL SINKS :**

88.1 The stainless steel shall be of the premium quality, genuine, "SALEM STAINLESS STEEL", AISI 304-18/8 stainless steel, by manufacturers such as "Nirali" or "Franke" or as approved by the Architect or Engineer-in-Charge.

It shall conform to IS : 13983 : 1994.

88.2 It shall be supplied with Plasti-Guard so as to protect it from being scratched in transit or during installation.

88.3 The S. S. sink have single bowl, having overall size 585 mm. x 485 mm., the bowl size 535 mm. x 432 mm., the depth of 178 mm. The thickness of the stainless steel shall be 1.60 mm.

88.4 The sink shall have choke-stop strainer, made from a combination of stainless steel & plastic in order to retain its sparkle to the years.

**M. 89. POLYCARBONATE SHEETS :**

89.1 Polycarbonate sheets for versatile glazing shall of the best quality such as "Lexan" from "GE Plastic India" or as approved by the Architect or Engineer-in-Charge.

It shall be meet all the requirements of BS : 6262. For impact performance, it shall meet the BS : 6206 requirements and for anti-bandit requirements, it shall conform to BS : 5544.

89.2 It shall be as transparent as glass, but shall have half its weight. It shall be tough and yet flexible. It shall have strong impact strength and shall offer thermal and sound insulation. It shall resist the effects of weather, shall be unbreakable and shall provide protection against forced intrusion. It shall be used for roof glazing, door and window glazing as well as privacy glazing, on many different types of buildings. As light weight, it shall be feasible to use it on wider spans. It promotes natural light and shall impart an impression of spaciousness.

89.3 It shall have tensile strength greater than 70 N/m<sup>2</sup>. Its flexural modulus shall be 2,500 N/m<sup>2</sup> and flexural yield strength shall be 100 N/mm<sup>2</sup>. It shall have an impact strength ( falling dart ) greater than 200 Nm. It shall have an indentation hardness – H358 10 of 98 N/mm<sup>2</sup> and H358 60 to 93 N/mm<sup>2</sup>. Its coefficient of linear expansion shall be 0.00067 per degree C and thermal conductivity shall, be 0.21 W/m.K. It shall have a specific gravity of 1.2 gm/cc. and water absorption @ 24 hrs. 23 degree C shall be 10 mg. Its elongation at break shall be greater than 100 %. It shall have a higher coefficient of thermal expansion. It shall allow light transmission of between 82 % and 90 %, ,



depending on the thickness of the sheet. It shall not transmit UV radiation up to 385 Nm. It shall resist the effect of chemicals. It shall have self-extinguishing, low flame spread characteristics and low fire propagation indices.

**M. 90. STAINLESS STEEL PIPES & PLATES :**

- 90.1. The stainless steel pipe shall be of 316 grade, best quality stainless steel.
- 90.2. The handrail shall be of 63 mm. diameter stainless steel pipe.
- 90.3. The pipes used for balustrade shall be of 20 mm. diameter stainless steel pipes.
- 90.4. The vertical support shall be of 25 mm. wide x 10 mm. thick stainless steel plates.

**M. 91. PVC / VINYL FLOORING :**

- 91.1. PVC sheets / tiles for PVC / Vinyl floor covering shall be of the best quality like 'LG Floors', 'Wonderfloor' or equivalent, as approved by the Architect and the Engineer-in-Charge. It shall be of homogeneous flexible type, conforming to IS : 3462. The PVC covering shall neither develop any toxic effect while put to use nor shall give off any disagreeable odour.
- 91.2. Thickness of flexible type covering tiles shall be as specified in the description of the item. The flexible type shall be backed with Hessian or other woven fabric. It shall be available in form of tiles of sizes up to 600 mm. x 600 mm. or rolls of 1.50 mts. width and of continuous length of 20 mts. The thickness shall be approximately 1.50 mm. to 2.0 mm. The dimensional stability shall be 0.30 %. The following tolerance shall be applicable on the nominal dimensions of the rolls or tiles :

Thickness : + 0.15 mm.

Length or Width :

- 1.30 mm. square tiles, + 0.20 mm.
- 3.90 mm. square tiles, + 0.60 mm.
- 2.60 mm. square tiles, + 0.40 mm.
- 4 sheets and roll, + 0.10 %.

- 91.3. It shall offer color fastness to daylight as per the relevant IS : 3462. Allowance for curling shall be 0.60 mm. It shall be flexible and shall not break, crack or show any signs of failure.
- 91.4. It shall offer above average resistance to mild and diluted acids, alkalies, soaps and detergents. It shall have high abrasion resistance. At normal temperature, it shall develop an indent of 0.15 mm., after one minute and 0.20 mm., after ten minutes. It shall offer insulation resistance as per the IS : 2259. It shall have a sound reduction factor of 3 db for 2.00 mm. thickness and 2 db for 1.50 mm. thickness. It shall have self extinguishing property and water absorption at room temperature for 24 hours shall be 0.10 %.
- 91.5. It shall be available in various designs and shall be recommended for floors and walls, in homes, institutions, commercial establishments, clinics and hospitals.
- 91.6. The adhesive for PVC flooring shall be of the type and make recommended by the manufacture of PVC sheets / tiles.

**M. 92. ALUMINIUM COMPOSITE PANELS :**

- 92.1. The aluminium composite panels ( ACP ) shall be of the premium quality, by manufacturers such as 'Eurobond' or 'Durabuild' or 'Aluma' or 'Alstrong' or 'Alex' or of equivalent quality as approved by the Architect or Engineer-in-Charge.
- 92.2. They shall be manufactured using the procedures of chromating, surface coating, processed LDPE Panel – sheet compound, petlamilating, etc., which are fully controlled by computers. The company must have passed ISO 9002 certification.
- 92.3. The ACPs shall be either 4 mm. or 3 mm. thick as specified in the detailed design drawings.
- 98.4. The ACPs, to be used for exterior purpose, shall have a surface treatment of Kynar 500 ( minimum 70 % ) PVDF coating, consisting of a thermoplastic resin core, laminated between two sheets of high



strength, 0.5 mm. thick aluminium boards-panels. The thermoplastic resin core shall be without toxicity. The aluminium boards shall be covered on one side with PVDF primer, PVDF face coating, PVDF light coating and finally a protecting film, and they shall be covered on the other side with anti-corrosive protecting film and anti-corrosive primer.

92.5. The minimum unit weight of 4 mm. thick ACPs shall be 5.50 Kgs./S.Mt. as per ASTM D792.

The resistant to outdoor temperature shall be as per ASTM D1654. The thermal expansion shall be 24-28 as per ASTM D648. Thermal conduction shall be 0.102 kcal/m.hr degree C. as per ASTM 976.

The flexural rigidity shall be  $14.0 \times 10^5$  as per ASTM C393.

The impact resistant shall be 1.650 kgf as per ASTM D372.

The adhesive strength shall be 0.78 kgs./mm. as per ASTM D903.

The sound insulating rate shall be 25 db as per ASTM E413.

The flexural elasticity shall be 4055 Kgs./mm<sup>2</sup> as per ASTM D790.

The shear resistant shall be 2.60 kgf/mm<sup>2</sup> as per ASTM D732.

The minimum bending radius shall be 70 mm. as per ASTM D790.

The fire propagation shall be as per ASTM E84.

The smoke developed shall be less than 45 as per ASTM E84.

The wind pressure resistant shall be as per ASTM E330.

The properties against water shall be as per ASTM E331.

The properties against air shall be as per ASTM E283.

92.6. The colors and the surface texture shall be as specified in the detailed design drawings.

92.7. The ACPs shall be easily processed using the normal wood working machines and tools. They shall be easily grooved on conventional grooving machines and CNC machining centers. Grooved ACPs shall be bent with jig, press brake or plate punch, using a top die having the desired radius, or with a three-roller bender.

92.8. The tolerances in width shall be  $\pm 0.2$  mm, in length shall be  $\pm 4$  mm, in thickness shall be  $\pm 0.2$  mm. in bow maximum 0.5 % of the length, and in square ness shall be maximum 5.0 mm.

#### **M. 93. ACRYLIC EMULSION PAINTS :**

93.1. It shall be from ICI, Nerolac, Asian Paints, Berger or equivalent, as approved by the Architect and Engineer-in-Charge. It shall conform to the relevant IS codes.

93.2. It shall be used on both interiors and exteriors, on all different types of plaster, wooden surfaces, stone, brickwork, asbestos cement sheets, hard and soft boards, etc. It shall render rich smooth finish and shall provide a tough film that forms a suitable protection against all elements.

93.3. It shall be water thinnable. It shall require no primer. On a well prepared surface, it shall be applied, after one coat of cement primer, in case it is an interior surface and waterproof cement coating, in case it is an exterior surface. On a new but highly absorbent surface, a thin coat of the same shall be applied by adding two parts of water by volume to two parts of acrylic emulsion by volume. On previously painted surfaces, one coat of the same shall be applied by thinning four parts of the emulsion with one or two parts of water. It shall be applied by brush, roller or spray. It shall have a covering capacity of 25 – 30 S.Mts./Liter, depending on the surface and shade used. It can be washed to remove the day-to-day dirt, after the surface has been painted, minimum for a month.

#### **M. 94. EXTERIOR PAINTS :**

94.1. It shall be from “Weathershield – Dulux from ICI”, “Jenson & Nicholson” or equivalent, as approved by the Architect and Engineer-in-Charge.

94.2. It is used for exterior surfaces and shall give a thick rich opaque matt finish. It shall be easily applicable using a flat brush, well moistened before use. No special tools or training shall be required for application. A single coat application is enough to render a smooth, well prepared surface, in the



color & texture, approved by the Architect & Engineer-in-Charge. It shall be weather and fade resistant, water and damp resistant and durable. It shall resist fungi and algae. It can be applied on wide variety of surfaces such as cement mortar, plywood, plaster board, AC sheet, Asbestos board, gypsum plaster or any other absorbent material to get homogeneous layer. It shall touch dry within 20 minutes.

- 94.3. It shall be thinned with 5 to 10 % of water by volume. It shall require no primer. On a well prepared surface, it shall be applied, in single coat, after one coat of cement paint. On a previously painted surface, painted with oil paints, a base coat of exterior paint, diluted 1 : 1 with water, is applied before the final coat of exterior paint, thinned with 5 to 10 % of water by volume. It shall be formulated to last for at least 10 years.

**M. 95. FLOOR SPRINGS :**

- 95.1. The floor spring shall be of the premium quality, by manufacturer such as 'Ozone Overseas Ltd.' or 'Everite' or as approved by the Architect or the Engineer-in-charge.
- 95.2. The floor spring shall have the dimensions of 306 mm. length x 108 mm. width x 40 mm. depth, and weight of approximately 5.00 kgs.
- 95.3. It shall have a closing force of 25Nm, and shall have variable valve adjustment to control its closing speed.
- 95.4. The floor spring shall have a hold open point at 105 degrees, and shall be able to carry 150 kg. Of door weight.
- 95.5. A single unit shall have both single and double action door.
- 95.6. The high grade cast iron mechanism body shall be housed within a galvanized steel loose box, which shall be zinc protected and painted for corrosion resistant.
- 95.7. The internal mechanism components shall be of heat treated high alloy steels and ball bearing for optimum efficiency.
- 95.8. The stable hydraulic fluid shall be provided for operation in any climatic condition and also for constant lubrication.
- 95.9. The floor spring shall have a built-in relief valve to protect the unit from rough use. The closer mechanism shall be totally immersed in hydraulic fluid.
- 95.10. The floor spring shall have two valves to control two different closing ranges, namely, valve 1 : 130<sup>0</sup> - 0<sup>0</sup> sweep, and valve 2 : to increase the closing speed between 130<sup>0</sup> - 20<sup>0</sup>.

**M. 96. GLASS MOSAIC TILES :**

- 96.1. The glass mosaic tiles shall be of premium quality, by manufacturers such as 'Bisazza, India' or as approved by the Architect or Engineer-in-Charge.
- 96.2. The dimensions of the tiles shall be 20 mm. x 20 mm. x 3.5 mm to 4.0 mm. thick, fixed on sheets of size 327 mm. x 327 mm., mounted uniformly, having joints of 1.8 mm width and weight of approximately 7.00 kgs./mq.
- 96.3. The water absorption shall be none to meet the standards EN 99-IS 13630 Part.2.
- 96.4. The resistant to thermal shock shall match the standards EN 104-IS 13630 Part.5.
- 96.5. The resistant to frost shall match the standards EN 202-IS 13630 Part.10.
- 96.6. The resistance to fading of the colors shall match the standard DIN 51094.
- 96.7. The resistant to chemical attack shall match the standards EN 122-IS 13630 Part.8.
- 96.8. The warpage shall not exceed more than 0.02 % along any edge and either diagonal, and it shall meet the standards of The Council of America inc. specification TCA 137.1-1976.
- 96.9. The rear side of the tiles shall have raised design.
- 96.10. The wedging shall not exceed 0.02 %.



**M. 97. 10 mm. THICK GRANITE TILES :**

- 97.1. The light gray colored, 10 mm. thick granite tiles shall be manufacture from natural granite stone slabs. The quality and the color shall be approved by the Architect and the Engineer-in-Charge. The stone shall be hard, having even sound and regular in shape and thickness, and generally uniform in color. It shall be without any soft veins, cracks or flaws.
- 97.2. One face of the tiles shall be double polished to render it truly smooth and even reflecting surface. The exposed edges shall be machine cut to have uniform shape and thickness.

Signature of the Contractor :

**The Registrar  
VEER NARMAD SOUTH GUJARAT UNIVERSITY.**



## **09. GENERAL TECHNICAL SPECIFICATIONS FOR BUILDING WORKS :**

### **SECTION – 4**

#### **Excavation**

**4.0.0.[A] Excavation for foundation up to 1.5 M. depth including sorting out and stacking of useful Materials : and disposing of the stuff up to 50 meter lead in loose or soft soil.**

#### **1.0. General**

1.1 Any soil which generally yields to the application of pickaxes and shovels, phawaras rakes or any such ordinary excavating implement or organic soil, gravel, silt, and turf loam, clay, peat etc. fall under this category.

#### **2.0 Clearing the site**

2.1 The site on which the structure is to be built shall be cleared, and all obstructions, loose stone, Materials : and rubbish of all kind, bush, wood and trees shall be removed as directed. The Materials : so obtained shall be property of the Government and shall be conveyed and stacked as directed within 50 mm lead. The roots of the trees coming in the sides shall be cut and coated with a hot asphalt.

2.2 The rate of side clearance is deemed to be included in the rate of earth work for which no extra will be paid.

**3.0** Setting out. After clearing the site, the centre lines will be given by the engineer-in-charge. The contractor shall assume full responsibility for alignment, elevation and dimension of each and all parts of the work. Contractor shall supply labours, Materials ; etc., required for setting out the reference marks and batch marks and shall maintain them as long as required and directed.

#### **4.0 Excavation**

The excavation in foundation shall be carried out in true line and level and shall have the width and depth as shown in the drawings or as directed. The contractor shall do the necessary shoring and shutting or providing necessary slopes to a safe angle, at his own cost. The payment for such precautionary measures shall be paid separately if not specified. The bottom of the cavated area shall be leveled both longitudinally and transferly as directed by removing and watering as required. No earth filling will be allowed for bringing it to level, if by mistake or any other reason excavation is made deeper or wider than that shown on the plan or directed. The extra depth or width shall be made up with concrete of same proportion as specified for the foundation concrete at the cost of the contractor. The excavation up to 1.5 m depth shall be measured under this item.

#### **5.0 Disposal of the excavated stuff**

5.1 The excavated stuff of the selected type shall be used in filling the trenches and plinth or leveling the ground in layers including ramming and watering etc.

5.2 The balance of the excavated quantity shall be removed by the contractor from the site or work to a place as directed with lead up to 50 M. and all lift.

#### **6.0 Mode of measurements and payment :**

6.1 The measurement of excavation in trenches for foundation shall be made according to the sections of trenches shown on the drawing or as per section given by the engineer-in-charge. No payment shall be made for surplus excavation made in excess of above requirements or due to stopping and sloping back as found necessary on account of conditions of soil and requirements of safety.

6.2 **The rate shall be for a unit of one cubic metre.**





**4.0.0.[B] Excavation for foundation up to 1.5 M depth including sorting out and stacking of useful Materials : and disposing of the excavated stuff up to 50 metre lead in the dense or Hard Soil.**

**1.0 Dense or Hard Soil**

Any soil which generally require close application of ricks or jumpers or screfiers to loosen it stiff, clay, gravel, and rubble stone etc fall under this category.

**2.0 Workmanship :**

The relevant specifications of Item No. 4.0.0 [A] shall be followed except that the excavation work shall be carried out in dense or hard soil.

**3.0 Mode of measurements and payment :**

3.1 The relevant specifications of Item No. 4.0.0 [A] shall be followed.

3.2 **The rate shall be for unit of one cubic metre.**

**4.0.0.[C] Excavation for foundation up to 1.5 M. depth including sorting out and stacking of useful Materials : and disposing of the excavated stuff up to 50 metre lead in Hard Murrum.**

**1.0 Hard murrum**

The hard murrum shall be clean of good binding quality and of approved quality obtained from approved quarries, of disintegrated rocks which contain silicious Materials : and natural mixture of clay of calcarious origin . the size of hard murrum shall not be more than 20 mm.

**2.0 Workmanship :**

The relevant specification of Item No. 4.0.0 [A] shall be followed except that the excavation work shall be carried in hard murrum.

**3.0 Mode of measurements and payment :**

3.1 The relevant specifications of Item No. 4.0.0 [A] shall be followed.

3.2 **The rate shall be for a unit for one cubic metre.**

**4.0.0.[D] Excavation for foundation up to 1.50 M. depth including sorting out and stacking of useful Materials : and disposing of the excavated stuff up to 50 meter lead – Soft Rock not requiring blasting.**

**1.0 Workmanship :**

1.1 The relevant specification of Item No. 4.0.0. [A] shall be followed except that the excavation shall be carried out for foundation upon 1.5 M. lift in soft rock not requiring blasting.

1.2 The excavation in soft or disintegrated rock shall be carried out by crow bars, pickaxes or pneumatic drills or any other suitable means.

1.3 If contractor desires to resort to blasting, he can do so with permission of the Engineer-in-charge but nothing extra shall be paid to him.

1.4 The Materials : available from soft rock excavation shall be properly stacked within 50 M. lead and 1.5 M. lift and shall be the property of department.



1.5 The classification of strata of the foundation soil shall be done by the Engineer-in-charge and shall be acceptable to the contractor.

1.6 However this shall include the type of rock and boulder 2which may quarried or split with crow bars. Laterite and conglomerate also come under this category.

## **2.0 Mod of measurements and payment**

2.1 The relevant specifications of Item No. 4.0.0 [A] shall be followed.

2.2 **The rate shall before a unit of one cubic metre.**

**4.0.0.[E] Excavation for foundation up to 1.5 M. depth including sorting our and stacking of useful material and disposing of the excavated stuff up to 50 meter lead in Hard Rocks.**

### **1.0 Workmanship :**

1.1 The relevant specification of Item No. 4.0.0 [a] shall be followed by except that the excavation for foundation work shall be carried out in hard rock.

1.2 Excavation shall be done by blasting to the dimensions shown in the drawing or as directed. The blasting shall b e carried out only with written permission of the Engineer-in-charge. All the laws, regulations etc, pertaining to the precautions, acquisition shall be rigidly followed. The Magazine for the storage for the explosive shall be built to the design and specifications of explosive authority and located at the approved site. No unauthorized persons shall be admitted into the magazine and when not in use it shall be kept securely locked. No matches or inflammable Materials : shall be allowed in Magazine. The Magazine shall have an effective lightening conductor. The rules or explosives 1940 revised from time to time shall be followed strictly for obtaining, starting, handling, undertaking blasting work.

1.3 The contractor shall be responsible for damage to property, workmen public due to any accident due to use of explosives and operations.

### **1.4 Precautions**

1.4.1 The blasting operation shall remain in charge of competent and experienced supervisor and workmen who are thoroughly acquainted with the detail of handling explosive and blasting shall be carried out during fixed hours of the day, preferably during the mid-day lunch hours or at the close of the work as ordered in writing by the Engineer-in-charge, the hours of blasting shall be notified in advance to the people in the vicinity. All the charges shall be prepared by the men in charge only.

1.4.2 Red danger flags shall be displayed prominently in all directions during the blasting operations.

1.4.3 People except those who actually light the fuse shall be prohibited form entering into this are. The flags shall be stationed at 200 M. from the firing site in al directions and all persons including workmen shall be excluded form the flagged area atleast 10 minutes before the firing warning whistle being sounded for this purpose.

1.4.4 During excavation in rock by blasting, the lowest 15 cm of the stratas shall be blasted with light charges so as not to shatter or weaken the underlying rock on which the foundation will be actually laid. If excavation in rock in done to larger widths and length than those shown on the drawings or directed, no payment shall be made for such over break. If excavation is done to depths greater than shown on the drawings or directed, excess depth shall be made up with foundation grade concrete as directed at the contractor's cost.

1.4.5 The charged hole shall be drilled to the required depth and in suitable places when blasting is done with powder, the fuse cut to the required length shall be inserted in the holes and the powder dropped in. The powder shall be gently tamped with copper rod with rounded ends. The explosive powder shall then be covered with trapping Materials : which shall be tamped lightly but firmly. When blasting is done with dynamite and other high explosive, dynamite cartridges shall be prepared by



inserting the square cut ends of fuse into the detonator, and finished with dippers at the open ends. The detonator should be gently pushed into the primer leaving one third of the copper exposed outside. The primer shall be housed into the explosive. Bore holes shall be of such size that the cartridges can be easily passed down. The holes shall be cleared of all debris and explosive inserted. The space for about 20 cms above the charge shall then be gently filled with dry clay pressed home and rest of the tamping is firmed with any convenient Materials : gently filled with dry clay pressed home and rest of the taming is firmed with any convenient Materials : gently packed with a wooden cover.

1.4.6 At a time not more than 10 such carges shall be prepared and fired. The man in charge shall blow a whistle in a recognized manner for cautioning the people. All the people shall then be required to move to safe distances. The carges shall be lighted by the mane in charge only. The man in-charge shall count the number of explosions. He shall satisfy, himself that all the carges have been exploded before allowing the workmen to go the work site.

1.4.7 The contractor shall be fully responsible to strictly follow the prevailing rules and procedures regarding blasting procedures regarding blasting procedures.

#### 1.5 **Misfire**

1.5.1 In case of a misfire the following procedure shall be observed :

1.5.2 Sufficient time shall be allowed to account for the delayed blast. The man in charge shall inspect all the charges and determine the missed charge.

1.5.3 If it is the blasting powder charge it shall b3e completely flooded with water. A new hole shall be drilled at about 45 cm from the old and fired. This should blast the old charge. Should it not blast the old charge, the procedure shall be repeated till the old charge is blasted.

1.5.4 In case of charge of gelatine, dynamite etc., the mane in charge shall gently remove the tamping and the primer with detonator and primer shall then be used to blast the charge. Alternatively the hole may be cleared of one foot of tamping and the direction then ascertained by placing a stick in the hole. Another hold may then be drilled 15 cm away and paralld to it. The man in charge shall report to the office all cases of misfire and cause of the same and what steps were taken in connection therewith.

1.5.6 If a misfire has been found to be due to defective detonator or dynamite, the whole quantity in the box from which defective article was taken must be sent to authority as directed for inspection to ascertain whether all the remaining Materials : in the box are also defective or not.

#### 1.6 **Accidents :**

1.6.1 The contractor shall be solely responsible for any accident during the entire procedure of handling explosive and blasting and shall pay necessary compensation to persons affected or damage to lands to properly etc, due to the blasting, without extra claims on the department.

#### 1.7 **Account :**

1.7.1 A careful and day to-day account of explosives shall be maintained by the contractor in an approved manner and shall be open to inspection of the Engineer-in-charge. Surprise visits may also be paid by the Engineer-in-charge to the storage and in case of any unaccountable shortage or unsatisfactory accounting, the contractor shall be liable to be penalized by forfeiture of part or whole of his Security Deposit or by cancellation of tender in which case he shall not be entitled for any compensation.

#### 1.8 **Disposal of Excavated Materials :**

1.8.1 No Materials : excavated from foundation trenches of whatever kind they may be, are to be placed even temporarily nearer than 1.5 m or distance prescribed by the Engineer from the outer edge of excavation. All Materials : excavated shall remain the property of Government. Rate for excavation includes sorting out of useful Materials : and stacking them se3parately as directed within the specific lead. Materials : suitable and useful for backfilling or other use shall be stacked in convenient places



but not in such a way as to obstruct free movement of men, animals and vehicles or encroach upon the area required for constructional purposes. The site shall be left clean of all debris on completion.

**1.8.2 Disposal of excavated Materials : is subject to the following :**

Unsuitable Materials : obtained from clearing site and excavation shall be disposed off within a lead of 50 metres as directed. Useful Materials : obtained from clearing site and excavation shall be stacked within a lead of 50 M beyond the building area as directed. Materials : suitable for back-filling shall be stacked at convenient places within a lead of 50 M from the structure for reuse. Useful stones from rock excavation shall be stacked neatly within a lead of 50 M and will be used by the contractor on payment at rates laid down in the contract or if not so laid down, at scheduled rates of the Division or at a mutually agreed rates if there are no such rates in the schedule or rates.

1.8.3 If surplus Materials : are required to be conveyed beyond 50 M conveyance will be paid for under a separate item.

**2.0 Mode of measurements and payment :**

2.1 The work shall be measured for the work limited to the dimensions on drawings or directed, excavation to dimension in excess of the above will not be measured or paid for and if so ordered by the Engineer, the contractor shall have to fill up the excess depth with cement concrete specified for foundation without extra payment.

2.2 Driving of sounding bars, drill holes to explore the nature of substratum up to a total length of meter distributed in 2 or 3 places in each foundation if necessary, will be considered incidental work and will not be paid for separately.

2.3 Removal of slips and blows in the foundation trenches will not be measured or paid for.

2.4 If it is necessary in the opinion of the Engineer – in – charge to carry foundation below the levels shown on the plans, the excavation for the first 1.5 M of additional depth will be included in the quantity for the particular classification and will be paid for as extra work at rate to be decided under the general conditions of contract unless the contractor is willing to accept payment as tendered rates.

2.5 **The rate shall be for a unit of one cubic metre.**

**4.0.0.1[A] Excavation for foundation for depth from 1.5 M to 3.0 M including sorting out and stacking of useful Materials : and disposing of the excavated stuff up to 50 M lead loose or soft soil.**

**1.0 Workmanship :**

1.1 The relevant specifications of Item No. 4.0.0 [A] shall be followed except that the excavation work shall be carried out in loose or soft solid with lift 1.5 M to 3.0 M.

**2.0 Mode of Measurement & Payment :**

2.1 The relevant specification of item No. 4.0.0 [A] shall be followed.

2.2 The excavation work of from 1.5 M to 3.0 M shall be measured under this item.

2.3 **The rate shall be for a unit of one cubic metre.**

**4.0.0.1[B] Excavation for foundation for depth from 1.5 M to 3.0 M including sorting out and stacking of useful Materials : and disposing of the excavated stuff up to 50 M lead in Dense or Hard soil.**

**1.0 Workmanship :**

1.1 The relevant specifications of Item No. 4.0.0. (B) shall be followed except that the excavation work



shall be carried out in loose or soft soil with lift 1.5 M to 3.0 M lift in dense or hard soil.

**2.0 Mode of Measurement & Payment :**

2.1 The relevant specification of Item No. 4.0.0 (A) shall be followed.

2.2 The excavation work of from 1.5 M to 3.0 M shall be measured under this item.

2.3 **The rate shall be for a unit of one cubic metre.**

**4.0.0.1[C] Excavation for foundation for depth from 1.5 M to 3.0 M including sorting out and stacking of useful Materials : and disposing of the excavated stuff up to 50 M lead in Hard Murrum.**

**1.0 Workmanship :**

1.1 The relevant specifications of Item No. 4.0.0. (A) shall be followed except that the excavation work shall be carried out from 1.5 M to 3.0 M lift in hard murrum.

**2.0 Mode of Measurement & Payment :**

2.1 The relevant specifications of Item No. 4.0.0 (A) shall be followed.

2.2 The excavation work of from 1.5 M to 3.0 M shall be measured under this item.

2.3 **The rate shall be for a unit of one cubic metre.**

**4.0.0.1[D] Excavation for foundation for depth from 1.5 M to 3.0 M including sorting out and stacking of useful Materials : and disposing of the excavated stuff up to 50 M lead in Soft rock not required blasting.**

**1.0 Workmanship :**

1.1 The relevant specifications of Item No. 4.0.0. (D) shall be followed except that the excavation work shall be carried out from 1.5 M to 3.0 M lift in soft rock not required blasting.

**2.0 Mode of Measurement & Payment :**

2.1 The relevant specifications of Item No. 4.0.0 (A) shall be followed.

2.2 The excavation work of from 1.5 M to 3.0 M shall be measured under this item.

2.3 **The rate shall be for a unit of one cubic metre.**

**4.0.0.1[E] Excavation for foundation for depth from 1.5 M to 3.0 M including sorting out and stacking of useful Materials : and disposing of the excavated stuff up to 50 M lead in Hard Rock.**

**1.0 Workmanship :**

1.1 The relevant specifications of Item No. 4.0.0. (E) shall be followed except that the excavation work shall be carried out from 1.5 M to 3.0 M lift in hard rock.

**2.0 Mode of Measurement & Payment :**

2.1 The relevant specifications of Item No. 4.0.0 (A) shall be followed.

2.2 The excavation work of from 1.5 M to 3.0 M shall be measured under this item.



2.3 **The rate shall be for a unit of one cubic metre.**

**4.00.2.[A] Excavation for foundation for depth from 3.0 M to 5.0 M including sorting out and stacking of useful Materials : and disposing of the excavated stuff up to 50 M lead in loose or Soft Soil.**

**1.0 Workmanship :**

1.1 The relevant specifications of Item No. 4.0.0. (A) shall be followed except that the excavation work shall be carried out from 3.0 M to 5.0 M lift in loose or soft soil.

**2.0 Mode of Measurement & Payment :**

2.1 The relevant specifications of Item No. 4.0.0 (A) shall be followed.

2.2 The excavation work of from 3.0 M to 5.0 M lift shall be measured under this item.

2.3 **The rate shall be for a unit of one cubic metre.**

**4.00.2.[B] Excavation for foundation for depth from 3.0 M to 5.0 M including sorting out and stacking of useful Materials : and disposing of the excavated stuff up to 50 M lead in Dense or Hard Soil.**

**1.0 Workmanship :**

1.1 The relevant specifications of Item No. 4.0.0. (B) shall be followed except that the excavation work shall be carried out from 3.0 M to 5.0 M lift in dense or hard soil.

**2.0 Mode of Measurement & Payment :**

2.1 The relevant specifications of Item No. 4.0.0 (A) shall be followed.

2.2 The relevant specifications of Item No. 4.0.0 (A) shall be followed.

2.3 **The rate shall be for a unit of one cubic metre.**

**4.00.2.[C] Excavation for foundation for depth from 3.0 M to 5.0 M including sorting out and stacking of useful Materials : and disposing of the excavated stuff up to 50 M lead in Hard Murrum.**

**1.0 Workmanship :**

1.1 The relevant specifications of Item No. 4.0.0. (C) shall be followed except that the excavation work shall be carried out from 3.0 M to 5.0 M lift in hard murrum.

**2.0 Mode of Measurement & Payment :**

2.1 The relevant specifications of Item No. 4.0.0 (A) shall be followed.

2.2 The excavation work of from 3.0 M to 5.0 M lift shall be measured under this item.

2.3 **The rate shall be for a unit of one cubic metre.**

**4.00.2.[D] Excavation for foundation for depth from 3.0 M to 5.0 M including sorting out and stacking of useful Materials : and disposing of the excavated stuff up to 50 M lead in Soft Rock not required blasting.**

**1.0 Workmanship :**



1.1 The relevant specifications of Item No. 4.0.0. (D) shall be followed except that the excavation work shall be carried out from 3.0 M to 5.0 M lift in soft rock not requiring blasting.

**2.0 Mode of Measurement & Payment :**

2.1 The relevant specifications of Item No. 4.0.0 (A) shall be followed.

2.2 The excavation work of from 3.0 M to 5.0 M lift shall be measured under this item.

2.3 **The rate shall be for a unit of one cubic metre.**

**4.00.2[E] Excavation for foundation for depth from 3.0 M to 5.0 M including sorting out and stacking of useful Materials : and disposing of the excavated stuff up to 50 M lead in Hard Rock.**

**1.0 Workmanship :**

1.1 The relevant specifications of Item No. 4.0.0. (E) shall be followed except that the excavation work shall be carried out from 3.0 M to 5.0 M lift in loose or soft soil.

**2.0 Mode of Measurement & Payment :**

2.1 The relevant specifications of Item No. 4.0.0 (A) shall be followed.

2.2 The excavation work of from 3.0 M to 5.0 M lift shall be measured under this item.

2.3 **The rate shall be for a unit of one cubic metre.**

**4.00.3[A] Extra for additional depth of more than 5.0 M for Excavation for foundation including sorting out and stacking of useful Materials : and disposing of the excavated stuff up to 50 M lead in loose or Soft Soil.**

**1.0 Workmanship :**

1.1 The relevant specifications of Item No. 4.0.0. (A) shall be followed except that the excavation work shall be carried out from 5.0 M lift in loose or soft soil.

**2.0 Mode of Measurement & Payment :**

2.1 The relevant specifications of Item No. 4.0.0 (A) shall be followed.

2.2 The rate shall be paid extra over and above the rate of Item No. 4.00.2 (A) for carrying out excavation work for additional depth from 5.0 M and above.

2.3 **The rate shall be for a unit of one cubic metre.**

**4.00.3[B] Extra for additional depth of more than 5.0 M for Excavation for foundation including sorting out and stacking of useful Materials : and disposing of the excavated stuff up to 50 M lead in dense or hard Soil.**

**1.0 Workmanship :**

1.1 The relevant specifications of Item No. 4.0.0. (B) shall be followed except that the excavation work shall be carried out from 5.0 M lift in dense or hard soil.

**2.0 Mode of Measurement & Payment :**



- 2.1 The relevant specifications of Item No. 4.0.0 (A) shall be followed.
- 2.2 The rate shall be paid extra over and above the rate of Item No. 4.00.2.(B) for carrying out excavation work for additional depth from 5.0 M and above.
- 2.3 **The rate shall be for a unit of one cubic metre.**
- 4.00.3[C] Extra for additional depth of more than 5.0 M for Excavation for foundation including sorting out and stacking of useful Materials : and disposing of the excavated stuff up to 50 M lead in Hard Murrum.**
- 1.0 Workmanship :**
- 1.1 The relevant specifications of Item No. 4.0.0. (C) shall be followed except that the excavation work shall be carried out from 5.0 M lift in hard murrum.
- 2.0 Mode of Measurement & Payment :**
- 2.1 The relevant specifications of Item No. 4.0.0 (A) shall be followed.
- 2.2 The rate shall be paid extra over and above the rate of Item No. 4.00.2.(C) for carrying out excavation work for additional depth from 5.0 M and above.
- 2.3 **The rate shall be for a unit of one cubic metre.**
- 4.00.3[D] Extra for additional depth of more than 5.0 M for Excavation for foundation including sorting out and stacking of useful Materials : and disposing of the excavated stuff up to 50 M lead in Soft Rock not required blasting.**
- 1.0 Workmanship :**
- 1.1 The relevant specifications of Item No. 4.0.0. (D) shall be followed except that the excavation work shall be carried out from 5.0 M lift in soft rock not requiring blasting.
- 2.0 Mode of Measurement & Payment :**
- 2.1 The relevant specifications of Item No. 4.0.0 (A) shall be followed.
- 2.2 The rate shall be paid extra over and above the rate of Item No. 4.00.2.(D) for carrying out excavation work for additional depth from 5.0 M and above.
- 2.3 **The rate shall be for a unit of one cubic metre.**
- 4.00.3[E] Extra for additional depth of more than 5.0 M for Excavation for foundation including sorting out and stacking of useful Materials : and disposing of the excavated stuff up to 50 M lead in Hard Rock.**
- 1.0 Workmanship :**
- 1.1 The relevant specifications of Item No. 4.0.0. (E) shall be followed except that the excavation work shall be carried out from 5.0 M lift in loose or soft soil.
- 2.0 Mode of Measurement & Payment :**
- 2.1 The relevant specifications of Item No. 4.0.0 (A) shall be followed.





2.2 The rate shall be paid extra over and above the rate of Item No. 4.00.2.(E) for carrying out excavation work for additional depth from 5.0 M and above.

2.3 **The rate shall be for a unit of one cubic metre.**

**4.12 Filling available excavated earth (excluding rock) in trenches, plinth, sides of foundations, etc. in layers not exceeding 20 CM depth, considering each deposited layer by ramming and watering.**

**1.0 Workmanship :**

1.1 The earth to be used for filling shall be free from salts, organic or other foreign matter. All clods of earth shall be broken.

1.2 As soon as the work in foundation has been completed and measured the site of foundation shall be cleared of all debris, brick bats, mortar dropping etc and filled with earth in layers not exceeding 20 cms. Each layer shall be adequately watered, rammed and consolidated before the succeeding layer is laid. The earth shall be rammed with iron with iron rammers where feasible and with the butt ends of crow-bars, where rammer cannot be used.

1.3 The plinth shall be similarly filled with earth in layers not exceeding 20 Cms adequately watered and consolidated by ramming with iron or wooden rammers. When filling reaches finished level, the surface shall be flooded with water for atleast 24 hours and allowed to dry and then rammed and consolidated.

1.4 The finished level of filling shall be kept to shape intended to be given to floor.

1.5 In case of large heavy duty flooring like factory flooring the consolidation may be done by power rollers, where so specified. The extent of consolidation required shall also be as specified.

1.6 The excavated stuff of the selected type shall be allowed to be used in filling the trenches and plinth. Under no circumstances black cotton soil be used for filling the plinth.

**2.0 Mode of Measurement & Payment :**

2.1 the payment shall be made for filling in plinth and trenches. No deduction shall be made for shrinkage or voids, if consolidated as instructed above.

2.2 **The rate shall be for a unit of one cubic metre.**

**4.24 Filling in plinth with sand under floors including watering, ramming consolidating and dressing etc complete.**

**1.0 Materials :**

1.1 Sand shall conform to M6

**2.0 Workmanship :**

The relevant specifications of Item No. 4.12 shall be followed except the said shall be filled in under floors, including watering, ramming, consolidating and dressing etc complete.

**3.0 Mode of Measurement & Payment :**

3.1 The relevant specifications of Item No. 4.12 shall be followed.

3.2 The rate includes cost of collecting, carting sand with all lead and labour for filling the same in plinth under floors.



**3.3 The rate shall be for a unit of one cubic metre.**

**4.00.4 Filling in foundation and plinth with murrum or selected soil in layers of 20 CM. thickness including watering, ramming and consolidating etc complete.**

**1.0 Materials :**

1.1 Murrum shall be clean, of good binding quality and of approved quality obtained from approved pots / quarries of disintegrated rocks which contain silicons material and natural mixture of clay of calcarious origin. The size of murrum shall not be more than 20 mm.

**2.0 Workmanship :**

2.1 The relevant specifications of Item No. 4.12 shall be followed except that the the murrum soil shall be filled in under foundations and plinth in 20 cms. Layer including consolidating, ramming, watering, dressing etc complete.

**3.0 Mode of Measurement & Payment :**

3.1 The relevant specifications of Item No. 4.12 shall be followed.

3.2 The rate includes cost of collecting and carting murrum / or selected earth of approved quality with all lead and labour for filling in trenches and plinth.

**3.3 The rate shall be for a unit of one cubic metre.**

**4.00.5 Filling in foundation and plinth with brick-bats / chhara in layers of 20 CM. thickness including watering, ramming and consolidating etc complete.**

**1.0 Materials :**

Brick bats shall conform to M. 14.

**2.0 Workmanship :**

2.1 The relevant specifications of Item No. 4.12 shall be followed except that the brick bats of burnt bricks shall be filled in foundation and plinth in 20 cms. Layer including watering, ramming, consolidating etc complete.

**3.0 Mode of Measurement & Payment :**

3.1 The relevant specifications of Item No. 4.12 shall be followed.

3.2 The rate includes cost of collecting and carting brck bats / chhara with all lead and labour for filling in trenches and plinth.

**3.3 The rate shall be for a unit of one cubic metre.**

**4.27. Boring holes 3.5 M deep in ordinary soil (for cast in situ piles) and getting out the soil and disposal of the surplus excavated soil as directed within a lead of 50 M. for following diameter for piled. (i) 200 mm. (ii) 250 mm. (iii) 300 mm.**

**1.0 Workmanship :**

1.1 The ground shall be roughly leveled and after making the position of piles, the holes shall be bored with aspiral angle to the 3.5 M depth and specified diameter using boring guide.

1.2 The bore holes shall be truly vertical and uniform bore through out of specified diameter. After boring to the required depth, the bore shall be cleared off the loose soil and disposal of surplus excavated stuff as directed within a lead of 50 M.



**2.0 Mode of Measurement & Payment :**

**2.1 The rate for boring holes shall include :**

[a] Roughly leveling the ground in positions where piles are to be provided [b] Making the position of piles by pegs and boring guide and also for shifting of boring guide [c] Bailing out water, if any met with during boring [d] Disposal of surplus excavated soil within a lead of 50 M. and [e] All tools, plants, equipments and labour required for satisfactory completion of work.

**2.2 The rate shall be for a unit of one Number.**

**4.28. Extra for under ramming inside the bore holes for under rammed piles of following nominal diameter: . (i) 200 mm. (ii) 250 mm. (iii) 300 mm.**

**1.0 Workmanship :**

The relevant specifications of Item No. 4.27 shall be followed except that after boring to the required depth, the bore shall be enlarged at the bottom by an under rammer 2 to 2 1/2 times the diameter of the bore as directed. It shall be ensured that the bore for the pile shall be enlarged to the correct diameter.

**2.0 Mode of Measurement & Payment :**

2.1 The relevant specification of Item No. 4.27 for under ramming the piles.

2.2 The rate shall be aid extra over and above the rate of Item No. 4.27 under ramming the piles.

2.3 **The rate shall be for a unit of one Number.**



## SECTION 5

### Plain & Rcc work

**5.1.6 Providing and laying in foundation and plinth / under floors lime concrete with hard broken aggregate 40 mm nominal size and 40% mortar comprising of 1 Lime putty : 2 fine sand and curing complete excluding cost of form work.**

#### **1.0 Materials :**

Water shall conform to M-1. Sand shall conform to M-6. Lime shall conform to M-2. Graded aggregate 40 mm nominal size shall conform to M-12.

#### **2.0 General :**

**2.1** Before starting the concrete the bed of the foundation trenches shall be cleared of all loose Materials : and watered and rammed as directed.

#### **2.2 Proportion of Mix :**

**2.2.1** The proportion of lime, sand and aggregate shall be specified in the item of the work and shall be measured by volume.

**2.2.2** The lime mortar shall consist of proportion of 1 lime putty : 2 sand by volume. The lime mortar shall be prepared by wet process. Power driven mill shall be used for preparation of lime mortar. The slaked lime shall be placed in the mill in even layer and ground for 180 revolutions with sufficient water. The water shall be added as required during grinding and care shall be taken not to add more water so that it will bring the mixed Materials : to a consistency of stiff paste, thoroughly wetted sand shall then be added evenly and the mixture ground for another 180 revolutions.

**2.2.3** Lime mortar shall be kept, protected from sun and rain till used-up, covering it by tarpaulin or open sheds.

**2.2.4** All the lime mortar shall be used as soon as possible after grinding. It should be used on the day on which it is prepared but in no case mortar made earlier than 36 hours shall be permitted for use.

#### **2.3 Mixing :**

**2.3.1** The concrete shall be mixed in mechanical mixer. Mixing shall be continued until there is uniform distribution of the Materials : and the mass is uniform in colour and consistency but in no case mixing shall be done for less than 2 to 3 minutes.

#### **2.4 Laying and compacting:**

**2.4.1** The concrete shall always be used while quire fresh. It shall be laid (not thrown) in layers not exceeding 150 mm in thickness and shall be well and quickly rammed with wooden or iron rammers, till the required compaction is achieved. The concrete laid shall not be of too fluid consistency. After it has been mixed no more water shall be added, but the surface during and after compaction shall be kept damp. In laying consecutive layers, the layer cast shall be well watered and made rough before the upper layer is laid. The concrete shall be kept continuously wet for period of 7 days from the date of placing or until it is built over whichever is more.

#### **3.0 Mode of measurements and payment :**

**3.1** The concrete work shall be measured in length, breadth and depth as specified on drawing or as directed, correct up to nearest centimeter and cubical content shall be worked out nearest up to two places of decimals.

**3.2 The rate shall be for unit of one cubic metre.**



**5.1.8 Providing and laying in foundation and plinth / under floors lime concrete with graded bricks aggregate 40 mm nominal size and 40% mortar comprising of 1 Lime putty : 2 fine sand and curing complete excluding cost of form work.**

**1.0 Materials :**

1.1 Water shall conform to M-1. Lime mortar shall conform to M-10, Brick bats aggregate 40 mm nominal sizes shall conform to M-14.

**2.0 Workmanship :**

2.1 The relevant specification of Item No. 5.1.6 shall be followed except that brick aggregate shall be used instead of graded stone aggregate.

**3.0 Mode of measurements and payment :**

3.1 The concrete work shall be measured in length, breadth and depth as specified on drawing or as directed, correct up to nearest centimeter and cubical content shall be worked out up to two places of decimals.

3.2 **The rate shall be for unit of one cubic metre.**

**5.3.2.[A] Providing and laying cement concrete 1 : 3 : 6 ( 1 cement : 3 coarse sand : 6 graded stone aggregate 40 mm nominal size) and curing complete excluding the cost of form work in foundations and plinth.**

**1.0 Materials :**

1.1 Water shall conform to M-1. Cement shall conform to M-3. Sand shall conform to M-6. Stones aggregate 40 mm nominal size shall conform to M-12.

**2.0 Workmanship :**

**2.1 General :**

2.1.1 Before starting the concrete the bed of the foundation trenches shall be cleared of all loose Materials ;, leveled, watered and rammed as directed.

**2.2 Proportion of Mix :**

2.2.1 The proportion of cement, sand and coarse aggregate shall be one part of cement, 3 parts of sand and 6 parts of stone aggregates and shall be measured by volume.

**2.3 Mixing :**

2.3.1 The concrete shall be mixed in mechanical mixer at the site of work. Hand mixing may however be allowed for smaller quantity of work if approved by the Engineer-in-charge. When hand mixing is permitted by the Engineer-in-charge in case of break-down of machineries and in the interest of work, it shall be carried out on a water tight platform and care shall be taken to ensure that mixing is continued until the mass is uniform in colour and consistency. However, in such cases 10% more cement than otherwise required shall have to be used without any extra cost. The mixing in mechanical mixer shall be done for a period. 1.1/2 to 2 minutes. The quantity of water shall be just sufficient to produce dense concrete of required workability for the purpose.

**2.4 transporting & Placing the concrete :**

2.4.1 The concrete shall be handed from the place of mixing to the final position in not more than 15 minutes by the method as directed and shall be placed into its final position; compacted and finished within 30 minutes of mixing with water i.e., before the setting commences.

2.4.2 The concrete shall be laid in layers of 15 cms to 20 cm.



**2.5 Compacting :**

2.5.1 The concrete shall be rammed with heavy iron rammers and rapidly to get the required compaction and to allows all the interstices to be filled with mortar.

**2.6 Curing :**

2.6.1 After the final set, the concrete shall be kept continuously wet if required by sponging for a period of not less than 7 days from the date of placement.

**2.7 Mode of measurements and payment :**

2.7.1 The concrete shall be measured in length, breadth and depth, limiting dimensions to those specified on plan or as directed.

**2.7.2 The rate shall be for unit of one cubic metre.**

**5.3.3.[A]. Providing and laying cement concrete 1 : 4 : 8 ( 1 cement : 4 coarse sand : 8 graded stone aggregate 40 mm nominal size ) and curing complete, excluding the cost of form work in foundations and plinth.**

**1.0 Materials :**

1.1 Water shall conform to M-1. Cement shall conform to M-3. Sand shall conform to M-6 Stone aggregate 40 mm nominal size shall conform to M-12.

**2.0 Workmanship :**

2.1 Relevant specifications of Item No. 5.3.2 shall be followed except that cement concrete shall be mixed in the proportion of 1:4:8 instead of 1:3:6 by volume.

**3.0 Mode of measurements and payment :**

3.1 The concrete shall be measured for its length, breadth and depth, limiting dimensions to those specified on plans or as directed.

**3.2 The rate shall be for a unit of one cubic meter.**

**5.3.14[A]. Providing and laying cement concrete 1 : 3 : 6 ( 1 cement : 3 coarse sand : 6 Crushed stone aggregate 20 mm nominal size ) and curing complete excluding the cost of form work in wall caps / coping.**

**1.0 Materials & Workmanship :**

1.1 The relevant specification of Item No. 5.3.2 (A) shall be followed except that the work shall be carried out for coping and wall caps, except the stone aggregate 20 mm nominal size shall be used for the concrete work of wall caps / coping.

**2.0 Mode of measurements and payment :**

2.1 The relevant specifications of Item No. 5.3.2, (A) shall be except that the rate includes cost of necessary form work.

**2.2 The rate shall be for a unit of one cubic metre.**

**5.3.3. Providing and laying brick bats cement 1 : 4 : 8 ( 1 cement : 4 coarse sand : 8 graded bricks bats ), and curing complete excluding the cost of form work in foundation and plinth.**

**1.0 Materials :**



1.1 Water shall be conform to M-1, Cement shall conform to M-3, Sand shall conform to M-6. Brick bat shall conform to M-14.

**2.0 Workmanship :**

2.1 The specification of this item shall be followed as per Item No. 5.3.1.4 (A) except that the proportion of brick bat cement concrete shall be 1:4:\* i.e., 1 Part of Cements, 4 Parts of Coarse Sand and 8 Parts of Graded Brick Bat by volume using graded brick bat as coarse aggregate instead of stone aggregates.

**3.0 Mode of measurements and payment :**

3.1 The concrete work shall be measured in length, breadth and depth as specified on drawing limiting dimensions to those specified on drawings or as directed.

3.2 **The rate shall be for a unit of one cubic metre.**

**5.3.4.[A]. Providing and laying cement 1 : 5 : 10 ( 1 cement : 5 coarse sand : 10 graded aggregate 40 mm nominal size ), and curing complete excluding the cost of form work, for foundation and plinth.**

**1.0 Materials :**

1.1 Water shall conform to M-1. Cement shall conform to M-3. Sand shall conform to M-6. Stone aggregate 40 mm nominal size shall conform to M-12.

**2.0 Workmanship :**

2.1 The relevant specification of Item No.5.3.2 (A) shall be followed for the work except that the work is to be carried out in cement : 1:5:10.

**3.0 Mode of measurements and payment :**

3.1 The concrete shall be measured for it's length, breadth and depth, limiting dimensions to those specified on plans or as directed.

3.2 **The rate shall be for a unit of one cubic metre.**

**5.3.8.[A]. Providing and laying cement 1 : 5 : 10 ( 1 cement : 5 coarse sand : 10 brick bats 10 mm nominal size ), and curing complete excluding, cost of form work in foundation and plinth.**

**1.0 Materials :**

1.1 Water shall conform to M-1. Sand shall conform to M-6. Brick bats shall conform to M-14.

**2.0 Workmanship :**

2.1 The relevant specification of Item No.5.3.4 shall be followed except that brick bats aggregate shall be used in stead of stone aggregate.

**3.0 Mode of measurements and payment :**

3.1 The relevant specification of Item No. 5.3.4 shall be followed.

3.2 **The rate shall be for a unit of one cubic metre.**

**5.3.2.[B]. Providing and laying cement 1 : 3 : 6 ( 1 cement : 3 coarse sand : 6 graded brick bats ) and curing complete excluding, cost of form work in foundation and plinth.**

1.0 The specification of Item No.5.3.2 (A) shall be followed, except that brick bats shall be used coarse aggregate instead of graded stone aggregates.



**2.0 Mode of measurements and payment :**

2.1 The relevant specification of Item No. 5.3.2 (A) shall be followed for Mode of measurements and payment : except that it excludes the cost of form work.

2.2 **The rate shall be for a unit of one cubic metre.**

**5.4.18 Providing throating or plaster drip and moulding to R.C.C. Chhajjas.**

**1.0 Materials :**

1.1 Water shall conform to M-1. Cement shall conform to M-3. sand shall conform to M-6. Cement mortar shall conform to M-11.

**2.0 Workmanship :**

2.1 The work shall be carried out as directed. The proportion of mix for finishing shall be in C.M. 1:2 by volume. Curing shall be done for not less than 7 days. The work shall be carried out in best workman like manner. The throating or plaster drip and moulding shall be one centimeter in thickness.

**3.0 Mode of measurements and payment :**

3.1 **The rate shall be for a unit of one cubic metre.**

**5.7.5 Extra for providing and mixing Water proofing material in cement concrete in mix proportions recommended by the manufacturers.**

**1.0 Workmanship :**

1.1 The proportions of Materials : for the cement concrete shall be mentioned with the specifications of that item. The quantity to water proofing Materials : to be added and the method of addition shall be as specified by manufacturers.

**1.2 Mixing :**

1.2.1 The mixing of the water proofing Materials : in cement, water or concrete shall be done according to the specifications of the manufacturer.

**2.0 Mode of measurements and payment :**

2.1 The payment of extra over and above the rate of concrete for mixing water proofing proper.

2.2. The rate shall be for a unit of one litre or Kg per quintal of cement in which water proofing material is added.

**5.7.1 Providing and laying dump proof course 25 mm thick cement concrete 1:2:4 ( 1 cement : 2 coarse sand : 4 stone aggregate 10 mm nominal size ) and curing complete.**

**1.0 Materials & Workmanship :**

1.1 The specifications of Item No. 5.3.1.3 (A) of ordinary concrete with or without reinforcement shall be followed except that the size of the stone aggregate shall be 10 mm nominal size and the concrete work shall be carried out in 25 mm thick damp proof course.

**2.0 Mode of Measurement & Payment :**

2.1 The rate includes cost of all Materials : and labour required to complete the item.





2.2 The rate shall be for a unit one sq. metre.

**5.3.13 Providing and laying cement concrete 1:2:4 (1 cement : 2 coarse sand : 4 graded stone aggregate 20 mm nominal size) and curing complete excluding cost of form work in (A) foundation and plinth, (B) Independent piers, columns and pillars up to floor two level.**

**1.0 Materials :**

1.1. Water shall conform to M-1. Cement shall conform to M-3. Sand shall conform to M-6. Grit shall conform to M-8. Graded stone aggregate 20 mm nominal size shall conform to M-12.

**2.0 General :**

- 2.1 The concrete mix is not required to be designed by preliminary testes. The proportion of the concrete mix shall be 1:2:4 (1 cement : 2 coarse sand : 4 graded stone aggregate 20 mm nominal size) by volume. Concrete work shall have exposed concrete surface or as specified in the item.
- 2.2 The designation ordinary M-100, M-150, M-200, M-250 specified as per I. S. correspond approximate to 1 : 3 : 6, 1 : 2 : 4, 1 : 1/2 : 3 and 1 : 1 : 2 nominal mix of ordinary concrete by volume respectively.
- 2.3 The ingredients required for ordinary concrete containing one bag of cement of 50 kgs by weight (0.0342 Cu. M.) for different proportions of mix shall be as under:

Grade of concrete	Total quantity of dry aggregate by volume per 50 kgs of cement to be taken as the sum of individual volume of fine and coarse aggregates, maximum	Proportion off line aggregate to coarse aggregate	Quantity of water per 50 kgs of cement maximum.
1	2	3	4
M-100 (1:3:6) M-150 (1:2:4) M-200 (1:1.1/2:3) M-250 (1:1:2)	300 Litres 220 Litres 160 Litres 100 Litres	Generally 1:2 for fine aggregate to coarse aggregate by volume but subject to an upper limit of 1:1.1/2 and lower limit 1:3	34 Litres 32 Litres 30 Litres 27 Litres

- 2.4 The water cement ratios shall not be more than specified in the above table. The cement content of the mix specified in the Table shall be increased if the quantity of water in mix has to be increased to overcome the difficulties of placements and compaction so that the water-cement-ratio specified in the table is not exceed.
- 2.5 Workability of the concrete shall be controlled by maintaining a water – cement – ratio that is found to give a concrete mix which is just sufficient wet to be placed and complaced without difficulty with the means available.
- 2.6 The maximum size of course aggregate shall be as large as possible within the limits specified but in no case greater than one fourth of the minimum thickness of the member, provided that the concrete can be placed without difficulty so as the surround all reinforcement thoroughly and to fill the corners of the form.
- 2.7 For reinforced concrete work, coarse aggregates having a nominal size of 20 mm are generally considered satisfactory.
- 2.8 For heavily reinforced concrete members as in the case of ribs of main beams, the nominal maximum size of coarse aggregate should usually be restricted to 5 mm less than the minimum cover to the reinforcement whichever is smaller.



- 2.9 Where the reinforcement is widely spaced as in solid slabs, limitations of size of the aggregate may not be so important, and the nominal maximum size may some times be as great as or greater than the minimum cover.
- 2.10 Admixture may be used in concrete only with approval of Engineer-in-charge based upon the evidence that with the passage of time, neither the compressive strength of concrete is reduced nor are other requisite qualities of concrete and steel impaired by the use of such admixtures.

### **3.0 Workmanship :**

- 3.1 Proportioning : Proportioning shall be done by volume, except cement which shall be measured in terms of bags of 50 kg weight, the volume of one such bag being taken as 0.0342 cu. Metre. Boxes of suitable size shall be used for measuring sand aggregate. The size of boxes (internal) shall be 35 x 25 cms and 40 cms deep while measuring the aggregate and sand the boxes shall be filled without shaking ramming or hammering. The proportioning of sand shall be on the basis of its dry volume and in case of damp sand, allowances for bulking shall be made.

### **3.2 Mixing :**

- 3.2.1 For all work, concrete shall be mixed in a mechanical mixer which alongwith other accessories shall be kept in first class working condition and so maintained throughout the construction. Measured quantity of aggregate, sand and cement required for each batch shall be poured into the drum of the mechanical mixer while it is continuously running. After about half a minute of dry mixing measured quantity of water required for each batch of concrete mix shall be added gradually and mixing continued for another one and a half minute. Mixing shall be continued till Materials : are uniformly distributed and uniform colour of the entire mass is obtained and each individual particle of the coarse aggregate shows complete coating of mortar containing its proportionate amount of cement. In no case shall the mixing be done for less than 2 minutes after all ingredients have been put into the mixer.
- 3.2.2 When hand mixing is permitted by the Engineer-in-charge for small jobs or for certain other reasons, it shall be done on the smooth water tight platform large enough to allow efficient turning over the ingredients of concrete before and after adding water. Mixing platform shall be so arranged that no foreign Materials : get mixed with concrete nor does the mixing water flow out. Cement in required number of bags shall be placed in a uniform layer on top of the measured quantity of fine and coarse aggregate, which shall also be spread in a layer on top of the measured quantity of fine and coarse aggregate, which shall also be spread in a layer of uniform thickness on the mixing platform. Dry coarse and fine aggregate and cement shall then be mixed thoroughly by turning over to get a mixture to uniform colour. Specified quantity of water shall then be added gradually through a rose can and the mass turned over till a mix of required consistency is obtained. In hand mixing quantity of cement shall be increased by 10 percent above that specified.
- 3.2.3 Mixers which have been out of use for more than 30 minutes shall be thoroughly cleaned before putting in a new batch. Unless otherwise agreed to by the Engineer-in-charge the first batch of concrete from the mixture shall contain only two thirds of normal quantity of coarse aggregate. Mixing plant shall be thoroughly cleaned before changing from one type of cement to another.

### **3.3 Consistency :**

- 3.3.1 The degree of consistency which shall depend upon the nature of the work and methods of vibration of concrete, shall be determined by regular slump tests in accordance with I.S. 1199-1959. The slump of 10 mm to 25 mm shall be adopted when vibrators are used and 80 mm when vibrators are not used.

### **3.4 Inspection :**

- 3.4.1 Contractor shall give the Engineer-in-charge due notice before placing any concrete in the forms to permit him to inspect and accept the false work and forms as to their strength, alignment, and general fitness but such inspection shall not relieve the contractor of his responsibility for the safety of men, machinery, Materials : and for results obtained. Immediately before concreting all forms shall be thoroughly cleaned.
- 3.4.2 Centering design and its erection shall be got approved from the Engineer-in-charge. One carpenter with helper shall invariably be kept present throughout the period of concreting. Movement of labour and other persons shall be totally prohibited for reinforcement laid in position, for access to different parts suitable



mobile platforms shall be provided so that steel reinforcement in position is not disturbed. For ensuring proper cover, mortar blocks of suitable size shall be cast and tied to the reinforcement. Timber, kapachi or metal pieces shall not be used for this purpose.

### 3.5 Transporting and laying :

- 3.5.1 The method of transporting and placing concert shall be as approved. Concrete shall be so transported and placed that no contamination, segregation or loss of its constituent material takes place. All from work shall be cleaned and made free from standing water dust show or ice immediately before placing of concrete. No concrete shall be placed in any part of the structure until the approval of the Engineer-in-charge has been obtained.
- 3.5.2 Concreting shall proceed continuously over the area between construction joints. Fresh concrete shall not be placed against Concrete which has been in position for more than 30 minutes unless a proper contraction joint is formed. Concrete shall be compacted in its final position within 30 minutes of its discharge from the mixture. Except where otherwise agreed to by the Engineer –in – charge, concrete shall be deposited in horizontal layers to a compacted depth of not more than 0.45 meter when internal vibrators are used and not exceeding 0.30 meter in all other cases.
- 3.5.3 Unless otherwise agreed to by the engineer in charge, concrete shall not be dropped into place from a height exceeding 2 meters. When trunking or chutes are used they shall be kept close and used in such a way as to avoid segregation. When concreting has to be resumed on a surface which has hardened, it shall be roughened, swept clean, thoroughly wetted and covered with a 13 mm thick layer of mortar shall be freshly mixed and placed immediately before placing of new concrete. Where concrete has not fully hardened, all laitance shall be removed by scrubbing the wet surface with wire or bristly brushes, care bring taken.
- 3.5.4 All concrete shall be compated to produce a dense homogenous mass with the assistance of vibrators, unless othere wise permitted by the Engineer-in-charge for exceptional cases, such as concreting under water, where vibrators cannot be used. Sufficient vibratorsn serviceable condition shall be kept at site so that spare equipment is always available in the event of breakdowns. Concrete shall be judged to be compacted when the mortar fills the spaces between the coarse aggregate and begins to cream up to form an even surface. Compaction shall be completed before the initial setting starts i.e. within 30 minutes of addition of water to dry mixture. During compaction, it shall be observed that needle vibrators are not applied on reinforcement which is likely to destroy the bond between concrete and reinforcement.

### 3.6 Curing :

Immediately after compaction, concrete shall be protected from weather, including rain, running water, shocks, vibration traffic, rapid temperature changes, frost and drying out process. It shall be covered with wet sacking hassian or other similar absorbent material approved soon after the initial set, and shall be kept continuously wet for a period of not less than 14 days from the date of placement. Masonary work over foundation concrete may be started after 48 hours of its laying but curing of concrete shall be continued for a minimum period of 14 days.

### 3.7 Sampling and testing of concrete :

- 3.7.1 Samples from fresh concrete shall be taken as per I.S. 1199-1959 and cubes shall be made cured and tested at 7 days of 28 days as per requirements in accordance with I.S. 516-1959. A random sampling procedure shall be adopted to ensure that each concrete batch shall have a reasonable chance of being tested i.e. the sampling should be spread over the entire period of concreting and cover all mixing units. The minimum frequency of sampling of concrete of each grade shall be in accordance with following :

Quantity of concrete in the work.	No. of Samples.	Quantity of concret in the works.	No.of samples.
1-5 cmt.	1	16-30 cmt.	3
6-15 cmt.	2	31-50 cmt.	4
51 and above.	4+ one additional for each additional 50 m. on part thereof.		



NOTE : Atleast one sample shall be taken from each shift. Ten test specimens shall be made from each sample, five for testing at 7 days and the remaining five at 28 days. The samples of concrete shall be taken on each day of the concreting as per above frequency. The number of specimens may be suitable increased as deemed necessary by the engineer-in-charge when procedure of tests given above reveals a poor quality of concrete and in other special cases.

- 3.7.2 The average strength of the group of cubes cast for each day shall not be less than the specified cube strength of 150 kg/Cm<sup>2</sup> at 28 days. 20% of the cubes cast for each day may have value less than the specified strength provided the lowest value is not less than 85% of the specified strength. If the concrete made in accordance with the proportions given for a particular grade does not yield the specified strength, such concrete shall be classified as belonging to the appropriate lower grade. Concrete made in accordance with the proportions given for a particular grade shall not, however, be placed in a higher grade on the ground that the test strength are higher than the minimum specified.

### **3.8 Stripping :**

- 3.8.1 The Engineer-in-charge shall be informed in advance by the contractor of his intention to strike the form work. While fixing the time for removal of form work, due consideration shall be given to local conditions, character of the structure, the weather and other conditions that influence the setting of concrete and of the Materials : used in the mix. In normal circumstances (generally where temperatures are above 20.C.) and where ordinary concrete is used, forms may be struck after expiry of periods specified in item No. 9.1 (A) for respective item of form work.
- 3.8.2 All form work shall be removed without causing any shock or vibration as would damage the concrete. Before the soffit and struts are removed, the concrete surface shall be gradually exposed, where necessary in order to ascertain that concrete has sufficiently hardened. Centering shall be gradually and uniformly lowered in such a manner as to permit the concrete to take stresses due to its own weight uniformly lowered and gradually. Where internal metal ties are permitted, they or their removable parts shall be extracted without causing any damage to the concrete and remaining holes filled with mortar. No permanently embedded metal part shall have less than 25 mm. cover to the finished concrete surface. Where it is intended to re-use the form work, it shall be cleaned and made good to the satisfaction of the Engineer-in-charge. After removal of form work and shuttering, the Executive Engineer shall inspect the work and satisfy by random checks that concrete produced is of good quality.
- 3.8.3 Immediately after the removal of forms, all exposed bolts etc, passing through the cement concrete member and used for shuttering or any other purpose shall be cut inside the cement concrete member to a depth of at least 25 mm. below the surface of the concrete and the resulting holes be filled by cement mortar. All fins caused by form joints, all cavities produced by the removal of form ties and all other holes and depressions, honeycomb spots, broken edges or corners and other defects, shall be thoroughly cleaned, saturated with water and carefully pointed and rendered true with mortar of cement and fine aggregate mixed in proportions used in the grade of concrete that is being finished and of as dry consistency as is possible to use. Considerable pressure shall be applied in filling and pointing to ensure thorough filling in all voids. Surface which are pointed shall be kept moist for a period of 24 hours. If rock pockets/honeycombs in the opinion of the Engineer-in-charge are of such an extent or character as to effect or character as to effect the strength of the structure materially or to endanger the life of the steel reinforcement, he may declare the concrete defective and required the removal and replacement of the portions of structure affected.

### **4.0 Mode of measurements and payment :**

- 4.1 The consolidate cubical contents of concretes work as specified in item shall be measured. The concrete laid in excess of sections shown on drawing or as directed shall not be measured. No deduction shall be made for –
- (a) Ends of dis-similar Materials : such as joints, beams, posts, girders, rafters, purline trusses, corbels and steps etc. up to 500 Sq.Cm. in section.
- (b) Opening up to 0.1 Sq.M.



4.2 The rate includes cost of all Materials : labour, tools and plant required for mixing, placing in position, vibration and compacting, finishing, as directed, curing and all other incidental expenses for producing concrete of specified strength. The rate excludes the cost of form work.

4.3 **The rate shall be for a unit of one cubic metre.**

**5.4.1 Providig and laying cement concrete 1 : 2 : 4 (1 cement : 2 coarse sand : 4 graded stone agreegate 20 mm. nominal size) and curing complete excluding cost of form work and reinforcement for reinforced work in : (A) Foundatins, footing base of columns and mass concrete. (C) Slabs, landings, shelves, balconies, lintels, beams, girders and cantilever up to floor two level. (D) Columns, pillars, and struts up to floor two level. (E) Staircase up to floor two level (K) Vertical and horizontal fins up to floor two level.**

**1.0 Materials & Workmanship :**

1.1 The relevant specifications of item No. 5.3.13 shall be followed except that the work shall be carried out for reinforced concrete work for work as specified in item 1.2. In addition, the following stipulations shall be followed for :

(a) The bars shall be kept in position by the following methods:

(i) In case of beam and slab construction, sufficient number of precast cover blocks in cement mortar 1 : 2 (1 cement : 2 coarse sand) about 4 cms. X 4 cms. Section and of thickness equal to the specified cover shall be placed between the bars and shuttering as to secure and maintain the requirsite cover of concrete over the reinforcement. In case of cantilevered or doubly reinforce beams or slabs, the main reinforcing bars shall be held in position by introducing chain spacers or supports bats at 1.0 to 1.2 metres centers. (ii) In case of columns and walls, the vertical bars shall be kept in position by means of timber temphters with slotes accurately out in them, the tamphthes shall be removed after concreteing has been done below it. The bars may also be suitably tied by means of annealed steel wires to the shuttering to maintain their position during concreting.

1.2 all bars projecting form pillars, columns, beams, slabs etc. to which other bars and concrete are to be attached or bounded to later on, shall be protected with a coat of thin neat cement grout, if the bars are not likely to be incorporated with succeeding mass of concrete within the following 10 days. This coat of thin neat cement shall be removed before concreting.

**2.0 Mode of measurements and payment :**

2.1 The relevant specifications of item No. 5.3.13 shall be followed.

2.2 The volume occupied by reinforcement shall not be deducted from R.C.C. work.

2.3 **The rate shall be for a unit of one cubic metre.**

**5.4.4 Providing and laying cement concrete 1 : 2 : 4 (1 cement : 2 coarse sand : 4 graded stone agreegate 20 mm. nominal size) for reinforced concrete chhajjas not exceeding 10 cms. Thickness up to floor two level including finishing the exposed surface with cement mortar 1 : 3 (1 cement : 3 fine sand) to give a smooth and even surface, centering and form work and curing complete excluding cost of reinforcement.**

**1.0 Materials & Workmanship :**

1.1 The cement mortar shall conform to M-11.

1.2 The relevant specification of item No. 5.3.13 and 5.4.1 shall be followed except that the work shall be carried out for reinforced concrete chhajjas not exceeding 10 cms. In thickness.

1.3 The specifications for form work and centering shall be as per item No. 9.1.

1.4 The finishing work in cement mortar 1 : 3 (1 Cement : 3 fine sand) shall be carried out as per specifications of item No. 17.59 (I) Before the plastering is done, the surface of the concrete shall be raked for proper bond.



**2.0 Mode of measurements and payment :**

2.1 The relevant specification of item No. 5.3.13 and 5.4.1 shall be followed except that the work of chhajjas up to 10 cms. Shall be carried out including centering form work and finishing the surface with cement mortar 1 : 3 ( 1 cement : 3 fine sand ).

2.2 **The rate shall be for a unit of one cubic meter.**

**5.4.10 Providing an Mild Steel reinforcement for R.C.C. work including bending binding and placing in position etc. complete up to floor two level.**

**1.0 Materials :**

1.1 Mild Steel bars shall conform to M-18. Mild Steel binding wires shall conform to M-21.

**2.0 Workmanship :**

2.1 The work shall consists of furnishing and placing reinforcement to the shape and dimensions shown as on the drawings or as directed.

2.2 Steel shall be clean and free from rust and loose mill scale at the time of fixing in position and subsequent concreting.

2.3 Reinforcing steel shall conform accurate to the dimensions given in the bar bending schedules shown on relevant drawings. Bars shall be bent cold to specified shape and dimensions or as directed, using a proper bat bender, operated by hand or power to attain proper radius of bends. Bars shall not be bent or straightened in a manner that will injure the material. Bars bent during transport or handling shall be straightened before. Being used on the work. They shall not be heated to facilitate bending. Unless otherwise specified, a “U” type hook at the end of each bar shall invariably be provided to main reinforcement. The radius of the bend shall not be less than twice the diameter of the round bar and the length of the straight part of the bar beyond the end of the curve shall be at least four times the diameter of the round bar. In case of bars which are not round and in case of deformed bars, the diameter shall be taken as the diameter of circle having an equivalent effective area. The hooks shall be suitably encased to prevent any splitting of the concrete.

2.4 All the reinforcement bars shall be accurately placed in exact position shown on the drawings, and shall be securely held in position during placing of concrete by annealed binding wire not less than 1 mm. in size, and by using stay blocks or metal chair spacers, metal hangers, supporting wires or other approved devices at sufficiently close intervals. Bars shall not be allowed to sag between supports nor displaced during concreting or any other operations of the work. All devices used for positioning shall be of non-corrodible material. Wooden and metal supports shall not extent to the surface of concrete, except where shown on drawings. Placing bars on layers of freshly laid concrete as the work progresses for adjusting bar spacing shall not be allowed. Pieces of broken stone or brick and wodden blocks shall not be used. Layers of bars shall be separated by spacer bars, precast mortar blocks or other approved devices. Reinforcement after being placed in position shall be maintained in a clean condition until completely embedded in concrete. Special care shall be exercised to prevent any displacement of reinforcement in concrete already placed. To prevent reinforcement form corrosion, concrete cover shall be provided as indicated on drawings. All the bars prodruding from concrete and to which other bars are to be spliced and which are likely to be exposed for a perod exceeding 10 days shall be protected by a thick coat of neat cement grout.

2.5 Bars crossing each other where required shall be secured by binding wire (annealed) of size not less than 1 mm. in such a manner that they do not slip over each other at the time of fixing and concreting.

2.6 As far possible, bars of full length shall be used. In case this is not possible. Overlapping of bars shall be done as directed. When practicable, overlapping bars shall not touch each other, but be kept apart by 25 mm or 1.25times the maximum size of the coarse aggregate whichever is greater, by concrete between them. Where not feasible, overlapping bars shall be bound with annealed wired not less than 1 mm. thick twisted tight. The overlaps shall be staggered for different bars and located at points, along the span where neither shear not bending moment is maximum.



2.7 Whenever indicated on the drawings of desired by the Engineer-in-charge, bars shall be joined by couplings which shall have a cross-section sufficient to transmit the full stresses of bars. The ends of the bars that are joined by coupling shall be upset for sufficient length so that the effective cross section at the base of threads is not less than the normal cross-section of the bar. Threads shall be standard threads. Steel for coupling shall conform to I.S. 226.

2.8 When permitted or specified on the drawings, joints of reinforcement bars shall be butt-welded so as to transmit their full stresses. Welded joints shall preferably be located at points when steel will not be subject to more than 75 percent of the maximum permissible stresses and welds so staggered that at any one section not more than 20 percent of the rods are welded. Only electric arc welding using a process which excludes air from the molten metal and conforms to any or all other special provisions for the work shall be accepted. Suitable means shall be provided for holding bars securely in position during welding. It shall be ensured that no voids are left in welding and when welding is done in two or three stages, previous surface shall be cleaned properly. Ends of the bars shall be cleaned of all loose scale, rust, grease, paint and other foreign matter before welding. Only competent welders shall be employed on the work. The M.S. electrodes used for welding shall conform to I.S.814. Welded pieces of reinforcement shall be tested. Specimen shall be taken from the actual site and their number and frequency of test shall be as directed.

**3.0 Mode of measurements and payment :**

3.1 For the purpose of calculating consumption, wastage shall not be permitted beyond 5 percent. Excess consumption over 5% will be charged at penal rate.

3.2 Reinforcement shall be measured in length including overlaps, separately for different diameters as actually used in the work. Where welding or coupling is resorted to, in place of lap joints, such joints shall be measured for payment as equivalent length of overlap as per design requirement. From the length so measured, the weight of reinforcement shall be calculated in tones on the same basis of as per M-18 eventhough steel is supplied to the contractor by the department on actual weight. Length shall include hooks at the ends. Wastage and annealed steel wire for binding shall not be measured and the cost of these items shall be deemed to be included in the rate for reinforcement.

3.3 The rate for reinforcement includes cost of steel binding wires, its carting from Departmental store to work site, cutting, bending, placing, binding and fixing in position as shown on the drawings and as directed. It shall also include all devices for keeping reinforcement in approved position, cost of joining as per approved method and all wastage and spacer bars.

3.4 **The rate shall be for a unit of One Kg.**

**5.4.11 High yield deform bars steel reinforcement for R.C.C. work including bending, binding and placing in position complete up to floor two level.**

**1.0 Materials :**

1.1 Cold twisted steel bars (high yield strength steel deformed bars) shall conform to m.19 Mild steel binding wires shall conform No. M-21.

**2.0 Workmanship :**

2.1 The specifications of item No. 5.4.10 shall be followed except that the cold twisted steel bars shall be used with or without hooks at the ends. Deformed bars without hooks shall. However, comply with relevant anchorage requirements.

**3.0. Mode of measurements and payment :**

3.1 The relevant specifications of item No. 5.4.10 shall be followed.

3.2 **The rate shall be for a unit of One Kg.**



**5.4.13. Extra for additional lift of concrete for all R.C.C. work above floor two level excluding cost of reinforcement.**

**1.0 Materials & Workmanship :**

1.1 The relevant specifications for item No. 5.4.1 shall be followed for the work except that the R.C.C. work shall be done for ground floor i.e. above plinth level to first floor level.

**2.0 Mode of measurements and payment :**

2.1 The relevant specifications of item 5.4.1 shall be followed except that rate shall be for extra lift above plinth to floor two level, over and above the rate of concrete at floor two level.

2.2 **The rate shall be for a unit of one cubic metre per floor.**

**5.4.13 (A) Extra for additional lift of reinforcement steel for all R.C.C. work above floor two level.**

**1.0 Materials & Workmanship :**

1.1 The relevant specifications of item No. 5.4.10 or 5.4.11 as may be applicable shall be followed except that the work shall be carried out above floor two level for each floor.

**2.0 Mode of measurements and payment :**

2.1 The relevant specifications of item No. 5.4.10 or 5.4.11 as may be applicable shall be followed except that the work shall be carried out above floor two level.

2.2 **The rate shall be for a unit of one Kg. per floor.**

**5.6.2 Providing up to floor two level precast cement concrete jail or grill 1 : 2 : 4 (1 cement : 2 coarse sand : 4 graded stone aggregate 6 mm nominal size) reinforced with 1.6 mm. dia mild steel wire including roughening, cleaning fixing and finishing in cement mortar 1 : 3 and curing complete. (A) 50 mm thick (B) 40 mm thick (C) 25 mm thick (D) 75 mm thick (E) 100 mm thick.**

**1.0 Materials :**

1.1 Water shall conform to M-1 Cement shall conform to M-3 Sand shall conform to M-6. Mortar shall conform to M-11 Aggregates shall conform to M-12. Mild steel wire shall conform to M-21. Shuttering shall conform to M-26.

**2.0 Workmanship :**

It shall be of cement 1 : 2 : 4 (1 cement : 2 coarse sand : 4 graded stone aggregate 6 mm. nominal size) reinforced with 1.6 mm dia mild steel wire unless otherwise specified. The thickness of the jail shall be as specified in the item. The jail shall be set in position true to line and level before the jambs sills and soffits of the opening are plastered. It shall then be properly cemented with cement mortar 1:3 (1 cement : 3 sand) and rechecked for levels. Finally the jambs, sills and soffits shall be plastered gripping the Jail uniformly on all sides.

**3.0 Mode of measurement and payment :**

3.1 The item shall be measured in square metre.

3.2 **The rate shall be for a unit of one square metre.**

**5.8.1 Providing and laying controlled concrete M-150 and curing complete excluding the cost of form work and reinforcement for reinforced concrete work in : (A) Foundations, footings, base of columns, and mass concrete, (B) Walls from top of foundation / level up to floor two level (C) Slabs, landing shelves, Balconies, lintels, beams, girders and cantilevel, up to floor two level (D) Columns, pillars,**





**posts and struts, up to floor two level (E) Staircase up to floor two level (F) Vertical and horizontal fins up to floor two level.**

**1.0 Materials :**

1.1 Water shall conform to M-1. Cement shall conform to M-3. Sand shall conform to M-6. Grit shall conform to M-8. Course aggregate shall conform M-12.

**2.0 General :**

2.1 The relevant specifications of item No. 5.4.1 of ordinary concrete shall be followed except that the concrete mix shall be designed from preliminary tests. The proportioning of cement and aggregates shall be done by weight and necessary precautions shall be taken in the production to ensure that the required work cube strength is attained and maintained. The controlled concrete shall be in grades of M-100, M-150, M-200, M-250, M-300, M-350 & M-400, with prefix controlled added to it. The letter “ M “ refers to mix and the numbers specify 28 days work cube compressive strength of 150 mm. cubes of the mix expressed in Kg./Cmt.

2.2 The proportion of cement, sand and coarse aggregates shall be determined by weight. The weight batch machine shall be used for maintaining proper control over the proportion of aggregates as per mix design. The strength requirements of different grades of concrete shall be as under :

**Grade Concrete. Compressive strength of 15 cms. Cubes in Kg./Cmt. at Concrete 28 days, conducted in accordance with I.S.516-1959.**

	<b>Preliminary test Min.</b>	<b>Work test. Min.</b>
M-150	200	150
M-200	260	200
M-250	320	250
M-300	380	300
M-350	440	350
M-400	500	400

In all cases, the 28 days compressive strength specified in above table shall be the criteria for acceptance or rejection of the concrete. Where the strength of a concrete mix as indicated by tests, lies in between the strength of any two grades specified in the above table, such concrete shall be classified in for all purposes as concrete belonging to the lower of the grades between which its strength lies.

**3.0 Workmanship :**

3.1 The proportions for ingredients chosen shall be such that concrete has adequate workability for conditions prevailing on the work in question and can be properly compacted with means available except where it can be shown to the satisfaction of the Engineer-in-charge, that supply of properly graded aggregate of uniform quality can be maintained till the completion of work, grading of aggregate shall be controlled by obtaining the coarse aggregates in different sizes and bending them in the right proportions as required. Aggregates of different sizes shall be stocked in separate stock piles. The required quantity of Materials : shall be stock piled several hours, preferably a day before use. The grading of coarse and fine aggregates shall be checked as frequently as possible, the frequency for a given job being determined by Engineer-in-charge to ensure that the suppliers are maintaining the uniform grading as approved for samples used in the preliminary tests.

3.2 In proportioning concrete, the quantity of both cement and aggregates shall be determined by weight. Where the weight of cement is determined by accepting the maker’s weight per bag, a reasonable number of bags shall be weighed separately to check the net weight. Where cement is weighted from bulk stocks at site and not by bags, it shall be weighed separately from the aggregates. Water shall either be measured by volume in calibrated tanks or weighed. All measuring equipment shall be maintained in clean, and serviceable condition. Their accuracy shall be periodically checked.



- 3.3 It is most important to keep the specified water cement ratio constant and at its correct value. To this end, moisture content in both fine and coarse aggregates shall be determined by the Engineer-in-charge according to the weather conditions. The amount of mixing water shall then be adjusted to compensate for variations in the moisture content. For the determination of moisture content in the aggregates, I.S. 2389 (Part III) shall be referred to suitable adjustments shall also be made in the weights of aggregates due to variation in their moisture content. Minimum quantity of cement to be used in controlled concrete shall not be less than 220 Mg/M-3 in plain concrete and not less than 250 Kg/M-3 in reinforced concrete.

**4.0 Mode of measurements and payment :**

- 4.1 The relevant specifications of item No. 5.4.1 shall be followed except the controlled concrete R.C.C. work as specified in item shall be measured under this item. The rate excludes cost ofform work.

- 4.2 **The rate shall be for a unit of one cubic metre.**

- 5.8.2 Providing and laying controlled cement concrete M-200 and curing, etc. complete, excluding the cost of form work and reinforcement for reinforced concrete work in : A. Foundations / rafts, footings, base of columns, and mass concrete, B. Walls from top of foundations up to floor two level, C. Slabs, landings, lofts, small slabs, chhajjas, cornices, shelves, balconies, lintels, plinth and floor beams, girders and cantilevers up to floor two level, D. Columns, pillars, posts and struts up to floor two level, E. Staircases, waist slabs and steps up to floor two level, F. Vertical and horizontal fins up to floor two level.**

Controlled concrete is that concrete, in which proportions of aggregates, cement and water are determined by preliminary test of the materials to be actually used, in order to obtain the specified strength with the use of minimum quantity of cement. It shall generally comply with relevant provisions in I.S. 456 - 2000.

**1.0. Materials :**

- 1.1. Ordinary Portland cement, fine aggregate and coarse aggregates, sand and water shall confirm M-3, M-12, M-6 and M-1 respectively.
- 1.2. No fly ash shall ever be allowed to be added in the design mix and in the concrete made on the site.

**2.0. Workmanship :**

**2.1. Proportioning Mix :**

The mix of fine and coarse aggregates, cement and water shall be designed by preliminary test to give the densest concrete requiring the minimum quantity of cement paste for binding the materials, to give the specified strength. Water content and the water cement ratio shall be determined from the results of preliminary tests of concrete to give the specified strength with the materials proposed for actual use in the work carried out before the work is started, adopting the consistency suitable for the work and method of compaction that will be actually used on site, subject to the water cement ratio as per IS codes tabulated separately.

**2.2. Test :**

Test shall confirm to the specifications laid down in I.S. 456 – 2000. This test shall be got done in an approved laboratory at the cost of the Contractor.

**2.3. Preliminary Tests :**

In preliminary tests, 03 separate tests shall be carried out on samples collected from different stacks. Each test shall be carried out with 06 samples of 15 cm. ( about 6” ) cubes, and 03 of these shall be tested at 07 days, and the other 03 at 28 days.

**2.4. Work Tests :**



For each of the work tests, 06 samples shall be prepared for the concrete used on the work, 03 samples being tested at 07 days and the remaining 03 samples at 28 days. Work tests shall be carried out on each of the first 06 days and subsequently once in three working days or for every 60 cu.m. of concrete, whichever is less, and also, whenever the quality of grading of the materials is changed. When a relation between the strengths at 07 days and 28 days is established, only 03 samples may be prepared and tested at 07 days only. This normal number of control specimen tests may be increased, if the Engineer-in-Charge considers it necessary.

#### 2.5. **Field Mix :**

The actual proportions of the fine and coarse aggregates will be determined by preliminary tests. In the work tests, bulkgage of sand due to moisture, if any, should be allowed for different batches according to the moisture actually present at the time of mixing. This moisture will be taken into account in controlling the mixing water also. The proportions, once fixed by preliminary tests, shall not be changed so long as the materials are the same, subject only to the quantities of fine aggregate and water being adjusted to compensate for bulkgage due to the moisture in sand and free water in fine aggregate at the time of use.

No change of materials shall be allowed unless fresh tests with new materials show satisfactory results.

Water and cement content per batch of concrete, as determined by preliminary tests, shall be maintained constant, except for suitable allowances to be made for surface moisture of the aggregate at the time of actual use.

Immediately upon the receipt of the award of the contract, the Contractor shall inform the Engineer-in-Charge the exact location of the sources of the acceptable materials, which he proposes to use, and get the materials approved. The mix with the actual approved materials to be used shall be got designed in an approved laboratory by the Contractor with minimum water cement ratio as specified later in this specifications to give the specific strength in the preliminary tests, and the proportions got approved by the Engineer-in-Charge in writing. These proportions shall be used so long as the materials contains to be of the same quality and from the same sources, subject only to slight changes in the relative quantities of fine and coarse aggregates for the purpose of promoting workability, provided the work tests also show the required strengths. If during the progress of the work, the Contractor wishes to change the materials, the proportion shall be fixed on the basis of fresh preliminary tests to give the required strength after the Engineer-in-Charge is satisfied that the materials satisfy the specifications. No adjustment of the cost shall be made for change of proportions of cement mixed in the original preliminary tests.

#### **Mixing Concrete :**

2.6. For manufacturing concrete, use of batching and mixing plant, fully automatic with a minimum output of 16 cu.m. per hour, with appropriate number of transit mixers minimum 2 numbers with a minimum capacity of 3 cu.m. in working condition. Concrete pumps shall be used only for casting of the superstructure. Concrete boom along with other accessories shall be mandatory, and shall be kept in first class working condition, and so maintained throughout the construction. Mixing shall be continued till materials are uniformly distributed and a uniform colour of the entire mass is obtained and each individual particle of the coarse aggregate shows a complete coating of mortar containing its proportionate amount of cement.

In no case shall the mixing be done for less than 2 minutes after all ingredients have been put into the mixer.

Hand mixing of concrete is not permissible. For mixes lower than M 20, ordinary machine mixing may be permitted with the permission of the Engineer-in-Charge in advance. In ordinary machine mixing, quantity of cement shall be increased by 10% above what has been specified above, but the cost of increased cement quantity shall be borne by the Contractor. Mixers, which have been out of use for more than 30 minutes, shall be thoroughly cleaned before putting in a new batch. Unless otherwise agreed to by the Engineer-in-Charge, the first batch of concrete from the mixer shall



contain only two thirds of the normal quantity of coarse aggregate. The mixing plant shall be thoroughly cleaned before changing from one type of cement to another.

2.7. **Maximum Water Cement Ratio :**

Sr. No.	Type of Concrete	Mix Strength	Maximum water cement ratio
01.	Reinforced concrete.	M 200.	0.55

2.8. **Proportioning of Field Mix :**

The proportion of sand and coarse aggregate shall be determined by weight. The weigh-batch machine shall be used for maintaining proper control over the proportioning of aggregate as per mix design. The mix proportion shall be allowed either by volume or by weigh batcher. The decision of Engineer-in-Charge shall be final.

2.9. **Cement :**

The cement shall be ordinary Portland Cement confirming to IS : 269. Under special circumstances, other cements may be used with prior approval of Engineer-in-Charge.

2.10. **Aggregates :**

Aggregates shall comply with the requirements of IS : 383. Clauses 4.2.1 and 4.2.2 and 4.2.3 shall not be applicable. Generally aggregates having a nominal size of 20 mm. shall be used. Coarse and fine aggregates shall be batched separately.

2.11. **Water :**

Water used for mixing and curing shall be as per clause 4.3 of IS : 456 – 2000.

**Quantity of Water :**

The quantity of water shall be just sufficient to produce a dense concrete of required workability and strength for the job. An accurate and strict control shall be kept on the quantity of mixing water.

In the case of reinforced concrete work, workability shall be such that the concrete surrounds and properly grips, all reinforcements. The degree of consistency, which shall depend upon the nature of work and the methods of vibration of concrete, shall be determined by regular slump tests. The following slump shall be adopted for different types of works or as directed by the Engineer-in-Charge.

Sr. No.	Type of Work	Where Vibrators are Used	Pump concrete
i.	Mass Concrete in R.C.C. Foundations, Footings and Retaining Walls.	25 mm. to 40 mm.	80 mm. to 100 mm.
ii.	Beams, Slabs & Columns Simply Reinforced.	40 mm. to 60 mm.	100 mm. to 120 mm.

**Notes :**

- i. With the use of ordinary concrete, the slump requirement specified above would not be applicable.



- ii. The above referred slump shall be measured at pouring site & at pouring time, that is, after 30 to 40 minutes after mixing water in concrete. The mix design shall have to be carried out accordingly.
- iii. The Contractor shall use plastisizer of approved quality to achieve the required degree of workability. However, the cost of the plastisizer admixture shall have to be born by the Contractor.

2.12. **Admixtures :**

Admixtures such as plasticizer / super plasticizer may be used with prior approval of the Engineer-in-Charge.

- 2.13. All reinforcement shall be free from loose mill scale, loose rust, and coats of paints, oil, mud or other coatings. The Contractor shall clean the reinforcement by using wire brush, rubbing with gunny bags, light acid itching, etc. as required.

- 2.14. Grade of concrete to be used shall be M 20.

- 2.15. Minimum cement content for different grades of concrete shall be as follows :

<b>Grade</b>	<b>Minimum cement content in Kg.</b>
<b>M 100</b>	<b>250</b>
<b>M 150</b>	<b>300</b>
<b>M 200</b>	<b>350</b>
<b>M 250</b>	<b>410</b>

2.16. **Transport, Placing and Compaction of Concrete :**

The method of transporting and placing concrete shall be through transit mixer as approved by the Engineer-in-Charge. Concrete shall be transported and placed such that no contamination, segregation or loss of its constituent materials takes place.

All form work and reinforcement contained in it shall be cleaned and made free from standing water or dust, immediately before placing of concrete.

No concrete shall be placed in any part of the structure, until the approval of the Engineer-in-Charge has been obtained in writing.

If concreting is not started within 24 hours of the approval being given, it shall have to be obtained again from the Engineer-in-Charge. Concreting shall then proceed continuously over the area between construction joints. Fresh concrete shall not be placed against concrete which has been in position for more than 30 minutes unless it is ensured that the vibration limit of the earlier concrete is not crossed or a proper construction joint is formed.

Concrete, when deposited, shall have a temperature of not less than 5<sup>0</sup>C and not more than 40<sup>0</sup>C, unless otherwise specified. It shall be compacted in its final position within 30 minutes of its discharge from the mixer, unless carried in properly designed agitators, operating continuously, and also within 1 hour of the addition of cement to the mix, and within 30 minutes of its discharge from the agitator, except where otherwise agreed to by the Engineer-in-Charge, concrete shall be deposited in horizontal layers to a compacted depth of not more than 450 mm., when internal vibrators are used and not exceeding 300 mm. in all other cases.



Unless otherwise agreed to by the Engineer-in-Charge, concrete shall not be dropped into place from a height exceeding 1,500 mm. When trunking or chutes are used, they shall be kept clean and used in such a way as to avoid segregation.

When concrete is conveyed by chute, the plant shall be of such size and design as to ensure practically continuous flow. Slope of the chute shall be so adjusted that the concrete flows without the use of an excessive quantity of water and without any segregation of its ingredients. The delivery end of the chute shall be as close as possible to the point of deposit. The chute shall be thoroughly flushed with water before and after each working period and the water used for this purpose shall be discharged outside the form work.

When concreting has to be resumed on a surface, which has already hardened, it shall be thoroughly hacked, roughened, swept clean, thoroughly wetted and covered with a layer of neat cement grout. This shall be followed by a 13 mm. thick layer of mortar composed of cement and sand in the same ratio as in the concrete mix itself. This 13 mm. layer of mortar shall be freshly mixed and placed immediately before placing of new concrete.

Where concrete has not fully hardened, all laitance shall be removed by scrubbing the wet surface with wire or bristle brushes, care being taken to avoid dislodgement of any particles of coarse aggregate. The surface shall then be thoroughly wetted, all free water removed, and then coated with neat cement grout. The first layer of concrete to be placed on this surface shall not exceed 150 mm. in thickness, and shall be well rammed against old work, particular attention being given to comers and close spots.

All concrete shall be compacted to produce a dense homogeneous mass with the assistance of vibrators, unless otherwise permitted by the Engineer-in-Charge for exceptional cases, such as concrete under water, where vibrators can not be used. Sufficient vibrators, in serviceable condition, shall be kept at site so that spare equipment is always available in the event of breakdowns.

The performance requirements of vibrators shall conform to relevant IS Codes. Vibration shall not be applied through reinforcement, and where vibrators of the immersion type are used, contact with reinforcement and all inserts shall be avoided as far as practicable.

#### 2.17. **Curing of Concrete :**

Protection and Water Curing :

Immediately after compaction, concrete shall be protected against harmful effects of weather, including rain, running water, shocks, vibration, traffic, rapid temperature changes and premature drying out. It shall be covered with wet sacking of hessian or other similar absorbent material, approved by the Engineer-in-Charge, soon after the initial set, and shall be kept continuously wet for a period of not less than 21 days from the date of placement. Masonry work over the foundation concrete may be started after 48 hours of its laying, but the curing of concrete shall be continued for a minimum period of 21 days.

#### **Working in Extreme Weather :**

#### 2.18.

When depositing concrete in very hot weather, precautions shall be taken so that the temperature of wet concrete does not exceed 38<sup>0</sup>C while placing. This shall be achieved by stacking aggregate under sheds, and keeping it moist using cold water or crushed or flaked ice, if specified and permitted by the Engineer-in-Charge, reducing the time between mixing and placing to the minimum, cooling formwork by sprinkling water on the exterior, starting curing before the concrete dries out, and restricting concreting, as far as possible, to mornings and evenings.

During hot weather and rains, the concrete shall be covered with tarpaulin and transported and placed in the forms and consolidated to final state. Commencement of concrete pours shall be avoided during heavy rains, storms and high winds.



### **Finishing :**

- 2.19. Immediately after the removal of forms, all exposed bars or bolts passing through the reinforced cement concrete member and used for shuttering or any other purpose shall be cut inside the reinforced cement concrete member to a depth of at least 25 mm. below the surface of the concrete and the resulting holes be closed by cement mortar.

All cavities produced by the removal of form ties, all holes and depressions, honey-comb spots, broken edges or corners and all other defects shall be thoroughly cleaned, saturated with water and carefully pointed and rendered true with mortar of cement and fine aggregate, mixed in the proportions used in the grade of concrete, that is being finished, and of as dry a consistency as is possible to use. Considerable pressure shall be applied in filling and pointing to ensure thorough filling in all voids. Surfaces, which have been filled / pointed, shall be kept moist for a period of twenty-four hours. Any repair and rectification of defective work shall be undertaken and carried out as directed by the Engineer-in-Charge.

If soft pockets / honey-combs, in the opinion of the Engineer-in-Charge, are of such an extent or character as to affect the strength of the structure materially or to endanger the life of the steel reinforcement, he may declare the concrete defective, and require the removal and replacement of the portions of the structure affected.

All construction and expansion joints in the completed work shall be left carefully tooled and free from any mortar and concrete. Expansion joint filler shall be left closed for its full length with clean and true edges.

### **Construction Joints :**

Concreting shall be carried out continuously up to the construction joints, the position and details of which shall be as shown on approved drawings or as directed by the Engineer-in-Charge. Such joints shall, however, be kept to the minimum.

- 2.20. For a vertical construction joint, a stopping board shall be fixed previously at the pre-determined position and shall be properly stayed for sufficient lateral rigidity to prevent its displacement or bulging when concrete is compacted against it. Concreting shall be continued right up to the board. The board shall not be removed before the expiry of the specified period for removal of vertical forms.

In all cases, the position and detailed arrangement of all construction joints shall be predetermined and got approved by the Engineer-in-Charge.

- 2.21. **Durability :** In order to provide / produce durable concrete with low permeability, it must have an adequate cement content and a low water cement ratio. By using strong, dense aggregates, sufficient low water cement ratio, ensuring thorough compaction and sufficient hydration of cement through proper curing methods, a sufficient low permeability is achieved. Therefore, cement content shall be sufficient to provide adequate workability with a low water cement ratio so that concrete can be completely compacted with the means available.

The permissible limits of chlorides and sulphate in concrete shall be as per Appendix A of IS 456 – 2000.

- 2.22. **Concrete Mix Proportioning :**

The mix proportions of cement, aggregates and water for different grades of concrete shall be determined by designing the concrete mix. ( Controlled concrete weigh batch ). The Designed Mix Concrete, when fresh, shall have required workability suitable for the conditions of handling and placing so that after compaction, it surrounds all reinforcements, and completely fills the formwork. When the concrete is hardened, it shall have the required strength, durability and surface finish. For this purpose, the Contractor shall establish a well equipped concrete testing laboratory at site. Different grades of concrete shall be carried out by relevant Indian Standards. The results of these



shall be sent to Consultant for their comments / approval / suggestion for modification of Design Mix.

**2.23. Strength requirement of Concrete :**

Where ordinary portland cement conforming to IS : 269 or Portland blast furnace cement conforming to IS : 455 is used, the compressive strength requirements for various grades of concrete, controlled as well as ordinary shall be as given in Table 1. Where rapid hardening Portland cement is used, the 28 days compressive strength requirement specified in Table 1 shall be met at 7 days. For controlled concrete, the mix shall be so designed as to attain in preliminary tests, a strength at least 33 percent higher than that required on work tests, for concrete mix up to, and including M 200 and 25 percent higher for higher strengths, preliminary tests need not be made in case of 'ordinary concrete' :

Grade of Concrete	Compressive works strength in Kg./cm <sup>2</sup> on 150 mm. cubes as per testing conducted in accordance with IS : 516.	
	Minimum at 7 days	Minimum at 28 days
M 100	70	100
M 150	100	150
M 200	135	200
M 250	170	250
M 300	200	300
M 350	235	350
M 400	270	400
M 450	300	450
M 500	335	500

**Note :**

In all cases, the 28 days compressive strength, specified in Table 1, shall alone be the criterion for acceptance or rejection of the concrete.

When the strength of a concrete mix, as indicated by tests, lies inbetween the strength for any two grades specified in Table 1. Such concrete shall be classified for all purpose as concrete belonging to the lower of the two grades, between which its strength lies.

**2.24. Repair Work :**

Concrete with satisfactory test results, but with otherwise minor defects, shall only be considered unsatisfactory. It shall be allowed to be repaired by cutting out the unsatisfactory material and by replacing it with new concrete, if so allowed by the Engineer-in-Charge. Voids to be so filled shall be provided with anchors, keys or dovetail slots, wherever necessary, to attach the new material securely in place. Surface of prepared voids shall be wetted for 24 hours immediately before the patching material is placed. Repair of concrete shall be made by skilled workmen. Repairs shall be made as soon as practicable after removal of forms and in a manner to meet the requirements for the finish, specified for the particular location.





For repair of the concrete works, the Contractor may use epoxy as a bonding agent prior to placing fresh concrete. The use or otherwise of epoxy for the repair work will be at the discretion of the Engineer-in-Charge. Epoxies shall be applied in strict accordance with the instructions of the manufacturer.

Epoxy is a 02 - component or 03 - component system, containing base and hardener/s. The shelf life of the unmixed cans is about one year or more, when stored in a place, where ambient temperature does not increase beyond 75<sup>0</sup>F. The base and hardener/s shall be mixed in the correct proportions recommended by the manufacturer. The blend, after mixing intimately, shall have a pot life of one hour, and the material shall be applied over the old concrete to form a thin film. Fresh concrete shall be deposited immediately prior to the film drying up so as to ensure proper bonding between both concrete.

Where the dry pack method is used, holes shall be sharp and square at the surface edges, but corners within holes shall be rounded. The perimeter of the hole shall be undercut in several places. Holes for dry pack shall have a minimum depth of 25 mm. The holes to be repaired shall be scrupulously cleaned and slightly wetted, with no free water on the surface. The surface shall then be dusted lightly with cement by means of dry brush. Under no conditions shall the holes be painted with neat cement grout.

The dry pack mix shall be proportioned by weight : 1 part cement to 2.50 parts of sand, that will pass a No. 16 screen. Only enough water shall be used to produce a mortar which will stick together, when moulded into a ball by a slight pressure of the hands and will not extrude water, but will leave the hands just damp.

Dry pack material shall be placed and packed in layers, having a compacted thickness of about 10 mm. Each layer shall be solidly contacted over its entire surface by use of hardwood stick and hammer. The stick is normally about 300 mm. to 460 mm. long and not over 30 mm. in diameter. Most of the tamping should be directed at a slight angle and towards the side of the hole to assure maximum compaction and bond. Water shall not be used to facilitate finishing.

Filling material used in repair of surfaces, which will be exposed after completion of the project, shall be made with cement from the same sources as that used in concrete and blended with a sufficient amount of white portland cement to produce the same color as in the adjoining concrete. Patched surfaced shall be given a final treatment as required to make the texture of the patch match that of the surrounding material.

Immediately after patching is completed, the patched area shall be covered with an approved non-staining, water-saturated material, which shall be kept wet and protected against sun and wind for a period of 12 hours. Thereafter, the patched area shall be kept continuously wet by a fine spray or sprinkling of water for not less than 10 days as required. The layers of gunite may be reinforced with steel mesh, if directed by the Engineer-in-Charge.

All materials procedures and operations, used in the repair of concrete and also the finished work, shall be subject to the approval of the Engineer-in-Charge. All fillings shall be tightly bonded to the concrete, and shall be sound, free from shrinkage cracks or dummy areas after the fillings have been cured and dried.

The extent of repair shall be decided upon by the Engineer-in-Charge. The cost of repairs of defective areas shall be borne by the Contractor. The Engineer-in-Charge may adopt at his discretion any other method of repairing like grouting with cement grout, epoxy grouts or guniting, etc., which shall be carried out by the Contractor at his own cost as per the specifications supplied by the Engineer-in-Charge.

2.25. Use of Plums in Ordinary Concrete :

Use of plums in concrete shall not be permitted.

**3.0. Measurement for Payment :**

3.1.



- i. **The rate shall be per 1 cubic meter.** In reinforced concrete, the volume occupied by reinforcement shall not be deducted.
- ii. Any concrete used in excess of the theoretical dimensions as shown on the drawings shall not be paid.
- iii. Unacceptable work :

All defective concreting work, including but not limited to defects arising out of honey-combing, under sizing, under strength, etc. shall have to be demolished and rebuilt by the Contractor at his own cost as may be directed by the Engineer-in-Charge. In the event of such works being accepted by carrying out repairs, etc., as suggested by the Contractor and accepted by the Engineer-in-Charge, he shall be paid for the work actually carried out by him at the reduced rate as may be asked by the Engineer-in-Charge for the portion of the work, that may be accepted with repairs, executed by the Contractor.

### 3.2. **Rate :**

The unit rate for concrete shall include the cost of all materials, labour, tools and plant required for mixing, placing in position, vibrating and compacting, finishing as per directions of the Engineer-in-Charge, curing and all other incidental expenses for producing concrete of specified strength to complete the structure or its components as shown on the drawings and according to these specifications. The rate shall also include the cost of making, fixing and removing of all centers and forms required for the work, unless otherwise specified in the Contract.

All expenses likely to be incurred by the Contractor in transporting materials procured at the site of works, the expenses incurred in improving the quality of materials to acceptable levels, such as screening, washing, etc., and expenses incurred in proper storage of materials as directed by the Engineer-in-Charge, etc. shall be included in the unit rate.

### 5.8.3 **Providing and laying controlled cement concrete M-250 and curing complete, excluding the cost of reinforcement for reinforcement for reinforced concrete work in : (A) foundations, footings base of columns, and the like and mass concrete. (B) Walls from top of foundation level up to floor two level (C) Slabs, landings, balconies, beams, girders and cantilever up to floor two level, (D) Columns, Pillars, struts, up to floor two level.**

#### 1.0 **Materials : & Workmanship :**

- 1.1 The relevant specifications of item No. 5.8.1. shall be followed except that the grading of controlled concrete shall be controlled concrete M-250 grades for the works as specified in the item.

#### 2.0 **Mode of measurements and payment :**

- 2.1 The relevant specifications of item No.5.8.1 shall be followed.

#### 2.2 **The rate shall be for a one cubic metre.**

### 5.00.1 **Providing and laying ordinary concrete 1:2:4 (1 Cement : 2 coarse sand : 4 graded stone aggregates 20 mm. nominal size) and finishing smooth with curing etc., complete including the cost of form work but excluding the cost of reinforcement for R.C.C. work in (I) Slabs up to 8 cms. Thickness (II) Slabs having more than 8 cms. and up to 10 cms. (III) Slabs having more than 10 cms. and up to 13 cms thickness. (IV) Slabs having more than 1.3 cms and up to 1.5 cms. thickness.**

#### 1.1 **Materials & Workmanship :**

- 1.1 The relevant specifications for item No. 5.4.1 shall be followed for concrete work and relevant specifications of item no. 9.1 shall be followed for form work and centering. The concrete surface shall be smooth finished with cement mortar 1:3 (1 cement : 3 fine sand) as per item No. 17.59 (I) The thickness shall be as specified in the item.



**2.0 Mode of measurements and payment :**

2.1 The relevant specification for item No. 5.4.1. shall be followed except that item shall include the item providing form work and centering work as directed.

2.2 **The rate shall be for a one cubic metre.**

**5.00.2 Providing and laying controlled cement concrete M-150 and finishing smooth with curing etc., complete including the cost of form work but excluding the cost of reinforcement for R.C.C. work in : (I) Slabs up to 8 cms. thickness (II) Slabs having more than 8 cms. and up to 10 cms. (III) Slabs more than 10 cms. and up to 13 cms. (IV) Slabs more than 13 cms. and up to 15 cms.**

**1.0 Materials & Workmanship :**

1.1 The relevant specifications of item no. 5.8.1 shall be followed for concrete work and item No. 9.1. shall be followed for form work and centering. The concrete surface shall be smooth finished with cement mortar 1:3 (1 cement : 3 fine sand) as per No. 17.59 (I) The thickness shall be as specified in the item.

**2.0 Mode of measurements and payment :**

2.1 The relevant specifications of item No.5.8.1. shall be followed except that the item shall include the cost and from work and centering.

2.2 **The rate shall be for a one cubic metre.**

**5.00.3 Providing and laying ordinary cement concrete 1:2:4 (1 cement : 2 coarse sand : 4 graded stone aggregates 20 mm. nominal size) exposed work with curing etc. complete, including the cost of work but excluding the cost of reinforcement for R.C.C. work in (I) Slabs up to 8 cms. thickness. (II) Slabs having more than 8 cms. and up to 10 cms. thickness. (III) Slabs having more than 10 cms. and up to 13 cms. thickness. (IV) Slabs having more than 13 cms. and up to 15 cms. thickness.**

**1.0 Materials & Workmanship :**

1.1 The relevant specifications of item No. 5.4.1 shall be followed for concrete work and that of form work shall be followed as per item No. 9.1 and 9.7. The thickness of the slab shall be as specified in the item.

**2.0 Mode of measurements and payment :**

2.1 The relevant specifications of item No. 5.4.1 shall be followed except that form work and centering work shall be included in the item.

2.2 **The rate shall be for a one cubic metre.**

**5.00.4 Providing and laying controlled cement concrete M-150 exposed work with curing etc., complete including the cost of form work but excluding the cost of reinforcement for R.C.C. work in : (I) Slabs up to 8 cms. thickness (II) Slabs having more than 8 cms and up to 10 cms. thickness (III) Slabs having more than 10 cms. and up to 13 cms. thickness. (IV) Slabs having more than 13 cms. and up to 15 cms. thickness.**

**1.0 Materials & Workmanship :**

1.1 The relevant specification of Item No. 5.4.1 shall be followed for controlled concrete and the relevant specifications of item No. 9.1 and 9.7 shall be followed exposed concrete form work and centering work. The thickness of the slab shall be as specified in the item.

**2.0 Mode of Measurement & Payment :**

2.1 The relevant specifications of item No. 5.8.1 shall be followed except that the form work and centering



work shall be included in the item.

2.2 **The rate shall be for a one cubic metre.**

**5.00.5 Providing and laying ordinary cement concrete 1:2:4 (1 cement : 2 coarse sand : 4 graded stone aggregate 20 mm. nominal size) for R.C.C. lintel including finishing smooth with curing etc. complete including the cost of form work but excluding the cost of reinforcement.**

**1.0 Materials & Workmanship :**

1.1 The relevant specification of item No. 5.4.1 shall be followed for concrete work, relevant specifications of item No. 17.59 (I) for finishing work and relevant specifications of item No. 9.1 shall be followed for form work and centering work. The concrete work shall be followed for the form work and centering work for exposed concrete work.

**2.0 Mode of Measurement & Payment :**

2.1 The relevant specification of item No. 5.8.1 shall be followed except that the item includes the cost of form work for exposed concrete work.

2.2 **The rate shall be for a one cubic metre.**

**5.00.6 Providing and laying ordinary cement concrete 1:2:4 (1 cement : 2 coarse sand : 4 graded stone aggregate 20 mm. nominal size) and finishing smooth with curing etc., complete, including the cost of form work but excluding reinforcement for R.C.C. work in (A) Beams : (I) Having cross sectional area 0.05 to 0.08 Sq.meter. (II) Having cross sectional area more than 0.08 Sq.mt. up to 0.12 Sq.mt. (III) Having cross sectional area more than 0.12 Sq.Mt. and up to 0.18 Sq.Mt. (B) Columns : (I) Having cross sectional area 0.05 to 0.08 Sq.Mt. (II) Having cross sectional area more than 0.12 Sq.Mt. and up to 0.18 Sq.Mt.**

**1.0 Materials & Workmanship :**

1.1 The relevant specifications of item No. 5.4.1 shall be followed for concrete work and item No. 9.1 shall be followed for form work and centering work. The finishing shall be done in cement mortar 1:3 (1 cement : 3 fine sand) as per item No. 17.59 (I) The cross sectional area of beam shall be specified in item.

**2.0 Mode of measurement & payment :**

2.1 The relevant specifications of item No. 5.4.1 shall be followed but the form work and centering work shall be included in the item.

2.2 **The rate shall be for a one cubic metre.**

**5.00.7 Providing and laying controlled cement concrete M-150 exposed work with curing etc. complete, including the cost of form work but excluding the cost of reinforcement for R.C.C. work in : (A) Beams : (I) Having cross sectional area 0.05 to 0.08 Sq.meter. (II) Having cross sectional are more than 0.08 Sq.mt. up to 0.12 Sq.mt. (III) Having cross sectional area more than 0.12 Sq.Mt. and up to 0.18 Sq.mt. (B) Columns : (I) Having cross sectional area 0.05 to 0.08 Sq.mt. (II) Having cross sectional area more than 0.08 Sq.mt. and up to 0.12 Sq.mt. (III) Having cross sectional area more than 0.12 Sq.mt and up to 0.18 Sq. mt.**

**1.0 Materials & Workmanship :**

1.1 The relevant specifications of item No. 5.8.1 shall be followed for controlled concrete work as specified in item for M-150 and relevant specifications of item 9.1 shall be followed for form work and centering work for exposed cement work.

**2.0 Mode of measurement & payment :**



2.1 The relevant specifications of item No. 5.8.1 shall be followed except that the form work and centering work shall be included in the item.

2.2 **The rate shall be for a one cubic metre.**

**5.00.8 Providing and laying controlled cement concrete M-200 exposed work with curing etc. complete, including the cost of form work but excluding the cost of reinforcement for R.C.C. work in : (A) Beams : (I) Having cross sectional area 0.05 to 0.08 sq.mt (II) Having cross sectional area more than 0.08 sq.mt. up to 0.12 sq.mt. (III) Having cross sectional area more than 0.12 sq.mt. and up to 0.18 sq.mt.(B) Columns : (I) Having cross sectional area 0.05 to 0.08 sq. mt. (II) Having cross sectional area more that 0.08 sq.mt. and up to 0.12 sq.mt (III) Having cross sectional area more than 0.12 sq.mt. and up to 0.18 sq.mt.**

**1.0 Materials & Workmanship :**

1.1 The relevant specifications of item No. 5.8.1 shall be followed for controlled concrete work as specified in item for M-200 and relevant specifications of item 9.7 and 9.1 shall be followed for form work and centering work for exposed cement work.

**2.0 Mode of Measurement & Payment :**

2.1 The relevant specifications of item No. 5.8.1 shall be followed except that the item includes the cost of form work and centering work for exposed work.

2.2 **The rate shall be for a one cubic metre.**

**5.00.9 Providing and laying controlled cement concrete M-250 exposed work with curing etc. complete, including the cost of form work but excluding the cost of reinforcement for R.C.C. work in : (A)Beams : (I) Having cross sectional area 0.05 to 0.08 sq.mt (II) Having cross sectional area more than 0.08 sq.mt. up to 0.12 sq.mt. (III) Having cross sectional area more than 0.12 sq.mt. and up to 0.18 sq.mt. (B) Columns : (I) Having cross sectional area 0.05 to 0.08 sq.mt. (II) Having cross sectional area more than 0.08 sq.mt. and up to 0.12 sq.mt. (III) Having cross sectional cross sectional area more than 0.12 sq.mt. and up to 0.18 sq.mt.**

**1.0 Materials & Workmanship :**

1.1 The relevant specifications of item No. 5.8.1 shall be followed for controlled concrete work as specified in item for M-250 and relevant R.C.C. lintels shall be carried out.

**2.0 Mode of measurements and payment :**

2.1 The relevant specifications of item No. 5.4.1 shall be followed except that the form work finishing and centering work shall be included in the item.

2.2 **The rate shall be for a one cubic metre.**



## SECTION – 6

### Brick Masonary Work

**6.12. (A) Brick work using common burnt clay building bricks having crushing strength not less than 35 Kg/Sq.Cm. in foundations and plinth in cement mortar 1:5 (1 cement : 5 fine sand) modular bricks.**

#### **1.0 Materials :**

Water shall conform to M-1 Cement shall conform to M-3, Sand shall conform to M-6 Brick shall conform to M-15. Cement mortar shall conform to M-11.

#### **2.0 Workmanship :**

##### **2.1 Proportion.**

2.1.1. The proportion of the cement mortar shall be 1:5 (1 cement : 5 fine sand) by volume.

##### **2.2 Wetting of bricks :**

2.1.1. The bricks required for masonry shall be thoroughly wetted with clean water for about two hours before use or as directed. The cessation of bubbles, when the bricks are wetted with water in an indication of through wetting of bricks.

##### **2.3 Laying :**

2.3.1 Bricks shall be laid in English bond unless directed otherwise Half or cut bricks shall not be used except when necessary to complete to bond; closers in such case shall be cut to required size and used near the ends of walls.

2.3.2 A layer of mortar shall be spread on full width for suitable length of the lower course. Each brick shall first be properly bedded and set home by gently tapping with handle of trowel or wooden mallet. Its inside face shall be flushed with mortar before the net brick is laid and pressed against it. On completion of course, the vertical joints shall be fully filled from the top with mortar.

2.3.3 The walls shall be taken up truly in plumb. All courses shall be laid truly horizontal and all vertical joints shall be truly vertical. Vertical joints in alternate course shall generally be directly one over the other. The thickness of brick course shall be kept uniform.

2.3.4 The brick shall be laid with frog up wards. A set of tools comprising of wooden straight edges mason's spirit level, square half metre rub, and pins, string and plumb shall be kept on the site of work for frequent checking during the progress of work.

2.3.5. Both the faces of walls of thickness greater than 23 cms. shall be kept in proper place. All the connected brick work shall be kept not more than one metre over the rest of the work. Where this is not possible, the work shall be raked back according to bond (and not left toothed) at an angle not steeper than 45 degrees.

2.3.6. All fixtures, pipes, outlets of water, hold fasts of doors and windows etc. which are required to be built in wall shall be embedded in cement mortar.

##### **2.4 Joints :**

2.4.1. Bricks shall be so laid that all joints are quite flush with mortar. Thickness of joints shall not exceed 12 mm. The face joints shall be raked out as directed by raking tools daily during the progress of work when the mortar is still green so as to provide key for plaster or pointing to done.

2.4.2. The face of brick shall be cleaned the very day on which the work is laid and all mortar dropping removed.



## **2.5 Curing :**

- 2.5.1. Green work shall be protected from rain suitably. Masonry work shall be kept moist on all the faces for a period of seven days. The top of masonry work shall be kept well wetted at the close of the day.

## **2.6 Preparation of foundation bed :**

- 2.6.1. If the foundation is to be laid directly on the excavated bed, the bed shall be leveled, cleared of all loose Materials :, cleaned and wetted before starting masonry. Is masonry is to be laid on concrete footing, the top of concrete shall be cleaned and moistened. The contractor shall obtain the engineer's approval of the foundation bed before foundation masonry is started. When pucca flooring is to be provided flush with the top to plinth, the inside plinth offset shall be kept lower than the outside plinth top by the thickness of the flooring.

## **3.0 Mode measurements & payment :**

- 3.1. The measurements of this item shall be taken for the brick masonry fully completed in foundation up to plinth. The limiting dimensions not exceeding those shown on the plans or as directed shall be final. Battered tapered and curved portions shall be measured net.
- 3.2. No deduction shall be made from the quantity of brick work, for any extra payment made for embedding in masonry or making holes in respect of following items :
- (1) Ends of joints, beams, posts, girders rafters purlins, Trusses corbel steps etc. where cross sectional area does not exceed 500 sq.cm.
  - (2) Openings not exceeding 1000 Sq.cm.
  - (3) Wall plates and bed plates, bearing of slabs, chajjas and the like those thickness does not exceed 10 cms. and the bearing does not extend to the full thickness of wall.
  - (4) Drainage holes, and recesses for cement concrete blocks to embed hold fasts for doors, windows etc.
  - (5) Iron fixtures, pipes up to 300 mm. dia; hold fasts, and doors and windows built into masonry and pipes etc for concealed wiring.
  - (6) Forming chases of section not exceeding 350 sq.cm. in masonry.
- 3.3. Apertures for fire places shall not be deducted nor shall be paid for separately.
- 3.4. The rate shall be for a unit of one cubic metre.

## **6.12 (B)Brick work using common burnt clay building bricks having crushing strength not less than 35 Kg./Sq.cm. in foundations and plinth in cement mortar 1:5 (1 cement : 5 fine sand) conventional bricks.**

### **1.0 Materials :**

Cement mortar of proportion 1:5 shall conform to M-11. Conventional bricks shall conform to M-15.

### **2.0 Workmanship :**

- 2.1. The relevant specification of item No. 6.12 (A) shall be followed except that the masonry work shall be carried out by using conventional bricks.

### **3.0 Mode of measurements and payment :**

- 3.1. The relevant specification of item No. 6.12 (A) shall be followed.



3.2. **The rate shall be for a unit of one cubic metre.**

**6.13.A. Brick work using common burnt clay building bricks having crushing strength not less than 35 Kg/Sq.cm. in foundation and plinth in cement mortar 1:6 (1 cement : 6 fine sand) with modular bricks.**

**1.0 Materials :**

Cement mortar of conform to M-11. Brick shall conform to M-15.

**2.0 Workmanship :**

2.1. The relevant specifications of item No. 6.12 (A) shall be followed except that the bricks to be used shall be modular bricks and the proportion of cement mortar is 1:6.

**3.0 Mode of measurements and payment :**

3.1. The relevant specification of item No. 6.12 (A) shall be followed.

3.2. **The rate shall be for a unit of one cubic metre.**

**6.13.B. Brick work using common burnt clay building bricks having crushing strength not less than 35 Kg/Sq.cm. in foundation and plinth in cement mortar 1:6 (1 cement : 6 fine sand) with conventional bricks.**

**1.0 Materials :**

Cement mortar of conform to M-1. Cement mortar shall conform to M-11. Brick shall conform to M-15.

**2.0 Workmanship :**

2.1. The relevant specifications of item No. 6.12 (A) shall be followed except that the bricks to be used shall be conventional bricks and the proportion of cement mortar is 1:6.

**3.0 Mode of measurements and payment :**

3.1. The relevant specification of item No. 6.12 (A) shall be followed.

3.2. **The rate shall be for a unit of one cubic metre.**

**6.0.0.1. (A). Brick work using common burnt clay building bricks having crushing strength not less than 35 Kg./Sq.Cm. in foundation and plinth in cement mortar 1:8 (1 cement : 8 fine sand) with Modular bricks.**

**1.0 Materials :**

Water mortar of conform to M-1. Brick shall conform to M-15. Cement mortar shall be conform to M-11.

**2.0 Workmanship :**

2.1. The relevant specifications of item No. 6.12 (A) shall be followed except that the proportion of cement mortar shall be cement mortar 1:8 and bricks used shall be conventional bricks.

**3.0 Mode of measurements and payment :**

3.1. The relevant specification of Item No. 6.12 (A) shall be followed.





3.2. **The rate shall be for a unit of one cubic metre.**

**6.0.0.1. (B). Brick work using common burnt clay building bricks having crushing strength not less than 35 Kg./Sq. Cm. in foundation and plinth in cement mortar 1:8 (1 cement : 8 fine sand) with conventional bricks**

**1.0 Materials :**

Water shall conform to M-1 Brick shall conform to M-15. Cement mortar shall conform to M-11.

**2.0 Workmanship :**

2.1 The relevant specification of item No 6.12.(A) shall be followed except that the proportion of cement mortar shall be cement mortar is 1:8

**3.0 Mode of measurements and payment :**

3.1 The relevant specification of item No.6.12 (A) shall be followed.

3.2 **The rate shall be for a unit of one cubic metre.**

**6.0.0.2. (A). Brick work using common burnt clay building bricks having crushing strength not less than 35 kg./Sq. Cm. in foundation and plinth in lime mortar 1:1.5 (1 Lime putty: 1.5 fine sand) modular bricks.**

**1.0 Materials :**

Lime mortar of proportion (1:1.5) shall conform to M-10 brick shall conform to M-15

**2.0 Workmanship :**

2.1 The relevant specification of item No.6.12(A) shall be followed except that the masonry work shall be carried out in lime mortar 1:1.5 (1 lime putty 1.5 fine sand) in foundation and plinth.

**3.0 Mode of measurements and payment :**

3.1 The relevant specification of item No. 6.12 (A) shall be followed.

3.2 **The rate shall be for a unit of one cubic metre.**

**6.0.0.2 (B) Brick work using common burnt clay building bricks having crushing strength not less than 35 kg./Sq. Cm. in foundation and plinth in lime mortar 1:1.5 (1 Lime putty: 1.5 fine sand) conventional bricks.**

**1.0 Materials & Workmanship :**

The relevant specification of item No. 6.12 (A) and 6.0.0.2(A) shall be followed except that the masonry work shall be carried out by using conventional bricks in lime mortar 1:1.5 (1 Lime putty : 1.5 fine sand) in foundation and plinth.

**2.0 Mode of Measurement & Payment :**

2.1 The relevant specification of item No. 6.12. (A) shall be followed.

2.2 **The rate shall be for a unit of one cubic metre.**

**6.0.0.3. (A). Brick work using common burnt clay building bricks having crushing strength not less**



than 35 kg./Sq. Cm. in foundation and plinth in lime mortar 1:2 (1 Lime putty: 2 fine sand) modular bricks.

**1.0 Materials & Workmanship :**

The relevant specification of item No. 6.12(A) and 6.0.0.(A) shall be followed except that the masonry work shall be carried out by using conventional bricks in lime mortar 1:2 (1 Lime putty; 2 fine sand) in foundation and plinth.

**2.0 Mode of Measurement & Payment :**

2.1 The relevant specification of item No. 6.12 (A) shall be followed.

2.2 **The rate shall be for a unit of one cubic metre.**

**6.0.03. (B) Brick work using common burnt clay building bricks having crushing strength not less than 35 kg./Sq. Cm. in foundation and plinth in lime mortar 1:2 (1 Lime putty: 2 fine sand) conventional bricks.**

**1.0 Material & Workmanship :**

The relevant specification of item No. 6.12 (A) and 6.0.03 shall be followed except that the masonry work shall be carried out by using conventional bricks in lime mortar 1:2 (Lime putty: 2 fine sand) in foundation and plinth.

**6.19 (A) Brick work using common burnt clay building bricks having crushing strength not less than 35 kg./Sq. Cm. for super structure above plinth level up to floor two level in cement mortar 1:5 (1 cement: 1 fine sand) modular bricks.**

**1. Materials :**

Bricks shall conform to M-15 Cement mortar shall conform to M-11.

**2.0 Workmanship :**

2.1 The relevant specification of item No. 6.12 (A) shall be followed except that the masonry work shall be carried out above plinth level to floor two level i.e. for ground floor,

2.2. The frames of doors, windows, cupboards etc. shall be housed into the brick work at the correct location and level as directed. The heavy steel doors, window frames, hold-fasts etc., shall be left in the wall and frame embedded later on in order to avoid damage to the frames.

2.3 Necessary scaffolding shall be provided. The supports of the scaffolding shall be sound and strong tied together with horizontal pieces over which the scaffolding plunks shall be fixed. Simple scaffolding shall be allowed normally. In this case scaffolding hole header horizontal coarse only. Minimum number of holes be left in brick work of supporting horizontal scaffolding poles. The contractor is responsible for providing and maintaining sufficiently strong scaffolding so as to withstand all loads likely to come upon it.

2.4 For the face of brick work, where plastering is to be done, joints shall be raked out to a depth not less than thickness of joints. The face of brick work shall be cleaned and mortar dropping removed on very same day that brick work is laid.

**3.0 Mode of measurements and payment :**

The masonry work of G.F. i.e. above plinth level to floor two level shall be measured and paid under this item.

3.2 Brick work in parapet shall be included in the corresponding masonry item for storey immediately below the floor above which the parapet is built.



- 3.3 No deduction shall be made from quantity of brick work nor any extra payment made for embedding in masonry of making holes in respect of following item.
- (1) Ends of joints, beams, posts, girders, rafters, purlins truses corbel, steps, etc., where cross sectional area does not exceed 500 sq.cm.,
  - (2) Opening not exceed in 1000 sq.cm.
  - (3) Wall plate sand bed plates, bearing of slab, chhajjas and like whose thickness does not exceed 10 cms. And the bearing does not extend the full thickness of wall.
  - (4) Drainage holes and recesses for cement concrete blocks to embed hold fasts for doors, window etc.,
  - (5) Iron fixtures, pipes up to 300 mm. dia. Hold fasts of doors, and window built into masonry and pipes etc. for concealed wiring.
  - (6) Apertures for fire places, shall not be deducted nor shall extra labour required to make splaying of jumps, throating and making trenches over the aperture be paid for separately.
- 3.4. The extra payment shall be made for super structure one and above the rate of masonry work up to plinth.
- 3.5. **The rate shall be for a unit of one cubic metre per metre.**
- 6.19 (B) Brick work using common burnt clay building bricks having crushing strength not less than 35 kg./Sq. Cm. for super structure above plinth level up to floor two level in cement mortar 1:5 (1 cement : 5 fine sand) conventional bricks.**
- 1.0 Material & Workmanship :**
- The relevant specification of item No 6.19(A) shall be followed except that brick masonry work shall be carried out with conventional bricks.
- 2.0 Mode measurement and payment :**
- 2.1** The relevant specification of item No. 6.19 (A) shall be followed.
- 2.2 The rate shall be for a unit of one cubic metre per metre.**
- 6.20 Extra for brick in super structure above floor two level.**
- 1.0 Materials :**
- The relevant specification of item masonry work to be carried out shall be followed except that this work is for additional life of one floor above two level.
- 2.0 Mode of measurements and payment :**
- 2.2** The extra payment shall be made for additional life above floor two level to each additional floor over and above the rate of masonry work.
- 2.3 The rate shall be for a unit of one cubic metre per floor.**
- 6.10.I. (A) Half Brick masonry common burnt clay building bricks having crushing strength not less than 35 kg./Sq. Cm. in cement mortar 1:4 (1 cement : 4 coarse sand) in super structure above**



**plinth level up to floor two level with modular bricks.**

**1.0. Materials :**

1.1. Bricks shall conform to M-15 Water shall conform to M-1. Cement shall conform to M-3 Sand shall conform to M-6. Cement mortar shall conform to M-11

**2.0 Workmanship :**

2.1 Relevant specifications of bricks, wetting and laying of bricks, joints, curing etc. shall conform to item No. 6.19(A) except that the brick work of half bricks shall be carried out

2.2 Cement mortar used in masonry work shall be in proportion of 1 part of cement and 4 parts of sand volume.

2.3 All bricks shall be laid stretcher wise, breaking joints with those in the upper and lower course. The wall shall be taken truly plumb. All course shall be laid truly horizontal and all vertical joint shall be truly vertical. The bricks shall be laid with frogs upwards. A set of masons tools shall be maintained on work as required for frequent checking.

**3.0 Mode of measurement and payment :**

3.1 The half brick masonry work in foundation and plinth shall be measured this item, the limiting dimensions shall not exceed those shown in the plan or as directed. Any work done extra over the specified dimensions shall be ignored.

3.2 The relevant specifications of item no 6.12 shall be followed. The length shall be measured nearest to one cm.

3.3 **The rate shall be for a unit of sq.metre.**

**6.30.I (B) Half Brick masonry common burnt clay building bricks having crushing strength not less than 35 kg./Sq. Cm. in cement mortar 1:4 (1 cement : 4 coarse sand) in super structure above plinth level up to floor two level with conventional bricks.**

**1.0 Materials :**

1.1 The relevant specifications of item No. 6.10.1.(A) shall be followed except that the bricks to be used shall be conventional bricks instead of modular bricks.

**2.0 Mode of Measurement & Payment :**

2.1 The limiting dimensions shall not exceed those shown in the plan or as directed. Any work done extra over specified dimensions shall be ignored.

2.2. **The rate shall be for a unit of sq.metre.**

**6.30.II. (A) Half Brick masonry common burnt clay building bricks having crushing strength not less than 35 kg./Sq. Cm. in cement mortar 1:5 (1 cement : 5 coarse sand) with modular bricks in foundation and plinth.**

**1.0 Materials :**

1.1 The relevant specification of item No. 6.30.I (A) shall be followed except the half brick masonry work shall be carried out in cement mortar 1:5 (1 cement: 5 coarse sand) with modular bricks in foundation and plinth.

**2.0 Mode of measurement and payment :**



- 2.1 The relevant specification item No. 6.30.I. (A) shall be followed.
- 2.2. **The rate shall be for a unit of one cubic metre.**
- 6.30.II (B) Half Brick masonry common burnt clay building bricks having crushing strength not less than 35 kg./Sq. Cm. in cement mortar 1:5 (1 cement : 5 coarse sand) in foundation and plinth using conventional bricks.**
- 1.0 Materials :**
- 1.1 The relevant specifications of item No. 6.30. (I) (A) shall be followed except the half brick masonry work shall be carried out in cement mortar 1:5 (I cement : 5 coarse sand) in foundation and plinth using conventional brick.
- 2.0 Mode of measurement and payment :**
- 2.1 The relevant specification item No. 6.30.I. (A) shall be followed.
- 2.2 **The rate shall be for a unit of one sq.mt.**
- 6.30.III. (A) Half Brick masonry common burnt clay building bricks having crushing strength not less than 35 kg./Sq. Cm. in lime mortar 1:1.5 (1 lime putty : 1.5 coarse sand) in foundation and plinth with conventional bricks.**
- 1.0 Materials :**
- Modular bricks shall conform to M-15, water shall conform to M-1. Lime mortar or proportion L.M.I: i.5 (I Lime putty: 1.5 coarse sand) shall conform to M-10
- 2.0 Workmanship :**
- The relevant specifications of item No. 6.30. (I) (A) shall be followed except the half brick masonry work shall be carried out in lime mortar 1:1.5 (I Lime putty : 1.5 coarse sand) in foundation and plinth using modular brick.
- 3.0 Mode of Measurement & Payment :**
- 3.1. The relevant specifications of item No. 6.30 (I) – (A) shall be followed.
- 3.2. **The rate shall be for a unit of one sq. metre.**
- 6.30.III (B) Half Brick masonry common burnt clay building bricks having crushing strength not less than 35 kg./Sq. Cm. in lime mortar 1:1.5 (1 lime putty : 1.5 coarse sand) in foundation and plinth with conventional bricks.**
- 1.0 Materials :**
- Conventional bricks shall conform to M-15 water shall conform to M-1. Lime mortar of proportion L.M. 1:1.5 (1 lime putty: 1.5 coarse sand) shall conform to M-10.
- 2.0 Workmanship :**
- The relevant specifications of item No. 6.30 (I) (A) shall be followed except the half brick masonry work shall be carried out in Lime mortar 1:1.5 (lime putty; 1.5 coarse sand) in foundation and plinth using conventional bricks.
- 3.0 Mode of measurements and payment :**
- 3.1. The relevant specification of item No. 6.30.(I)-(A) shall be followed.



3.2. **The rate shall be for a unit of one sq. mt.**

**6.30.IV (A) Half Brick masonry common burnt clay building bricks having crushing strength not less than 35 kg./Sq. Cm. in cement mortar 1:5 (1 lime putty : 5 coarse sand) with hoop iron 25 mm. x 1.6 mm. or equivalent rein for cement at every third course embedded in cement mortar in foundation and plinth with modular bricks.**

**1.0 Materials :**

Bricks shall conform to M-15 Water shall conform to M-1 Cement shall conform to M-3, sand shall conform to M-6 Cement mortar shall conform to M-11. M.S. reinforcement shall conform to M-18.

**2.0 Workmanship :**

Relevant specifications of bricks, wetting and laying of bricks. Joints curing scaffolding etc. shall conform to item No 6.30. (I) (A) except the following.

2.2 Cement mortar used in masonry work shall be in proportion to 1 part of cement and 5 part of sand by volume and shall conform to M-11 and this work is for half brick thickness for partition Wall.

2.3 The hoop iron 25 mm. x 1.6 mm. or equivalent reinforcement shall be provided at every third course. The ends of reinforcement shall be fully embedded in main Walls sides as directed. Reinforcement shall be placed on the top of the bottommost course. Laps shall be of 15 cms. Of mild steel bars or hoop iron.

2.4 The joints in the course where reinforcement is placed shall admit or mortar cover to the reinforcement.

**3.0 Mode of measurement and payment :**

3.1 The relevant shall be for half brick masonry work including providing specified reinforcement, the limiting dimensions not exceeding those in the plan or as directed. The length shall be measured nearest to one Cm.

3.2 Any work done extra over specified dimensions shall be ignored.

3.3. The rate shall be for a unit of one sq. metre.

**6.30.II. (B) Half Brick masonry common burnt clay building bricks having crushing strength not less than 35 kg./Sq. Cm. in cement mortar 1:5 (1 lime putty : 5 coarse sand) with hoop iron 25 mm. x 1.6 mm. or equivalent reinforcement at every third course embedded in cement mortar in foundation and plinth with conventional bricks.**

**1.0 Materials & Workmanship :**

The relevant specification of item No. 6.30. (I) (A) shall be followed except the work is to be carried out with conventional bricks instead of Modular bricks.

**2.0 Mode of measurements and payment :**

2.1 The rate shall be for half brick work. Including providing specified reinforcement, the limiting dimensions not exceeding those shown in the plan or as directed. The length shall be measured nearest to one cms.

2.2 The work done extra over specified dimensions shall be ignored.

2.3 The rates shall be for a unit of one Sq. metre.

**6.33. (A) Extra for half brick masonry in superstructure above floor two level. Modular bricks**

1.1 The relevant specifications for item No 6.30.(A) ^ 6.30. (B) shall be followed except that this work is



for addition lift of each floor two level using Modular bricks.

**2.0 Mode of measurement and payment :**

2.1 The payment made for the half brick masonry work carried out above floor two level for each additional lift over and above the payment of work up to floor two level.

2.2 The rate shall be for a unit of one sq. metre per floor.

**6.33 (B) Extra for half brick masonry work in superstructure above floor two level, Conventional bricks.**

**1.0 Materials & Workmanship :**

1.1 The relevant specifications for item No. 6.30 (A) & 6.30 (B) shall be followed except that this work is for additional lift of each floor two level using conventional bricks.

**2.0 Mode of measurement and payment :**

2.1 The relevant specification of item No. 6.33 (A) shall be followed.

2.2 The rate shall be for a unit of one sq. Metre per floor.

**6.55 (1) Half brick thick Honey- comb brick work with burnt clay building having crushing strength not less than 35 kg/Sq. cm. in C.M. 1:4 (1 cement: 4 coarse sand)**

**1.0 Materials :**

Bricks shall conform to M-15 Cement mortar of proportion shall conform to M-11

**2.0 Workmanship :**

The relevant specifications of item No. 6.32 (A) shall be followed except that the masonry work shall be carried out Honey- comb in thickness of half bricks in cement mortar 1:4 (1 cement : 4 coarse and) and as and where directed with all lifts.

**3.0 Mode of Measurement & Payment :**

3.1 The honey- comb work shall be measured in sq. mtres. The area of honey comb work shall be measured without deduction for openings.

3.2 The rate shall be for a unit of one square metre of wall surface.



## SECTION – 7

### Rubble Masonary Work

**7.6 (1) Uncaused rubble masonry with hard stone approved quality in foundations and plinth in cement mortar 1:6 (1 cement : 6 coarse sand) including leveling etc. complete.**

#### **1.0 Materials :**

The cement mortar shall conform to M-11 Stone shall conform to M-16

#### **2.0 Workmanship :**

##### **2.1 Dassing for stone :**

Stone used for unclorsed rubble masonarey work shall be hammer dressed on the sides, and beds in such a way as to close with the adjustment stone in the masonry work as strongly as possible. The face stone shall be dressed in such a manner as to give a specified pattern such as polygonal facing etc. The face of the stone shall be so dressed that bushing on the exposed face shall not project by more than 40 mm. form the general wall surface and on the face to be plastered, it shall not project by more than 19 mm. nor shall have depressions more than 10 mm. form the average wall surface.

##### **2.2 Laying :**

2.2.1 All the stone shall be sufficiently wetted before laying to prevent absorption of water form mortar. The wall shall be built true to plumb (or true to required batter when so specified) All connected walls in a structure shall be raised up informally and regularly. However if for any specific reason, one part of masonry is required tobe left behind, the shall be racked back at an angle not steeper than 45° vertical toothed joints in masonry shall not be allowed. The work shall be carried out regularly and masonry of any day will not be raised by more than 1 metre in height.

2.2.2 The stone shall be laid in and un coursed fashion, or random facing etc. However the masonry is required to be brought to level at various stages viz. plinth level window still level. Foof level and any other level specifically shown in the drawings. This may be done first by adjusting the laying of stone to one level and then by providing leveling coarse of cement concrete 1:6: 12 (1 cement : 6 sand : 12 graded stone aggregate 20 mm. nominal size) or as otherwise specified.

2.2.3 Proper bonding shall be achieved by closely filling in adjacent stones as well as by using bond stones or through stones as described herein below. Face stones shall extend back sufficiently and bond well with the masonry. The stone shall be carefully set so as to break joint and avoid formation of vertical joints. The depth of stone form the face of wall shall consist of rubble stones which may be of any shape. Neither the face stone nor the hearting stone shall be so small to pass through circular ring of 150 mm. internal diameter in any direction nor shall any of them shall have minimum thickness 100 mm.

2.2.4 All stones shall be carefully laid, hammered down by a wooden mallet into position and solidly embedded in mortar, chips and spawns of stone may be used wherever necessary to avoid thick mortar beds or joints at the same times ensuring that no hollow speace is left any where in the masonry. The chips used shall not be more than 20% by volume of masonry. The hearting shall be laid be nearly level with face stones except that at about one metre intervals vertical bond stone or plums projecting about 150 to 200 mm. shall be firmly embedded to from vertical bonding in masonry.

##### **2.3 Bond Stone :**

Bond stones or through stones running right across the thickness the wall shall be provided in walls up to 600 mm. thick. In thicker walls two stones overlapping each other by atleast 150 mm. shall be oprovided across the thickness of the wall to form bond stones. There shall be atleast one bond stone for every 0.5 sq. mt. of wall surface. The bond stone shall be marked by distinguishing letter during construction for subsequent verification and shall be laid staggered in subsequent layers.





#### **2.4 Quoins :**

The quoins or corner stone shall be selected stone nearly dressed with hammer and/ or chisel to form the required corner angle and laid heard and stretcher alternatively. The bed top surface of quoins shall be chiseled dressed to give horizontal joints. The quoins shall have a uniform chisel draft of atleast 25 mm. width at four edges of each exposed face, all the edges of the same face being in one plane. No quoins stone shall be smaller than 0.025 m. Cum. In volume.

#### **2.5 Jamb Stones :**

The Jamb stone shall be made with stone specified for quoins. Except that the stone provided on the jambs shall have their length equal to thickness of wall up to 600 mm. and a line of headers shall be provided for walls thicker than 600 mm. as specified for bond.

#### **2.6 Joints :**

All the joints shall be completely filled with mortar and their width shall not exceed 25 mm. when plastering or pointing is not required to be done, the joints shall be struck flush and finished simultaneously while laying the stone. Otherwise the joints shall be raked to a minimum depth of 20 mm. by a racking tools during progress of laying while the mortar is still green.

#### **2.7 Scaffolding :**

Single or double scaffolding shall be used The scaffolding shall be strong and sound. The holes left in masonry for supporting scaffolding shall be filled and made good before plastering.

#### **2.8 Curing :**

Green work shall be protected from rains by suitably covering the same. Masonary shall be kept constantly moist on all the faces for a period of atleast 7 days. The top of masonry shall be flooded at close of the day.

#### **3.0 Mode of measurements and payment :**

3.1 All work shall be measure on the basis of finished dimensions and measure net except where other wise specified. Only specified dimensions shall be allowed. Anything extra shall be ignored. The masonry work in foundation and plinth shall be measured under this item. No deduction shall be made nor extra payment made for the following:

- (a) Ends of joints, beams, posts, girders, rafters, purloins stusses. Corbels, etc. each up to 500 sq. Cm. in section.
- (b) Opening each up to 0.1. Sq.m.
- (c) Wall plates and bed plates, bearing of chhaja and like up to 1.0 Cm depth (bearing of floor and roof slabs shall be deducted from masonry)
- (d) Drain holes and necessities for cement concrete blocks to embed hold fasts for doors windows.
- (e) Building in the masonry iron fixtures pipes up to 300 mm. dia. Hold fasts of foors and windows.
- (f) Forming cheses n masonry up to section of 350 sq.cm.

#### **3.2 The rate shall be for a unit of one cubic metre.**

**7.6 (II) Uncoursed rubble masonry with hard stone of approved quality in foundations and plinth in cement mortar 1.5 (1 cement : 5 coarse sand) including leveling up etc. complete.**

#### **1.0 Materials & Workmanship :**



The relevant specification of item No 7.6 (I) shall be followed except that the proportion of cement mortar shall be in C.M.1.5 (1 cement: 5 coarse sand)

**2.0 Mode of Measurement & Payment :**

2.1 The relevant specifications of item No. 7.6 (I) shall be followed.

2.2 **The rate shall be for a unit of one cubic metre.**

**7.6 (III) Uncoursed rubble masonry with hard stone of approved quality in foundations and plinth in lime mortar 1:1.5 (lime putty : 1.5 coarse sand) including leveling up etc. complete.**

**1.0 Materials :**

Lime mortar shall conform to M-10. The rubble shall conform to M-16.

**2.0 Workmanship :**

The relevant specification of item No. 7.6 (I) shall followed.

**3.0 Mode of measurements and payment : :**

3.1 The relevant specifications of item No. 7.6 (I) shall followed.

3.2 **The rate shall be for a unit of one cubic metre.**

**7.17.A. Course rubble masonry with hard stone of approved quality in foundations and plinth in cement mortar 1:6 (1 cement: 6 coarse sand) etc. complete.**

**1.0 Materials :**

Cement mortar shall conform to M-11 The stone shall conform to M-16

**2.0 Workmanship :**

**2.1 Dressing of stones:**

The face stone shall be hammer dressed so as to give approximately rectangular blocks. They shall be squared on bed and side joints. The bed joints shall be rough chisel dressed for a depth of atleast 5 mm. back from the faces and the side joints shall be so dressed to a depth of atleast 40 mm. back from the face, such that no portion of the dressed surface is more than 10 mm, from a straight edge held against the surface. The remaining partitions of surface shall not project by more than 40 mm. on an exposed face and 10 mm. on a face to be plastered. The hammer dressed stone shall also have a rough tooling for a minimum width of 25 mm. along the four edges of the face of the stone.

**2.2 Laying :**

2.2.1 All stones shall be wetted before laying. The wall shall be built up truly plumb (or to required batter where so specified)

All connected masonry in a structure shall normally be raised up uniformly and regularly. However, if for any specific reasons one part of wall is required to be left behind, such wall shall be raked back at an angle not steeper than 45. Vertical Toothed joints in masonry shall not be allowed. The work shall be carried up regularly and masonry on any day shall not be more than 1 metre in height.

2.2.2 All the course shall be laid truly horizontal. The height of course shall not be less than 150 mm. nor more than 300 mm. Face stone shall be laid in alternate header and stretcher fashion. They shall be so arranged as to break joints by atleast 75 mm. Stones shall be laid with grains horizontal so that the load is



transmitted along with direction of their maximum crushing strength. The depth of stone shall not be less than the height or breadth. The breadth of a face stone shall also be not less than the breadth. The breadth of a face stone shall also be not less than 150 mm. Each face stone shall be of the same height in any given course. The courses shall be built in perpendicular to the pressure which the masonry will bear. In case of battered walls (such as retaining walls) the beds of the stone and the plane of courses shall be laid with their bed perpendicular to the battered face.

- 2.2.3 The hearting or the interior filling of the wall shall consist of flat bedded stone carefully laid on their proper beds in mortar, chips and spawns of stone being used where necessary to avoid excessive use of mortar care being taken to see that no hollow space is left anywhere in the masonry. Chips shall not be used below the hearting stone to bring these up to the level of stones. The use of chips shall be restricted to the filling of interstices between the hearting stones but the volume of chips shall be limited to 15% of the total volume of the masonry.

### **2.3 Bond stones :**

The relevant specification of item No. 7.6.(I) para 2.6 shall be followed except that the bond stone shall be provided for at least 1.8 mm. length of every courses.

### **2.4 Quoins :**

- 2.4.1 The Quoins, which shall be of the same height as the course to which it belongs shall be formed from selected stone of at least 400 mm. length. They shall be laid square or beds as stretchers and headers alternatively. The beds shall be rough, chisel dressed to a depth of at least 100 mm. These stones shall have a minimum uniform chisel drafts of 25 mm. width at four edges. All the edge being in the same plan quoin stone shall be not smaller than 0.025 cum. In volume, and it shall also be not less than 300 mm. in length, 25% of them being not less 500 mm. in length.

### **2.5 Joints :**

- 2.5.1 All the bed joints shall be horizontal and all joints shall be vertical. Face joints shall not be more than 10 mm. thick. All joints shall be properly and completely filled with mortar. On faces where no plastering nor pointing is required to be done the joint shall be struck flush and finished simultaneously while laying stones. In other cases the joints shall be raked to a minimum depth of 20 mm. by raking tools during the progress of work while the mortar is still green.

### **2.6 Curing :**

- 2.6.1 The relevant specifications of item No. 7.6. (I) para 2.9. shall be followed.

### **3.0 Mode of Measurement & Payment :**

- 3.1 The relevant specifications of item No. 7.6 (1) shall be followed.

### **3.2 The rate shall be for a unit of not cubic metre.**

## **7.17.B. Coarsed rubble masonry with stone of approved quality of foundations and plinth in cement mortar 1:5 (1 cement : 5 coarse sand) etc. complete.**

### **1.0 Materials & Workmanship :**

The relevant specification of item No. 7.17 (A) shall be followed except that the proportion of mortar shall be C.M. 1:4 (1 cement : 4 coarse sand)

### **2.0 Mode of measurements and payment :**

- 2.1 The relevant specification of item No. 7.17 (A) shall be followed.



- 2.2 **The rate shall be for a unit of one cubic metre.**
- 7.17.C. Coarsed rubble masonry with stone of approved quality of foundations and plinth in cement mortar 1:4 (1 cement : 4 coarse sand) etc. complete.**
- 1.0 Materials & Workmanship :**
- The relevant specification of item No. 7.17 (A) shall be followed except that the proportion of mortar shall be C.M. 1:4 (1 cement : 4 coarse sand)
- 2.0 Mode of measurements and payment :**
- 2.1 The relevant specification of item No. 7.17 (A) shall be followed.
- 2.2 The rate shall be for a unit of one cubic metre.
- 7.17.D. Coarsed rubble masonry with stone of approved quality of foundations and plinth in C.M 1:3 (1 cement : 3 coarse sand) etc. complete.**
- 1.0 Materials & Workmanship :**
- The relevant specification of item No. 7.17 (A) shall be followed except that the proportion of mortar shall be C.M. 1:3 (1 cement : 3 coarse sand)
- 2.0 Mode of measurements and payment :**
- 2.1 The relevant specification of item No. 7.17 (A) shall be followed.
- 2.2 The rate shall be for a unit of one cubic metre.
- 7.19.A. Coarsed rubble masonry with stone of approved quality for superstructure above plinth level up to floor two level in C.M. 1:6 (1 cement : 6 coarse sand) etc. complete.**
- 1.0 Materials & Workmanship :**
- The relevant specification of item No. 7.17 (A) shall be followed except that the coarsed rubble masonry work shall be carried out for superstructure above plinth level up to floor two level.
- 1.2 Single or double scaffolding may be used. The scaffolding shall be strong and sound. In case single scaffolding is used, the holes shall be carefully made good as directed.
- 2.0 Mode of measurements and payment :**
- 2.1 The relevant specification of item No. 7.17 (A) shall be followed.
- 2.2 **The rate shall be for a unit of one cubic metre.**
- 7.75 Precast concrete block masonry (including quoin block, jamb blocks, closer etc.) with solid concrete blocks of approved size made of cement concrete 1:3:6 Mix. (1 cement; 3 coarse sand: 6 graded stone aggregate of 20 mm. and down gauge) in foundation and plinth in cement mortar 1:6.**
- 1.0 Materials :**
- (a) Aggregate shall conform to M-12. (b) Sand conform to M-6. (c) Cement shall conform to M-3. 1.1. The solid cement concrete blocks shall be precast with concrete of 1:3:6 mix (1 cement : 3 coarse sand : 6 graded stone aggregate)



- 1.2 A block shall be deemed to be solid if the solid Materials : is not less than 75% of the total volume of the blocks calculated form overall dimensions.
- 1.3 The concrete mix used for blocks shall not be richer than 1 part by volume of cement to 6 parts by volume of combined aggregate.
- 1.4 The actual size of the block shall be one of the following.  
Size – A : 39 x 30 x 19 cms. Size – B 39 x 20 x 19 cms. Size – C : 39 x 10 x 19 cms.  
The size other than thse specified above may be used with the approval of Enigneer – in – charge.
- 1.5 The blocks may be either machine made of hand made. The concrete mix, the mixing of concrete the manufacture of blocks, curing and drying shall be in accordance with pare – 6 to 10 under I.S.: 2185 – 1967.
- 1.6 Faces of blocks shall be flat and rectangular. Surface finish shall be rendered smooth or plastered with cement mortar 1:3 (1 cement : 3 coarse sand)
- 1.7 The average compressive strength of eight blocks when determined in the manner described in I.S.: 2185- 1967 shall not be less than 50 kg./ sq.cm. of gross area. The strength of lowest individual block shall not be less than 75 percent of average compressive strength of eight block.
- 1.8 Concrete blocks shall be stored and stacked properly in such a way as to avoid any contract will moisture at site. They shall be stock plied on planks or other supports free form contract with ground at covered to protect against wetting. Cement mortar of propotion 1:6 shall conform to M-11.

## **2.0 Workmanship :**

- 2.1 The block need not wetted before or during laying in the walls. In case climatic conditions so require the top and the sides of block may only be slightly moistured so as to prevent absorption of water form the mortar and ensure the development of required bond with mortar.
- 2.2 Operations of faying precast cement concrete block masonry shall be carried out in accordance with instructions detiled in I.S.: 6042 – 1952. The mortar shall not be spread so much of the actual laying of the units that it tends to stiffen and loose its plasticity, thereby resulting in poor bond. For most of the work the joints, both horizontal and vertical shall be 10 mm. thick except in the case of extended joint, construction the mortar joints shall be struck off flush with wall surface and when the mortar has started stiffening shall be compressed with rounded or U- shaped tool. The mortar shall be pressed against the units with jointing tool after the morta has stiffended in effect intimate contact between the mortar and the masonry unit and obtained a weather tight joint.

## **2.3 Quoins & closers :**

Special quoins blocks (with a return face equal to half the length of normal face) shall be cast for building blocks and slabs for external work. Proper half closures shall be cast and not cut form full size bloks. The returned ends of blocks for door windows reveals and quoins shall be finished with a fiar face in the mould.

- 2.4 Only double scaffolding shall be used. The scaffolding be strong and sound. No holes in the masonry for supporting shall be allowd.

## **2.5 Coring :**

The curing of concrete block masonry shall be carried out for 7 days.

## **3.0 Mode of measurements and payment :**

- 3.1 The relevant specification of item No. 7.6 (I) shall be followed.



3.2 The work of concrete block masonry in foundation and plinth shall be measured under this item.

3.3 **The rate shall be for a unit of one cubic metre.**

**7.82.A. Precast concrete block masonry in partitions wall 10 cms. Thick with solid block of approved size (including quoin block, jamb blocks, closer etc.) made of C.C.1:3:6 (1 cement coarse sand : 6 graded stone aggregates 20 mm. and down gauge) in C.M.1:4**

**1.0 Materials :**

1.1 The relevant specification of item No 7.75 shall be followed except that the precast concrete block shall be of size suitable for 10 cms. Size partition wall i.e. size, C, and the proportions of cement mortar shall be in cement mortar 1:4 (1 cement : 4 coarse sand)

**2.0 Workmanship :**

The relevant specification of item No 7.75 shall be followed except that the work shall be for precast.

**3.0 Mode of measurements and payment :**

3.1 The relevant specification of item No. 7.75 shall be followed.

3.2 **The rate shall be for a unit of one cubic metre.**

**7.0.0.1 White stone bela masonry block in superstructure with stone of approved quality in the mortar 1:1.5 (1 lime putty : 1.5 fine sand) including raking out joints etc. complete.**

**1.0 Materials :**

1.1 The stone or bela shall be white hard sand stone or block. The stone shall be sound hard rough durable. It shall be free from skin. The thickness of bela or block shall not be less than 15 cms. Or directed. The mortar used shall consist of one part of lime putty and 1.5 parts of fine sand. Lime mortar shall conform to M-10.

**2.0 Workmanship :**

**2.1 Dressing of stone :**

Stone shall be chiseled on all the sides so that all six sides shall be in a rectangular shape and all stones shall be so dressed that the bushing of the exposed face shall not project nor depression form general wall surfaces. That size of bela or block shall be as per thickness of the wall to be constructed or as directed.

**2.2 Laying :**

All the stone shall be sufficiently wetted before laying to prevent absorption of water from mortar. All connected walls in a structure shall normally be raised up uniformly and regularly. The vertical joint shall not be allowed and also it shall not be more than 12 mm in thickness.

**2.3** Proper bonding shall be made by laying bela or block side by side each other with lime mortar on bed as well as in between two bela or block vertically.

**2.4 Bond stones :**

Bond stone or through stones running right across the thickness of the wall shall be provided in walls up to 450 mm. thick. In thicker walls two bela or blocks or laying each other by atleast 150 mm. each other shall be provided across the thickness of the wall to bond stone. Such bond stone shall be atleast one for every 1.0 sq.mt. area of the wall surface.

**2.5 Joints :**



All the joints shall be completely filled up with mortar and their thickness shall not exceed by 12 mm. When plastering or pointing is not required to be done, the joints shall be struck flush and finished, simultaneously while laying the stone. Otherwise the joints shall be raked to a minimum depth of 20 mm. during process of laying while mortar is still green.

**2.6 Scaffolding :**

Single or double scaffolding shall be used. It shall be strong and sound. The holes left in masonry for supporting shall be made good before plastering.

**2.7 Curing :**

Green work shall be cured for a period of 7 days continuously.

**3.0 Mode of measurements and payment :**

3.1 The work shall be measured on the basis of finished dimensions. No deduction shall be made nor extra payment shall be made for the following :

- (a) Ends of joints, beams, posts, girders, rafters, purlins, corbels, etc. each up to 500 sq.cms. in section.
- (b) Opening each up to 0.10 sq.m.
- (c) Small plates and bed plates, bearing of chhajjas and like up to 10 cms. depth (bearing or floor and roof slabs shall be deducted from masonry).
- (d) Drain holes and recesses for cement concrete blocks to embed hold fasts for doors and windows etc.

3.2 **The rate shall be for a unit of one cubic metre.**

**7.0.0.2. White stone delam masonry work in partition walls up to 15 cms. thickness in C.M. 1:4 (1 cement : 4 coarse sand).**

**1.0 Materials & Workmanship :**

The relevant specifications of item No. 7.0.0.1 as above shall be followed except that the proportion of mortar shall be in C.M. 1:4 (1 cement : 4 coarse sand).

**2.0 Mode of Measurement & Payment :**

2.1 The relevant specifications of item No. 7.6 (I) shall be followed.

2.2 **The rate shall be for a unit of one cubic metre.**

**7.0.0.3. White stone bela masonry block in superstructure with stone of approved quality in C.M. 1:5 (1 cement : 5 coarse sand) including raking the joints etc. complete.**

**1.0 Materials :**

The relevant specification of item No. 7.0.0.1 as above, except that the proportion of cement mortar shall be in C.M. 1:5 (1 cement : 5 coarse sand)

**2.0 Mode of Measurement & Payment :**

2.1 The relevant specifications of item No. 7.6 (I) shall be followed.



2.2 **The rate shall be for a unit of one cubic metre.**

**7.0.0.4. White stone bela masonry block in coarse in super structure with stone of approved quality in C.M. 1:6 (1 cement : 6 coarse sand).**

**1.0 Materials & Workmanship :**

The relevant specifications of item No. 7.0.0.1 as above shall be followed except that the proportion of mortar shall be in C.M. 1:6 (1 cement : 6 coarse sand).

**2.0 Mode of Measurement & Payment :**

2.1 The relevant specifications of item No. 7.6 (I) shall be followed.

2.2 **The rate shall be for a unit of one cubic metre.**

## SECTION – 9

### Centering & Form Work

**9.1 (A) Providing form work of ordinary timber planking so as to give a rough finish including centering strutting and propping etc. height of propping and centering below supporting floor to centering not exceeding 4 m. and removal of the same for in situ reinforced concrete and plain concrete work in foundation, footings, bases of columns and mass concrete.**

**1.0 Materials :**

1.1 The shuttering to be provided shall be of ordinary timber plank and shall conform to M-26.

1.2 The dimensions of scantling and battens shall conform to the design. The strength of the wood not be less than that assumed in the design.

**2.0 Workmanship :**

2.1 The form work shall conform to the shape lines and dimensions as shown on the plants and constructed as to remain sufficiently rigid during the placing and compacting of the concrete. Ade arrangements shall be made by the contractor to safe – guard against any settlement of the form during the course of concreting and after concreting. The form work of shuttering, centering, scaffold bracing etc. shall be as per design.

**2.2 Clearing and Treatment of forms :**

2.2.1 All rubbish, particularly chippings shaving and saw dust shall be removed from the interior form before the concrete work is placed and the form in contact with concrete shall be cleaned and through wetted or treated. The surface shall be then coated with soap solution applied before concreting is Soap solution for the purpose shall prepared by dissolving yellow soap in water to get consistent paint. Alternatively a coat of raw linseed oil shall be applied after thoroughly cleaning the surface shall be taken that the coating does not get on construction joint surface and reinforced bars.

**2.3 Stripping time :**

2.3.1. In normal circumstances and where ordinary cement is used forms may be struck after expire following periods.

- |      |  |                 |
|------|--|-----------------|
| (a). | Sides of walls columns and vertical faces of beams | 24 to 48 hours. |
| (b). | Beam soffits (props. Left under).                  | 7 days.         |
| (c). | Removal of props slabs:                            |                 |





- |      |                                       |          |
|------|---------------------------------------|----------|
| (i)  | Slabs spanning up to 4.5 m.           | 7 days.  |
| (ii) | Spanning over 4.5 m.                  | 14 days. |
| (d). | Removal of props to beams and Arches: |          |
| (i)  | Spanning up to 6 m.                   | 14 days. |
| (ii) | Spanning over 6 m.                    | 21 days. |

#### **2.4 Procedure when removing the form work :**

- 2.4.1. All form work shall be removed without such shock or vibrations as would damage the reinforcement concrete surface. Before the soffits form work and struts are removed, the soffits and the concrete surface shall be exposed where necessary in order to ascertain that the concrete has sufficiently hardened.

#### **2.5 Centering :**

- 2.5.1 The centering to be provided shall be got approved. It shall be sufficiently strong to ensure above safety of the form work and concrete work before, during and after pouring concrete. Watch should be to see that behaviour of centering and form work is satisfactory during concerting. Erection should above such that it would allows removal of forms in proper sequence without damaging either the concrete forms to be removed.
- 2.5.2. The props of centering shall be provided on firm foundation or base of sufficient strength to the loads without any settlement.
- 2.5.3. The centering and form work shall be inspected and approved by the Engineering-in-charge concreting. But this will not relieve the contractor of his responsibility for strength, adequacy and of form work and centering. If there is a failure of form work for centering, contractor shall be responsible for the damages to property.

#### **2.6 Scaffolding :**

- 2.6.1. All scaffolding, hoisting arrangements and ladder etc., required for the facilitating of concerting shall be provided and removed on completion of work by contractor at his own expense. The scaffolding, hoisting arrangements and ladders etc. shall be strong enough to withstand all live, dead and impact loads expected to act and shall be subject to the approval of the Engineer-in-charge. However contractor shall be solely responsible for the safety of the scaffolding, hoisting arrangement, ladders, work and workmen etc.
- 2.6.2. The scaffolding, hoisting arrangements and ladder shall allow easy approach to the work spot and affords easy inspection.
- 2.6.3. The rate is applicable to all conditions of working and height up to 4 mts. The rate shall include the cost of Materials : and labour for various operations involved such as :
- (a). Splayed edges, notching, allowance for overlaps and passing at angles, battens centering, shuttering, propping, bolting, welding, easing striking and removal.
  - (b). Filleting to form stop chamfered edges or splayed external angles not exceeding 20 mm. width to beams, columns and the like.
  - (c). Temporary openings in the form for pouring concrete, if required removing rubbish etc.
  - (d). Dressing with oil to prevent adhesion of concrete with shuttering and
  - (e). Raking or circular cutting.

#### **2.7 Re-Use :**

- 2.7.1. Before re-use, all form shall be inspected by Engineer-in-charge and their suitability ascertained. The forms shall be scarred, cleaned and joints gone over, repaired where required. Inside surface shall be retreated to prevent adhesion of concrete.



**3.0.0 Mode of measurement and payment :**

3.1 Form work shall be measured as the area in square metres of shuttering in contact with concrete except in the case of inclined member and portion of cured profile and upper side in which case on area of underside shall be measured for payment.

3.4 From work to secondary beams shall be measured up to the sides of main beams but no deduction shall be made from the form work of the main beam at the inter section point. No deduction shall be made from the form work of a column at inter section of beams.

3.5 The rate is for the complete item.

3.6 **The rate shall be for a unit of one sq.meter.**

**9.1 (A) (i) Extra for providing from work of ordinary timber planking so as to give a rough finish including centering, shuttering, and propping etc. height of propping and centering below supporting floor to ceiling is between 4 m. to 5 m. and removal of the same for in situ reinforce or plain concrete work in foundations, footings, bases of columns etc. and mass concrete.**

**1.0 Materials : Workmanship :**

1.1 The relevant specification of Item No. 9.1 (A) shall be followed except they the height of propping and centering below supporting floor to ceiling exceeding 4 m. but not exceeding 5 m.

**2.0 Mode of measurements and payment :**

2.1 The payment shall be made extra over and above in payment made up to 4 mm. height. The relevant specifications of item 9.1. (A) shall be followed.

2.2 **The rate shall be for a unit of one sq.meter.**

**9.1 (B) (i) Providing from work of ordinary timber planksing so as to give a rough finish including centering, below supporting floor to ceiling not exceeding 4 m. and removal of the same for in situ reinforced and plain concrete work in flat surface such as soffits of slabs, landing and the like floors etc. up to 200 mm. in thickness.**

**1.0 Materials :**

1.1 Relevant specifications of item 9.1. (A) shall be followed except that work is to be carried out for flat surfaces such as soffits of slabs, landings, and the like for floors etc. up to 200 mm. in thickness.

**2.0 Mode of measurement and payment :**

2.1. The relevant specification of item No. 9.1 (A) shall be followed.

2.2 **The rate shall be for a unit of one sq.meter.**

**9.1 (B) (ii) Providing from work of ordinary timber planking so as to give a rough finish including centering, shuttering, strutting and propping etc. height of propping and centering below supporting floor to ceiling not exceeding 4 m. and removal of the same for in situ reinforced and plain concrete work in flat surface such as soffits of slabs, landing and the like floors etc. above 200 mm. in thickness.**

**1.0 Materials :**

1.1 Relevant specifications of item 9.1. (A) shall be followed except that work is to be carried out for flat



surfaces such as soffits of slabs, landings, and the like for floors etc. above 200 mm. in thickness.

**2.0 Mode of Measurement & Payment :**

2.1 The relevant specification of item No. 9.1 (A) shall be followed.

2.2 **The rate shall be for a unit of Sq.meter.**

**9.1 (C) Providing form work of ordinary timber plankings so as to give a rough finish including centering, shuttering, strutting and propping etc. height of propping and centering below supporting floor to ceiling not exceeding 4 m. and removal of the same for in situ reinforced concrete and plain concrete work in vertical surface as walls (any thickness) partitions.**

**1.0 Materials : Workmanship :**

The relevant specifications of item 9.1.(A) shall be followed except that the form work shall be carried out for vertical surfaces such as walls of any thickness, partitions etc.

**2.0. Mode of Measurement & Payment :**

2.1. The relevant specifications of item No. 9.1.(A) shall be followed.

2.2. **The rate shall be for a unit of Sq.meter.**

**9.1. (G) (i) Providing form work of ordinary timber planking so as to give a rough finish including centering, shuttering and propping etc. height of propping and centering below supporting floor to ceiling not exceeding 4 m. and removal of the same for in situ reinforced and plain concrete work in columns, pillars, posts, and struts, square rectangular, polygonal inplan.**

**1.0 Materials & Workmanship :**

1.1 The relevant specifications of item No. 9.1.(A) shall be followed except that the work is for columns, pillars, posts and struts, square rectangular, polygonal in plan.

**2.0 Mode of Measurement & Payment :**

2.1. The relevant specification of item No. 9.1.(A) shall be followed.

2.2 **The rate shall be for a unit of one Sq.metre.**

**9.1. (H) (I) Providing form work of ordinary timber planking so as to give a rough finish including centering, shuttering strutting and propping etc. height of propping and centering below supporting floor to ceiling not exceeding 4 m. and removal of the same for in situ reinforced and plain concrete work in side and soffits of beams, beam haunchings, cantileers, girders, bressumers, and lintels not exceeding 1 m. in depth.**

**1.0 Materials :**

1.1. The relevant specifications of item No. 9.1.(A) shall be followed except that the work is for sides and soffits of beams, beam haunting cantilevers, girders, bressumers and lintels not exceeding 1 M. in depth.

**2.2 Mode of measurement and payment :**

2.1 The relevant specification of item No. 9.1. (A) shall be followed.

2.2. **The rate shall be for a unit of one sq. metre.**



**9.1.** (H) (2) Providing form work of ordinary timber Planking so as to give a rough finish including centering. Shuttering, strutting and propping etc. height of propping and centering below supporting floor to ceiling not exceeding 4 m. and removal of the same for in situ reinforced and plain concrete work in sides and soffits of beams, beams haunchings, cantilevers, girders bressumers and lintels exceeding 1 m. in depth.

**1.0 Materials :**

1.1. The relevant specification of item No. 9.1.(A) shall be followed except that the work is for side and soffits beam haunting cantilevers, girders, bressumers and lintels, exceeding 1 M. in depth.

**2.0 Mode of measurement and payment :**

2.1 The relevant specifications of item No. 9.1.(A) shall be followed except that the work is for side and soffits of beams, beam haunting cantilevers, girders, bressumers and lintels, exceeding 1 m. in depth.

2.2 **The rate shall be for a unit of sq. metre.**

**9.1.** (I) (i) Providing formwork of ordinary timber planking so as to give a rough finish including centering, shuttering, strutting and propping etc. height of propping and centering below supporting floor to ceiling not exceeding 4 m. and removal of the same for in situ reinforced and plain concrete work in edges of slabs and breaks in floor and walls.

**1.0 Materials :**

1.1 The relevant specifications of item No. 9.1.(A) shall be followed except that the work is for edges of breaks in floors and walls.

**2.0 Mode of Measurement & Payment :**

2.1. The length and breadth shall be measured nearest to one Cm.

2.2. **The rate shall be for a unit of one sq.metre.**

**9.1.** (K) Providing form work of ordinary timber planking so as to give a rough finish including centering, shuttering, strutting and propping etc. height of propping and centering below supporting floor to ceiling not exceeding 4 m. and removal of the same for in situ reinforced and plain concrete in small surface such as cantilevers ends, brackets and ends of the steps, caps and bases to pilaster and columns and the like.

**1.0 Materials :**

1.1 The relevant specification of item No. 9.1 (A) shall be followed except that work is for small as cantilever ends, brackets and ends of steps, caps and bases to pilasters and columns and the like.

**2.0 Mode of measurement and payment :**

2.1 The relevant specification of item No. 9.1. (A) shall be followed.

2.2. **The rate shall be unit of one sq. metre.**

**9.1.** (L) Providing form work of ordinary timber plankings so as to give a rough finish including centering, shuttering, strutting and propping etc. height of propping and centering below supporting floor to ceiling not exceeding 4 m. and removal of the same for in situ reinforced and plain concrete in chullah hoods, weather sheds, chhajas, corbels etc. including edges.

**1.0 Materials :**

1.1 The relevant specifications of item No. 9.1. (A) shall be followed except that the work is for chullan hoods



weather – sheds, chhajjas corbels etc. including edges of the same.

**2.0 Mode of measurements and payment :.**

2.1 The relevant specification of item No. 9.1 (A) shall be followed.

2.2 **The rate shall be for a unit of one square metre.**

**9.1 (M) Providing form work of ordinary timber plankings so as to give a rough finish including centering, shuttering, strutting and propping etc. height of propping and centering below supporting floor to ceiling not exceeding 4 m. and removal of the same for in situ reinforced and plain concrete work in staircase with slopping or stepped soffits including risers and stringers excluding landing.**

**1.0 Materials :**

1.1 The relevant specification of item No. 9.1 (A) shall be followed except that the work is for staircases with slopping or stepped soffits including risers and stringers excluding landing.

**2.0 Mode of measurements and payment :**

2.1. The relevant specifications of item No. 9.1.(A) shall be followed.

2.2. **The rate shall be for a unit of one sq.metre.**

**9.1 (Q) Providing form work of ordinary timber plankings so as to give a rough finish including centering, shuttering, strutting and propping etc. height of propping and centering below supporting floor to ceiling not exceeding 4 m. and removal of the same for in situ reinforced and plain concrete work in vertical fins and vertical sun-breaker.**

**1.0 Materials :**

1.1 The relevant specifications of item No. 9.1. (A) shall be followed except that the work is for vertical fins and vertical sun breakers.

**2.0 Mode of measurements and payment :**

2.1 The relevant specifications of item No. 9.1.(A) shall be followed.

2.2. **The rate shall be for a unit of one sq.metre.**

**9.7.** Extra for providing form work with sheating of steel sheets so as to give a fair finish in :

- (A) Foundation, footings, base of columns etc. mass concrete.
- (B) Flat surfaces such as soffits, of slab landing and the like.

- [i] Floors etc, up to 200 mm. in thickness.
- [ii] Floors etc, above 200 mm. in thickness.

(C) Vertical surfaces such as walls (Any thickness) partitions.

(D) Columns, pillars, posts and struts.

- 1. Square, rectangular, bressumers, and lintels not exceeding 1 mm. depth.
- 2. Sides and soffits of beams, beam haunchings, cantilevers, girders, bressumers and lintels exceeding 1 mm in depth.

(I) Edges of slabs, and breaks in floors and walls.

(K) Small surfaces such as cantilever ends, brackets, and ends of steps, caps and bases to pillars



and columns including edges.

- (L) Chollar woods, weather sheds, chhajjas, coroeds etc., and the like.
- (M) Stair cases with sloping or stepped soffits, including risers, skingers excluding landing.
- (Q) Vertical fine and vertical sun breakers.

**1.0 Material and Workmanship :**

- 1.1. The relevant specification of item No. 9.1.(A) to (Q) shall be followed except that the extra rate shall be paid for using sheathing of steel sheets, and plates of steel or plywood instead of ordinary timber plank, to obtain a desired smooth exposed finish of surface. The surface shall be presentable without further treatment.

**2.0 Mode of measurements and payment :**

- 2.1. The measurement of form work shall be taken for the form work done with steel sheathing, extra over and above the rate of form work of the respective item of form work done. The relevant specification of respective item No. 9.1.(A) to (Q) shall be followed.
- 2.2. **The rate shall be for a unit of one sq.metre.**

**SECTION – 10**

**Wood Work, Doors & Windows**

**10.1.A. Providing wood work in frames of doors, windows, clerestory windows and other similar work, wright framed and fixed in position, Indian Teak Wood.**

**1.0 Materials :**

- 1.1 Wood in frames shall conform to M-29.

**2.0 Workmanship :**

- 2.1 The item covers the requirement of frames for doors, windows, clerestory windows, their supply and fixing.

**2.2 Frames :**

- 2.2.1. All members of frames shall be exactly at right angles. The right angle shall be checked from inside surfaces of the frames of the respective members.
- 2.2.2. All members of frames shall be straight without any warp or bow and shall have smooth surfaces well planed on the three sides exposed at right angles to each other. The surfaces touching the wall may not be planed unless it is required in order to straighten up the member or to obtain the overall sizes within the tolerances as specified.
- 2.2.3. Frame shall have dovetail joints. When clerestory windows is included, it shall be provided by having full length one piece post for door or windows and clerestory window extending the frame on top at the head to the require extent. Horns shall not be provided in the head of the frame. When no sills are provided, the vertical posts of the frame in the ground floor shall be embedded in the sill masonry for 10 cm. on upper floors, the vertical posts shall be fixed in the floor or masonry by forming notches 10 mm deep. Slight adjustment of spacing as necessary shall be done to have the hold fasts in the joints of masonry course. The frame shall be erected in position and held plumb with strong support form north sides and built in masonry as it is being built. The transom shall be through tenoned into the mortices of the jamb post to the full width of the jamb post and thickness of the tenon shall be not less than 1.5 mm.



### **2.3 Tolerance :**

Unless specially mentioned otherwise tolerance of + 1.5 mm. shall be allowed for each wrought face.

- 2.4. The tenons shall be closely fitting into the mortices and suitably pinned with wood dowels not less than 10 mm. dia metre. The depth of rebates for housing the shutter shall be as shown in the detailed drawing or as directed.
- 2.5. The contact surface of tenon and mortise shall be treated before putting together with an adhesive of approved make.
- 2.6. Minimum number of three hold-fasts shall be fixed on each side of door and windows frames, one at the centre point and the other two at 30 cm. from the top and the bottom of the frames. In case of windows and ventilators frames whose height is less than 1 M. two hold-fasts, in each side shall be fixed at quarter points of the frames. The size of each hold-fast shall be 300 x 25 x 6 mm. and of mild steel with split end. The hold fasts shall be fixed with screws to frames.
- 2.7. Mild steel hold fasts shall be protected with a coating of coal asphalt tar. The surface of frame abutting the masonry or concrete faces shall be properly treated by applying a coat of approved coating.

### **3.0 Mode of measurements and payment :**

- 3.1. The linear dimensions shall be measured correct up to 1 cm. The quantity shall be worked out correct to 2 places of decimals of cu. m.
- 3.2. **The rate shall be for a unit of 10 cu. meter.**

### **10.4.A. Providing work in trusses, purloins, rafters, posts, post plates, wall plates, and like wrought, framed, hoisted and fixed in position, Indian Teak Wood.**

#### **1.0 Materials :**

The teak wood shall conform M-29.

#### **2.0 Workmanship :**

- 2.1. The relevant specifications of item No. 10.1. (A) shall be followed except that wood work shall be carried out in trusses, purloins, rafters, posts, post plates, wall plates and like wrought framed.
- 2.2. The work shall be carried out as per detailed drawings supplied by the Department as directed.
- 2.3. The length of the each member shall be in one piece or as directed.

#### **3.0 Mode of Measurement & Payment :**

The length, breadth and depth shall measured nearest to 1 cm. unfinished member.

**The rate shall be for a unit of 10 cubic Decimetre.**

### **10.5.A. Providing wood work in frames of false ceiling, partition etc. swan and putup in position, Indian Teak Wood.**

#### **1.0 Materials :**

The teak wood shall conform to M-29.

#### **2.0 Workmanship :**



The relevant specification of item No. 10.1 (A) shall be followed except that the wood work shall be for a false ceiling, partitions, etc. swan and put in position.

**3.0 Mode of measurement and payment :**

3.1. The relevant specification of item No. 10.1 (A) shall be followed.

3.2. **The rate shall be for a unit of ten cubic metre.**

**10.12.A. (I) Providing and fixing 35 mm. thick fully paneled shutters for doors, windows, and clerestory windows including anodized aluminium butt hinges with necessary screws. Indian Teak Wood.**

**1.0 Materials :**

1.1. Wood for shutter shall conform to M-29. Glass shall conform to M-38. Anodised aluminium butt hinges shall conform to M-43.

**2.0 Workmanship :**

2.1. The item covers the requirement of preparation of shutters for doors, windows, clerestory windows, their supply and fixing.

**2.2. Shutters :**

2.2.1. Panelled shutters shall be constructed in the form of timber frame work of styles and rails with panel inserted of type as specified in the detailed drawings. Panel shall be fixed by providing grooves in the style and rails. The styles and rails shall be joined to each other by mortise and tenon joints at right angles.

2.2.2. All members of the shutters shall be straight without any warp or bow and shall have smooth, well planed faces at right angles to each other.

2.2.3. The size of styles and rails shall be as per drawings or as directed. Styles and rails of shutters shall be made of one piece only.

**2.3. Timber paneling :**

2.3.1. Thickness of the panel shall be as specified in the item as shown in the drawing or as directed. If the panel is made from more than one piece the pieces shall be finished as shown in the detailed drawings and shall be joined with continuous groove with specified size. The end pieces of the panel and the top and bottom of the panel shall be provided with continuous tongue to frame into groove of the frame shutter. An air space of 1.5 mm. shall be left in the groove of frame of shutter while framing the panels in it.

2.3.2. The faces of the panel as well as various pieces of the panel shall be closely fitted to the size of the grooves.

2.3.3. Finishing of the corners of raised panel edges shall be done as shown in drawings or as directed.

2.3.4. The thickness specified shall be finished thickness and no tolerance will be permitted.

**2.5. Fixtures and fastenings :**

2.5.1. The rate shall include anodised aluminium butt hinges including fixing with iron screws. The size and number of hinges shall be as per table given in annexure – I.

**3.0. Mode of Measurement & Payment :**

3.1. The rate for shutter includes cost of providing block and cleat for keeping the shutter in open position as directed.





3.2. The dimension of the shutter shall be measured clear size of the shutter in close position between the grooves of the frame.

3.3. **The rate shall be for a unit of one sq. metre.**

**10.12. (A)(II) Providing and fixing 35 mm. thick fully glazed shutters for doors, windows and clear story windows including anodized aluminium butt hinges with necessary screws, Indian Teak Wood.**

**1.0. Materials :**

Teak wood shall conform to M-29. Glass shall conform to M-38. Anodised aluminium butt hinges shall conform to M-43.

**2.0. Workmanship :**

2.1. The relevant specification of item No. 12.12. (A) (I) shall be followed except that the 35 mm. thick shutters full glazed for doors, windows and clear story windows including anodised aluminium butt hinges with necessary screws.

**2.2. Glazing :**

2.2.1. The glass panels shall be embedded in putty and secured to the rebate by wooden beads or mouldings shape and size as approved with counter sunk screws of suitable size.

2.2.2. The glass panel shall be properly cut to fit the rebates of the frames and sashes fully with a slight minus margin of about 1.5 mm. on all sides. Before glazing, the frame shall be primed and prepared for painting so that wood may not draw oil out of putty. The rebate shall be putted to an extent to provide bedding all round the glass.

2.2.3. The glass shall then be bedded in putty and fitted to frames with wooden heads or moulding as directed and secured with counter sunk screws. The screws shall be spaced not more than 100 mm. from each corner and not more than 200 mm. apart.

2.2.4. The size of the rebate in the frame and size and shape of beads or moulding shall be as per detailed drawings or as directed, the beads or mouldings shall have mitred corners.

**3.0. Mode of Measurement & Payment :**

3.1. The relevant specifications of item No. 12.12.-A(I) shall be followed.

3.2. **The rate shall be for a unit of one sq. metre.**

**10.12.A. (III) Providing and fixing 35 mm. thick partly paneled and partly glazed shutters for doors, windows, including anodized aluminium butt hinges with necessary screws, Indian teak wood.**

**1.0. Materials :**

Teak wood shall conform to M-29, Glass shall conform to M-38. Anodised aluminium butt hinges shall conform to M-43.

**2.0. Workmanship :**

2.1. The relevant specifications of item No. 10.12. (A)(I) and 10.12. (A)(II) shall be followed except that the 35 mm. thick shutters shall be partly paneled and partly glazed for doors, windows and clear story windows etc. as per drawings.



**3.0. Mode of measurement and payment :**

3.1. The relevant specifications of item No. 10.12. (A)(I) shall be followed.

3.2. **The rate shall be for a unit of one sq. meter.**

**10.12.A. (I) Providing and fixing 35 mm. thick full paneled, shutters for doors, windows and clear story windows including black enameled M.S. Butt, hinges with necessary screws, Indian teak wood.**

**1.0. Materials :**

1.1. Relevant specification of item No. 10.12 (A) shall be followed except that the hinges shall be of black enameled M.S. Butt type hinges. The hinges, bolts and other item of iron mongery with moving parts shall be properly oiled by the contractor before handing over the building.

**2.0. Mode of Measurement & Payment :**

2.1. The relevant specifications of item No. 10.12. (A) shall be followed.

2.2. **The rate shall be for unit of one sq. meter.**

**10.13.A. (II) Providing and fixing 35 mm. thick fully glazed shutters for doors, windows and clear story windows, including black enameled M.S. Butt hinges with necessary screws. India teak wood.**

**1.0. Materials & Workmanship :**

The relevant specifications of item NO 10.12 (A) (III) shall be followed except that the hinges shall be of black enameled M.S. Butt hinges, bolts and other items of iron monegery with moving parts shall be properly oie by the contractor before handing over the building.

**2.0** Mode of measurement & payment.

2.1 The relevant specifications of item No. 10.12(A) shall be followed.

2.2 **The rate shall be for a unit of one sq. metre.**

**10.13.A. (III) Providing and fixing 35 mm. thick partly paneled and partly glassed shutters for doors, windows and clear story windows, including black enameled M.S. Butt hinges with necessary screws. Indian teak wood.**

**1.0. Materials & Workmanship :**

The relevant specifications of item NO 10.12 (A) (III) shall be followed except that the hinges shall be of black enameled M.S. Butt hinges, bolts and other items of iron monegery with moving parts shall be properly oiled by the contractor before handing over the building.

**2.0** Mode of measurement & payment.

2.1 The relevant specifications of item No. 10.12.A.( I ) shall be followed.

2.2 **The rate shall be for a unit of one sq. metre.**

**10.15.A. (I) Providing and fixing 25 mm. thick fully paneled, shutters for for cup-boards etc. including anodised aluminium Butt hinges with necessary screws. Indian teak wood.**

**1.0 Materials :**



First class Indian teak wood for shutters shall conform to M-29. Glass shall conform to M-38. Anodised aluminium butt hinges shall conform to M-43.

**2.0 Workmanship :**

2.1 The relevant specifications of item No. 010.12(A) (I) shall apply except that the thickness of shutters shall be 25 mm for cup-boards.

**3.0 Mode of measurements and payment :**

3.1 The relevant specifications of item No. 10.12(A) (I) shall be followed.

3.2 **The rate shall be for a unit of one sq. metre.**

**10.15.A. (II) Providing and fixing 25 mm. thick fully glazed shutters for cup-boards etc. including anodised aluminium Butt hinges with necessary screws. Indian teak wood.**

**1.0 Materials & Workmanship :**

The relevant specifications of item No.10.12(A) (I) shall apply except that the thickness of shutters shall be 25 mm for cup-boards.

**2.0 Mode of measurements and payment : :**

2.1 The relevant specifications of item No. 10.12(A) (I) shall be followed.

2.2 **The rate shall be for a unit of one sq. metre.**

**10.15.A. (III) Providing and fixing 25 mm. thick partly glazed shutters for cup-boards etc. including anodised aluminium Butt hinges with necessary screws. Indian teak wood.**

**1.0 Materials & Workmanship :**

The relevant specifications of item No.10.12(A)(I) shall apply except that the thickness of shutters shall be 25 mm for cup-boards.

**2.0 Mode of measurements and payment :**

2.1 The relevant specifications of item No. 10.12(A) (I) shall be followed.

2.2 **The rate shall be for a unit of one sq. metre.**

**10.16.A. (I) Providing and fixing 25 mm. thick fully paneled, shutters for cup-boards etc. including black enameled M.S. Butt hinges with necessary screws. Indian teak wood.**

**1.0 Materials & Workmanship :**

1.1 The relevant specifications of item No.10.12(A) (I) shall apply except that the wood for shutters shall be Indian teak wood and black enameled M.S. Butt hinges are to be used instead of anodised aluminium butt hinges and thickness of shutter shall be 25 mm.

**2.0 Mode of measurements and payment :**

2.1 The relevant specifications of item No. 10.12.(A) (I) shall be followed.

2.2 **The rate shall be for a unit of one sq. metre.**



**10.16.A. (II) Providing and fixing 25 mm. thick fully glazed shutters for cup-boards etc. including black enameled M.S. Butt hinges with necessary screws. Indian teak wood.**

**1.0 Materials & Workmanship :**

The relevant specifications of item No.10.15(A)(II) shall be followed except that the fully glazed shutters of 25 mm thickness shall be of Indian teak wood fixed in position with black enameled but hinges for cup-boards.

**2.0 Mode of measurements and payment : :**

**2.1** The relevant specifications of item No. 10.12(A) (I) shall be followed.

**2.2 The rate shall be for a unit of one sq. metre.**

**10.16.A. (III) Providing and fixing 25 mm. thick partly glazed shutters for cup-boards etc. including black enameled M.S. Butt hinges with necessary screws. Indian teak wood.**

**1.0 Materials & Workmanship :**

The relevant specifications of item No.10.15(A)(I) & 10.15(A)(II) shall be followed except that the shutters shall be partly paneled and partly glazed of 25 mm thickness teak wood fixed with black enameled butt hinges for cup boards.

**2.0 Mode of measurements and payment : :**

**2.1** The relevant specifications of item No. 10.12(A) (I) shall be followed.

**2.2 The rate shall be for a unit of one sq. metre.**

**10.23 Providing and fixing 35 mm thick paneled glazed or paneled and glazed shutters for doors, windows and clearstory windows including anodised aluminium butt hinges with necessary screws. Indian Teak wood shutters with (A) Plywood (B) Particle Board (C) Hard Board (D) Asbestos Sheet panels.**

**1.0 Materials :**

Indian teak wood for shutters shall conform to M-29 Glass shall conform to M-38.

(A). Plywood shall conform to M-37.

(B). Particle board shall conform to M-40. Anodised aluminium butt hinges shall conform to M-43.

(C). Hard Board shall of best quality and shall be approved by Engineer in charge.

(D). A. C. sheet shall conform to M-24.

**2.0 Workmanship :**

**2.1** The relevant specifications of item o.10.12(A)(I) shall apply to this item except that the work is shuttered with (A) Plywood (B) Particle Board (C) Hard Board (D) A.C. sheets panels as specified in item.

**2.2** The shutter shall be prepared by fittings styles and rails (top; bottom, lock and frieze) as for paneled leaves with simple chamber on edge only. The styles and rails shall be grooved with just sufficient width for receiving panels and plain panels of specified type panels shall be fitted into the grooves.



**3.0 Mode of measurements and payment : :**

3.1 The relevant specifications of item No. 10.12(A) (I) shall be followed.

3.2 **The rate shall be for a unit of one sq. metre.**

**10.24 Providing and fixing 35 mm thick paneled, glazed shutters for doors, windows and clearstory windows including black enameled M.S. Butt hinges with necessary screws. Indian Teak wood shutters with (A) Plywood (B) Particle Board (C) Hard Board (D) Asbestos Sheet panels.**

**1.0 Materials & Workmanship :**

1.1 The relevant specifications of item No.10.23 shall be followed except that the hinges shall be black enameled M.S. Butt hinges instead of anodised aluminium butt hinges and shutter with (A) Plywood (B) Particle Board (C) Hard Board (D) Asbestos shet panels as specified in item.

**2.0 Mode of measurements and payment : :**

2.1 The relevant specifications of item No. 10.12(A) (I) shall be followed.

2.2 **The rate shall be for a unit of one sq. metre.**

**10.30 Providing and fixing flush door shutters, solid core construction with frame of 1<sup>st</sup> class hard wood with cross band and face veneer or plywood face panels including anodised aluminium butt hinges with necessary screws (1) Non-decorative type and block board core (2) 35 mm thick.**

**1.0 Materials :**

Flush door shall conform to M-30 Plywood shall conform to M-37. Anodised aluminium butt hinges shall conform to M-43.

**2.0 Workmanship :**

2.1 The relevant specification of item No. 10.23 shall be followed except that the shutters be non decorative type and block board core with face venner or plywood with 35 mm thickness.

2.2 Ready made shutters shall be for correct size and shall fit into the door or other openings without excessive scraping of edges. Adding of battens etc. to make up to the size shall not be allowed.

**3.0 Mode of measurements and payment :**

3.1 The relevant specifications of item No. 10.12(A) (I) shall be followed.

3.2 **The rate shall be for a unit of one sq. metre.**

**10.37 Extra for using bright finished M.S. Piano hinges instead of anodised aluminium butt hinges in flush door shutter (A) Nickel Plated Piano hinges.**

**1.0 Materials & Workmanship :**

1.1 The relevant specification of item No. 10.30 shall be followed except that the nickel plated piano hinges shall be provided and fixed. It shall conform to the latest Indian Standards and shall be got approved by the Engineer in charge.

**2.0 Mode of measurements and payment :**

2.1 The extra payment shall be made on sq.m. basis of door over and above the item No. 10.30 for providing finish M.S. paneled hinges instead of anodised aluminium butt hinges.



2.2 **The rate shall be for a unit of one sq. metre.**

**10.39 Extra for providing vision panel not exceeding 0.1 sq.mt. in all types of flush doors (A) Rectangular square.**

**1.0 Materials & Workmanship :**

1.1 The relevant specification of item o. 10.30 shall be followed except that the vision panel not exceeding 0.1 sq.m. shall be provided.

1.2 The glass panels shall conform to M-38 and this item is for extra work of providing vision panel rectangular or square not exceeding 0.1 sq. in all types of flush doors.

**2.0 Mode of measurements and payment :**

2.1 The payment shall be made over of item No. 10.30 for this extra work on shutter in which visions panels are provided.

2.2 **The rate shall be for a unit of one sq. metre of door area.**

**10.51 Providing and fixing 30 mm thick wire gauze shutters using galvanized M.S. wire of I.S. gauze designation 85-G with wire of 0.56 mm dia for doors, windows and clearstory windows including anodised aluminium butt hinges with necessary screws : Indian Teak wood.**

**1.0 Materials :**

Wire gauze jail shall conform to M-36. The teak wood shall conform to M-29. Anodised aluminium butt hinges shall conform to M-43.

**2.0 Workmanship :**

2.1 Specifications for item No. 10.12 (A)(I) shall be adopted for shutter and fixtures and fastenings except that 30 mm thick wire gauze shutter shall be provided;

2.2 Wire gauze shuttering :

2.2.1 The finished sizes of the wooden components like styles, rails, mountings shall be as per the paneled doors. Each leaf shall have 2 panels of wire gauze as per drawings or as directed.

2.2.2 The styles, rails etc. shall be rebated 12 mm along the side where they receive the gauze. The galvanized iron webbing of 0.56 mm dia, mesh shall be used unless otherwise specified. The webbing shall be at 90 to 12 mm along both sides of the rebate and fixed securely to the styles and rails and mounting by 12 mm galvanized iron staples at about 7.5 cms intervals staggered spacing. Teak wood fillets of the size 10 mm x 10 mm shall be securely and neatly fixed with small screws, spaced about 7.5 cm centres around the rebate for each panel of webbing. After the fillets are pressed well into the angle to hold the gauze in two faces, the exposed edge of fillets shall be neatly rounded. The gauze shall be tightly stretched during fixing. The space between the fillet and the rebate where the webbing is bent shall be neatly finished with putty so that cut end of webbing may not be visible. Each shutter shall be fitted with a pair of anodised aluminium butt hinges with necessary iron screws.

**3.0 Mode of Measurement & Payment :**

3.1 The relevant specification of item No. 10.12 shall be followed.

3.2 **The rate shall be for a unit of one sq. metre.**

**10.53 Providing and fixing 30 mm thick wire gauze using shutters galvanized M.S. wire of wire gauze**



**designation 85-G with wire of 0.56 mm dia for doors, windows and clearstory windows including bright finished or and black enameled M.S. butt hinges with necessary screws : Indian Teak wood.**

**1.0 Materials & Workmanship :**

1.1 The relevant specification of item No. 10.51 shall be followed except that the hinges to be used shall be bright finish / or and black enameled M.S. butt hinges with screws and the wood shall be used of Mango wood or equivalent quality of non teak wood.

**2.0 Mode of Measurement & Payment :**

2.1 The relevant specification of item No. 10.12 shall be followed.

2.2 **The rate shall be for a unit of one sq. metre.**

**10.54 Extra for providing and fixing galvanized M.S. Wire gauze of I.S. gauge designation 140 G to doors, windows and clearstory windows with wire of dia 0.71 mm instead of I.S. gauze designation 85 G with wire of dia 0.56 mm.**

**1.0 Materials & Workmanship :**

1.1 The relevant specification of item No. 10.51 & 10.53 shall be followed for this item except that the diameter of wire shall be 0.71 mm of I.S. gauze designation 140 G instead of 56 mm diameter I.S. gauze designation 85 G.

**2.0 Mode of Measurement & Payment :**

2.1 The payment shall be made extra over and the payment for galvanized M.S. Wire gauge.

2.2 The rate I.S. gauge designation 85 G shall of one sq. mt. of size of doors and windows shutters.

**10.74 Providing and fixing 12 mm. thick and 100 mm. wide pelmet of flat pressed 3 layer revered particle board solid core with 25 mm. diameter aluminium curtain rod bracket including fixing with 25 mm. x 3 m. M.S. flat 10 cms. long and plugs etc. comp.**

**1.0 Materials :**

(1) 3 layers veneered particle board solid core shall conform to M-40 25 mm diameter aluminium curtain rod and 25 mm. x 3 mm. x 10 cms. long M.S. flat and plugs shall of best approved quality as directed.

**2.0 Workmanship :**

The work shall be done as per drawing and description given in the item of work. The wooden planks shall be planed smooth and even on the exposed surface.

The pelmet shall be fixed to level by means of 10 cms. long x 25 mm x 3 mm M.S. flat brackets lent in the form of angle and wooden plug fixed in the walls using wood screws. For pelmet up to 1.5 metre long two such brackets shall be used and additional bracket provided for longer pelmet at the rate of one per metre length extra. The curtain rods be fixed by suitable brackets at the ends to the pelmet as directed.

**3.0 Mode of Measurement & Payment :**

3.1 Pelmet shall be measured in running metres along the sides and face.

3.2 **The rate shall be for a unit of one running metre.**



**10.84 Providing and fixing 40 mm. panalled, glazed or panaelled and glazed partitions fixed to frames with iron screws etc., complete with Indian teak wood (Frames to be paid separately).**

**1.0. Materials :**

Indian Teak Wood shall conform to M-29. Glass shall conform to M-38. Iron screws shall of best approved quality. Plywood, asbestos shall conform to relevant specification of Materials :

**2.0 Workmanship :**

The work shall be done as per detailed drawing or as directed. The wooden frames shall be of sizes as indicated in the drawing and description of item. They shall be palned and finished smooth and even. The vertical styles and rails shall be framed by tenon and mortise joints.

The panels which may be of planks, asbestos, plywoods, glass or any other Materials : specified shall be fixed in the grooves made in styles and rails or by means of rebate and beading fixed by suitable screws. When galzing is used as panels the glass shall be fixed by using putty in addition to beading, the putty shall be used before applying Materials :

**3.0. Mode of Measurement & Payment :**

Partitions shall be measured in square metres of the net area of the filler Materials : provided.  
**The rate shall be for a unit of one sq.metre.**

**10.85 Providing and fixing decorative plywood 4 mm. thick in partitions including fixing to frames with screws etc., complete with 50 mm. x 12 mm. teak wood beading (Frames to be paid, separately).**

**1.0 Materials :**

4mm. thick decorative plywood shall be of best approved quality. Teak wood beading and screws shall be best approved quality as directed.

**2.0. Workmanship :**

The relevant specifications shall be same as per that of item no. 10.84 expect that partitions shall be with 4 mm. thick decorative plywood and with teak wood beading.

**3.0. Mode of measurements and payment :**

Partitions shall be measure in square metres of the net area of the filler Materials : provided. The rate shall be for a unit of one sq. metre.

**10.86 Providing and fixing plain Asbestos cement sheet 6 mm. thick inpartition including fixing to frames with screws etc., complete with 50 mm. x 12 mm. deodar wood beading (Frames to be paid separate).**

**1.0 Matyerials :**

Plain A.C. Sheets shall conform to M-24. Deodar wood beading shall conform to M-29 A.

**2.0. Workmanship :**

The relevant specifications of item No. 10.84 shall be followed sme except that plain asbestos cement sheet 6 mm. thick shall be used in partition and Deodar wood beading of size 50 x 12 mm. size shall be used.

**3.0. Mode of Measurement & Payment :**





3.1. The relevant specifications of item No. 10.84 shall be followed except that the rate excludes cost of frame work.

3.2. **The rate shall be for a unit of one square metre.**

**10.88 Providing and fixing in partition 4 mm. thick medium hard board of approved quality including fixing to frames with screws etc., complete with 50 x 12 mm. Teak wood beading (Frame to be paid separately).**

**1.0. Materials :**

The hard board shall be 4 mm. thick and of best quality and made as approved. Teak wood beading shall conform to M-29.

**2.0 Workmanship :**

The relevant specifications of item No. 18.84 shall be followed except that the hard board of 4 mm. thickness shall be used in partition and teak wood beading 50 x 12 mm. size shall be used.

**3.0. Mode of measurements and payment :**

3.1. The relevant specifications of item No. 10.84 shall be followed, except that the rate excludes cost of frame work.

3.2. **The rate shall be for a unit of one square metre.**

**10.96 25 mm. thick wooden shelves supported on 40 x 40 x 6 mm. T. or L. Iron bracket fixed at suitable distances not exceeding 75 cms. apart with Mango wood or equivalent quality.**

**1.0 Materials :**

The mango wood shall conform to M-29-A. Structural steel shall conform to M-22.

**2.0 Workmanship :**

The mango wood or equivalent quality non teak wood shelves shall be prepared from 25 mm. thick planks. The planks shall be planed smooth. The planks shall be used in single piece up to 30 cms. width. The shelves shall be fitted in position by fixing 40 x 40 x 6 mm. T or L iron brackets. The spacing of brackets shall not be more than 75 cms. the 40 x 40 x 6 mm. T or L iron brackets shall be fixed firmly in position by embedding the same in concrete. The shelves shall be fixed as directed. The season teak wood battens of size 35 x 12 mm. shall be fixed on open side as directed.

**3.0 Mode of measurements and payment :**

3.1. The shelves shall be measured in sq.metre. The length and breadth of shelves shall be measured net.

3.2. The rate is inclusive of batton provided.

3.3. **The rate shall be for a unit of one sq.metre.**

**10.97 40 mm. thick wood shelves supported on 40 x 40 x 6 mm. T or L Iron brackets fixed at suitable distance but no exceeding 75 cms. apart with Mango wood or equivalent quality.**

**1.0 Materials & Workmanship :**

The relevant specifications of item No. 10.96 shall be followed except that the thickness of shelves shall be 40 mm. Thick teak wood battens shall be provided of 50 x 12 mm. on all open sides.



**2.0. Mode of Measurement & Payment :**

2.1. The relevant specifications of item No. 10.96 shall be followed.

2.2. **The rate shall be for a unit of one square metre.**

**10.99 Providing and fixing M.S. round or square bars with M.S. flats at required spacings in wooden frames of windows and clerestory windows.**

**1.0. Materials :**

M.S. bars and flats shall conform M-18 and m-22 respectively.

**2.0. Workmanship :**

**2.1** The M.S. bars shall be fabricated as shown in the drawing or as directed. It shall conform to I.S. 226-1975 and I.S. 961 and I.S. 1977-1975. The M.S. bars shall be fixed at the required spacing in mild steel flats, after drilling holes in the latter. The diameter and spacing of these bars shall be as mentioned in the drawing or as directed. The bars shall be passed through drill holes drilled into the mild steels flats, fixed in the recess in frames. The flats shall be fixed with iron screws.

**3.0. Mode of measurements and payment :**

3.1. The rate shall be for the M.S. round or square bars with M.S. Flats provided and fixed in position as per the specifications for the complete item.

3.2. **The rate shall be for a unit of one Kg.**

**10.100 (A) Providing and fixing M.S. Grills of required pattern to wooden frames of windows etc., with M.S. flats at required spacing and frame around, square, or round bars with round headed bolts and nuts or by screws: plain Grill.**

**1.0 Materials :**

The structural steel shall form conform to M-22.

**2.0. Workmanship :**

2.1. The M.S. Grill shall be prepared as per the drawing or as directed for fixing to wooden frames of windows etc.

2.2. The grill shall be fabricated to the designs and patterns shown in the drawings and the weight shall be as directed, and the joints shall be riveted or welded as shown in the plan or as directed. The grill so formed shall be fixed into the frames of the windows etc. before they are erected in position. The out side strip frame of the grill shall be housed to its full thickness into the recess cut into the frame of the windows etc., The grill shall be fixed to the frame with number of bolts and nuts or screws viz. bolt nut/ screw per 30 cm. of the length of outer strip subject to a minimum of 2 Nos. on each side of the frame or as indicated in the drawing or as directed.

2.3. The bolts and nuts or screws shall be counter sunk and shall be fixed with the top of their heads flush with the face of the frame strips.

**3.0 Mode of Measurement & Payment :**

3.1. No payment shall be made for weight of screws, bolts, nuts etc. only weight of grill shall be paid.

3.2. **The rate shall be for a unit of one Kg.**



**10.100 (B)Providing and fixing M.S. Grill of required pattern to wooden frames of windows etc. with M.S. plates, at required spacing and frame around, square or round bars with round headed bolts and nuts or by screws and with ornamental grill.**

**1.0. Materials & Workmanship :**

1.1. The relevant specification of item No. 10.100 (A) shall be followed except that the work is for of ornamental grill.

**2.0. Mode of Measurement & Payment :**

2.1. The relevant specification of Item No. 10.100 (A) shall be followed.

2.2. The rate shall be for a unit of one Kg.

**10.102. Providing and fixing hard drawn steel wire fabric 75 x 25 mm. mesh of weight not less than 7.75 Kg. per Sq.M. to window frames etc. including 60 x 20 mm. beading of teak wood.**

**1.0. Materials :**

Hard drawn steel wire of 75 x 25 mm mesh shall conform to M-34. Teak wood beading shall conform to M-29.

**2.0. Workmanship :**

The steel wire fabric 75 x 25 mm. mesh of weight not less than 7.75 Kg. per Sq.M. to windows frames etc. shall be fabricated as per detail drawings. The wire fabric shall be fixed to windows frame by teak wood beading of 60 x 20 mm. size by means of screws.

**3.0. Mode of Measurement & Payment :**

3.1. The wire mesh (Hard drawn) shall be measured net clear opening of frame of window in which mesh is fitted. Nothing shall be paid extra for fixing mesh in groove below teak wood beading.

3.2. **The rate shall be for a unit of one Sq.metre.**

**10.103. Providing and fixing fly proof galvanized M.S. Wire gauge of I.S. Gauge designation 85 G with wire of dia 0.56 mm. to windows and clerestory windows including 60 x 20 mm. beading of Indian Teak Wood.**

**1.0 Materials :**

The fly proof galvanized M.S. wire gauge shall conform to M-36. teak wood beading shall conform to M-29.

**2.0 Workmanship :**

The relevant specifications of item No. 10.102 shall be followed except that fly proof galvanized M.S. wire gauge of I.S. gauge designation 85-G with wire of 0.56 mm. shall be provided.

**3.0 Mode of Measurement & Payment :**

3.1. The relevant specification of item No. 10.102 shall be followed.

3.2. **The rate shall be for a unit of one square metre.**

**10.120. Providing and fixing first class Indian Teak Wood, 75 x 60 mm. moulded hand rails in straight lengths completed.**



**1.0. Materials :**

First Class Indian Teak wood shall conform to M-29.

**2.0 Workmanship :**

The teak wood hand rail shall be of size 75 x 60 mm. The hand rail shall be prepared from first class Indian teak wood. The hand rail shall be moulded as per detail drawings. The hand rail shall be fixed in straight length as per detail drawings with screws. The relevant specifications of item No. 10.4 shall be followed except that the teak wood work shall be for a railing of specified size.

**3.0 Mode of measurements and payment :**

3.1. The hand rail shall be measured in running metre.

3.2. **The rate shall be for a unit of one running metre.**

**10.0.0. (I) Providing and fixing glazed louvered Glass windows and ventilators with teak wood frame 10 x 75 mm. size including 3 coats of oil painting to wood work etc. complete.**

**1.0. Materials :**

Indian teak wood shall conform to M-29 Glass shall conform to M-38.

**2.0. Workmanship :**

The relevant specifications of item No. 10.1. (A) shall be followed for frame work except that the frame work of 10 x 7 cms. size of required size ventilators shall be provided with glazed glass louvers. The glass louvers shall be provided as directed. In the groove of 1.25 cms. depth made in frames, the thickness of glass shall be 5 mm. and glass shall be glass of best quality. The ventilation blades shall slope done towards the outside at an angle of 45°.

**3.0 Mode of measurements and payment :**

3.1. The area of opening within the frame in which louvers are fixed shall be measured in sq. metres.

3.2. The rate included painting 3 coats to wood work with ready mix paint.

3.3. **The rate shall be for a unit of one sq. metre.**

**10.0.0. (II) Providing & fixing with wooden louvers plank 12 mm. thick windows and ventilators with teak wood frame 10 x 7 cms. size including 3 coats of oil painting to wood etc. complete.**

**1.0 Materials & Workmanship :**

The relevant specifications of item No. 10.0.0 (I) shall be followed except that the teak wood planks 12 mm thick louvers shall be provided.

**2.0. Mode of measurements and payment :**

2.1. The relevant specifications of item No. 10.0.0. (I) shall be followed.

2.2. **The rate shall be for unit of one square metre.**



## SECTION – 11

### Steel Shutters, Windows, Ventilators.

**11.2 (A) Steel work rivetted, in build up sections, framed work including cutting, hosting fixing in position and applying a priming coat of red lead paint. In beam and joints, channels, angles tees, flats, with connecting plates or Angle cleats as in main & cross beams. Hop and jack rafters, purlins connected to common rafters and the like.**

**1.0. Materials :**

The structured steel work conform to M-22. Red lead paint primer shall conform to I.S.: 102 – 1962.

**2.0. Workmanship :**

2.1. The steel sections as specified or required shall be finished smooth. No two pieces shall be welded or otherwise jointed to make up the required length or members, except as indicated in the drawing or as directed. All straightening and shaping to form shall be done by application of pressure and not by hammering. Any bending or cutting shall be carried out in such a manner as not to impair the strength of the metal. All operations shall be done in cold state unless otherwise directed / permitted.

2.2. Steel riveted or bolted in builtup sections, frame work.

2.2.1. The steel structure as shows in the drawing or as per direction of the Engineer-in-charge shall be laid out on a level platform to full scale and to full size or in parts. A steel tape shall be used for measurements to ensure maximum accuracy.

2.2.2. Wooden templates 12 mm. to 19 mm. thick or metal sheel template shall be made to correspond to each connecting gusset plate and rivet holes shall be accurately marked on them and drilled. The templates shall be laid on the steel members and holes of the steel members shall also be marked for cutting. The base of steel columns and the position of Anchor bolts shall be carefully set out.

2.2.3. All stiffeners shall be formed by pressure and where practicable, the metal shall not to be cut and welded in making these. In major works or where so specified, shop drawings giving complete details and information for the fabrication of the component parts of the structure, including location, type, size, length and details of rivets, bolts or weld shall be prepared in advance of the actual fabrication and as approved. The drawings shall indicate the shop and field rivets and bolt. The steel members shall be distinctly marked or stenciled with paints with the identification mark as given in the shop drawings. The bars shall be thickened at the ends, so as to provide for screwed threads and gradually tapered off to meet their normal section. Great accuracy shall be observed in fabrication of various members, so that these can be assembled without being unduly packed, strained, or forced into position and when build up, shall be true and free from twists, binks, buckles, or open joints.

Before making holes in individual members for fabrication the steel work intended to be riveted or bolted to gether shall be as embled or clamped properly and tightly so as to ensure close abutting or lapping of the surfaces of the different members. All stiffeners shall bear tightly both at top and bottom without being Web splice plates and fillers under dtiffners shall be cut to fit within 3 mm. or flange. Angle Web plates or girders shall have no cover. Plates, shall have their ends flush with the top of angles forming the flanges unless otherwise required web plantes when spiced shall have clearance of not more that 6 mm.

The erection, clearance for cleated ends of members connecting steel to steel shall preferably be not greater than 1.5 mm. The erection clearance at the ends of beams without web cleats shall not be more than 3 mm. at each end but where for a practical reason greater clearance is necessary, suitably designed seation shall be provided.

Pains and rollers shall be accurately turned to gauge. These shall be straight and smooth and free from flows. The roller bearing shall be provided with adequate arrangement for holding the girders of truss resting on it. In columns caps and bases, the ends of shifts together with the attached gussets Angles, channels etc. after riveting together shall be accurately machanised so that the parts connected but against each other over the entire surfaces of contact connecting angles or channels shall be fabricated and placed in position with greater accuracy so that they are not unduly reduced in thickness by machining.



The ends of bearing stiffeners shall be machined or ground to fit tightly both at the top and bottom. All holes shall generally be drilled to the required size and at required position. Sub punching shall be permitted, provided it is done 3 mm. or less in diameter and reamed thereafter to the required size. The holes for rivets and bolts shall be larger by 0.4 to 6 mm. than the nominal diameter of rivets or black bolts depending up to the diameter of rivets.

Holes shall have their axis perpendicular to the surface bored through. The drilling or reaming shall be free from burrs, and the holes should be clean and accurate. Holes for counter shank bolts shall be made in such a manner that their heads fit flush with the surface after fixing.

The fabrication work shall be completed in workshop as far as it is practicable to do so. Site joints shall be done with rivets and fitted bolts or black bolts, as shown in the drawings or as directed. Generally the following principles shall govern the use of rivets turned and fitted bolts, and black bolts :

i] Rivets and turned and fitted bolts shall be used where the connection is such that slip under load has to be avoided.

ii] Black bolts may be used very sparingly where a force is carried through a connection without impact, vibration or reversal or stresses.

#### **2.2.4. Rivetting :**

The parts assembled for riveting shall be in close contact with each other and the bearing stiffeners shall bear tightly both at top and bottom without being drawn or caulked. Members to be riveted shall be properly pinned or bolted and rigidly held together while riveting. Drifting of holes shall not be permitted except to draw the parts together and the drifting tools so used shall have maximum diameter not exceeding the nominal diameter of rivets or bolts. Drifting done during assembling shall not distort the metal or enlarge the holes. The shanks or rivets shall project beyond the plate-surface sufficiently so as to fill the hole thoroughly and from the required head after riveting.

The riveting shall be done by hydraulic or pneumatic process. However, where such facilities are not available, hand riveting may be permitted. The rivet shall be heated red hot, care being taken to control the temperature of heating so as not to burn the steel. Rivets of diameter less than 10 mm. may be fitted cold. Rivets shall be of heat finish with heads full and replaced. The heads of rivets shall be central to shanks and shall grip the assembled members firmly. In cutting out rivets, care shall be taken so as not to injure the assembled members firmly. In cutting out rivets, care shall be taken so as not to injure the assembled members, caulking or recupping shall not be permitted.

For testing rivets, a hammer weighing approximately 0.25 Kg. shall be used. Both heads of the rivets shall be tapped, slack rivets will give a hollow sound and a jar. All rivet heads shall be painted with red lead paint within a week of other fixing.

2.2.5. All bolt heads and nuts shall be hexagonal and of equal size unless specified otherwise. The screwed heads shall conform to I.S. 1363-1960 and the threaded surface shall to be tapered. The bolts shall be of such length so as to project two clear threads beyond the nuts when fixed in position and these shall fit in the holes without any shakes. The nut shall be fit in the threaded ends of bolts properly.

Where turned and fitted bolts are required to be used in place of rivets there shall be provided with washers not less than 6 mm. thick so that the nut when tightened shall not bear on the unthreaded body of the bolt.

Tapered washers shall be provided for all heads and nuts bearing on leveled surfaces. The threaded portion of the bolt shall not be within the thickness of the parts bolted together. The faces of the bolt heads removed or becoming loose due to vibrations or reversal of stresses, these shall be secured from slackening by the use of locknuts, spring washers, cross-cutting or hammering down of threads as directed.

Bolts, nuts, and washers shall be thoroughly cleaned and dipped in double boiled linseed oil before use. The whole steel work shall be painted with a coat of priming coat of red lead as per relevant specification of painting.



### **3.0 Mode of Measurement & Payment :**

3.1. The Steel work shall be measured in general as under :

a] All work shall be measured on the basis of finished dimensions as fixed at site and measured net unless specified otherwise.

b] The weight of steel sections, steel rods, and steel strips in finished work shall be calculated from standard weight on the same basis on which steel is supplied to the Contractor by department or those given in relevant I.S. : if steel is arranged by the contractor.

c] The weight of steel plates and strips shall be taken from relevant I.S. based on 7.85 Kg./Sq.metre for every millimetre sheet thickness if steel is supplied to the contractor by department.

d] Unless otherwise specified, weight of cleaters, brackets, packing pieces, bolts, nuts, washers, distance pieces, separators, diaphragm gusset (taking over all square dimensions) fish plates etc. shall be added to the weight of respective items.

e] In riveted work allowance is to be made for weight of rivet hands. No deductions shall be made for rivet or bolt holes excluding holes for anchore or holding down bolts.

f] For forged steel and steel castings, weight shall be calculated on the basis of 8750 Kg./ cum.

g] Unless otherwise specified, addition of 2.5 percent of the weight of structure shall be made for shop and site rivet heads in riveted structure.

h] Unless otherwise specified, no allowance shall be made for the weld metal in case of welded steel structure.

i] Dimensions other than cross sections and thickness of plates shall be measured to nearest 0.001 m.

j] Mill tolerance shall be ignored when weight is determined by calculation.

3.2. The rate includes cost of all material, labour, erection, hoisting, scaffolding, protective measure required for proper completion of the item of work. This shall also include conveyance and delivery handling, loading, unloading and storing etc., required for completing the item described above including necessary wastage involved.

3.3. **The rate shall be for a unit of a unit of one Quintal.**

**11.2. (D) Steel work riveted in built up section, framed work including cutting, hoisting, fixing in position and applying a priming coat of red lead paint in trusses, and trussed purlins, up to 25 m. span and 15 m. overall height.**

### **1.0 Materials & Workmanship :**

The relevant specifications of item No. 11.2 (A) shall be followed except that the work shall be for trusses and trussed purlins up to 25 m. span and 15 m. overall height.

### **2.0 Mode of Measurement & Payment :**

2.1. The relevant specifications of item No. 11.2 (A) shall be followed.

2.2. **The rate shall be for a unit of one Quintal.**

**11.4.A. Steel work welded, in built up sections frame work including, cutting, hoisting, fixing in position and applying a priming coat of red lead paint. In beams and joints, channels, angles, tees, flats, with connecting plates or angle cleats as in main and cross beams. Hip and jack rafters, purlins connected to common rafters and the like.**



**1.0. Materials : & Workman ship :**

- 1.1. The relevant specifications of item No. 11.2 (A) shall be followed except that the steel work shall be done by welding.
- 1.2. Welding shall generally be done by electric process. Gas welding shall be resorted to, using oxyacetylene flame with specific prior approval. Gas welding shall not be permitted for structural steel work.
- 1.3. The work shall be done as shown in the shop drawings which should clearly indicate various details of the joints abjoints to be welded, shop and site welded as well as type of electrodes to be used. Symbol for welding on plans and shop drawings shall be according to I.S. 813-1961. As far as possible every effort shall be made to limit the welding that must be done after improper welding that is likely to be done due to heights and difficult positions on scaffoldings etc. The welding work shall conform to I.S. 816-1969.
- 1.4. Preparation of surfaces : Surfaces which are to be welded together shall be free from loose mill scale, rust, paint, grease or other foreign matter. A coating of boiled linseed oil shall be permitted.
- 1.5. Assembly for welding : Before welding is commenced, the plates shall first be brought together and firmly.

Clamped or spot welded at specified distance. This temporary connection has to be strong enough to hold the plates accurately in place without displacement.

- 1.6. Precautions : All operations connected with welding and cutting equipment shall conform to safety requirement given in I.S. 818-1968.

The following points shall be borne in mind during the process of welding :

- a] Welds shall be made in flat position wherever practicable.
  - b] Arc length, voltage and amperage shall be suited to the thickness of material type of groove and other circumstances of the work.
  - c] The segments of welding shall be such that where possible the members which offer the greatest resistance to compression are welded first.
- 1.7. The defective welds which shall be considered harmful to the structural strength shall cut out and rewelded.
  - 1.8. Finished welds and adjacent parts shall be protected with clean boiled linseed oil and after all stage has been removed. Welds and adjacent parts shall be painted after the same are approved.
  - 1.9. All the members shall be thoroughly cleaned of rust, scales, dust etc., and given a priming coat of red lead paint before fixing them in position.

Testing of welding to be added in the specification I.N. 12.2.2.12 (i) to (viii)

**2.0. Mode of measurements and payment :**

- 2.1. The relevant specification of Item No. 11.2 (I) shall be followed.
- 2.2. **The rate shall be for unit of one Quintal.**

**11.4.D. Steel work welded in built up section tramed work, including cutting, housting, fixing in position and applying a priming coat of red lead paint in trusses and trussed purlines up to 25 m. span and 15 m. overall height.**





**1.0. Materials & Workmanship :**

The relevant specification of Item No. 11.4 (A) shall be followed except that the work shall be for trusses and trussed purlines up to 25. span and 15 m. overall height.

**2.0. Mode of measurements and payment :**

2.1. The relevant specifications of item No. 11.4(A) shall be followed.

2.2. **The rate shall be for unit of one Quintal.**

**11.6 Providing and fixing in position collapsible steel shutters with vertical channels 20 x 10 x 2 mm. bracked with flat iron diagonals 20 x 5 mm, size with top and bottom rails of T Iron 40 x 40 x 6 mm with 38 mm. dia steel pulleys complete with bolts, nuts, locking arrangements, stoppers, handles, including applying a priming coat red lead paint.**

**1.0. Materials :**

The collespible steel gate shall conform to M-33.

**2.0. Workmanship :**

T-rails shall be fixed to the floor and to the lintel at top by means of Anchor bolts, embedded in cement concrete to floor and lintel. The anchor bolts shall be placed approximately at 45 mm. centres alternatively in the two flanges of the T – iron. In the bottom runner (T-iron) shall be embedded in the floor and proper groove shall be formed along the runner for the purpose. The collapsible gate shall fixed at the sites by fixing the double channels in the T-iron rail and also by hold fasts bolted to the end double channel and fixed in the masonry of the side walls or the otherwise.

In case where the collapsible gate is not required to the lintal, beams or slop above, a tee iron suitably designed may be fixed at the top embedded in masonry and provided with necessary clamps and roller arrangement at the top.

All the adjoining work damage while fixing of gate shall be made good to match the existing work without any extra payment.

All the members of the collapsible gate including T-iron shall be thoroughly cleaned of rust, scals, dust etc. and given a priming coat or red lead, before fixing them in position.

**3.0. Mode of measurements and payment :**

3.1. The collapsible gate shall be measured in sq. metre. The height of the gate shall be measured as the length of double channels and breadth from outside to outside of the end fixed double channels in open position of the gate. The rate includes provoding handles, arrangements stoppers etc.

3.2. **The rate shall be for a unit of one sq. metre.**

**11.7. Providing and fixing 1 mm. thick M.S. sheet sliding shutters both frame and diagonal braces of 40 x 40 x 6 mm. Angle iron 3.15 mm. M.S. gusset at junctions and corners, 25 mm. dia. Pulley 40 x 40 x 6 mm. Angle and T – iron guide rail at top and bottom respectively with handles, stoppers and locking arrangements etc. including applying priming coat of red lead paint.**

**1.0. Materials :**

M.S. sliding shutters shall be fabricated to M.S. component as given in the description of item M.S. sheets 1 mm. thick shall be fixed to the frame with rivets of welds as approved. The shutters shall be provided with top and bottom guide rails of Angles or T-iron as specified and 25 mm. dia steel pulleys at the bottom guide black with steel pulleys at the top. The frame shall be riveted and / or welded and



wherever riveting shall be done 3.15 mm. gussest plates shall be provided at the junctions.

**2.0. Workmanship :**

- 2.1. The shutters shall be single or double leaf shutters as specified. The guide rails shall be sufficiently long and continued along the wall on the both ends so that the sliding shutters can rest against walls, living full opening when so required.
- 2.2. The guide rails shall be fixed to the floor by means of anchor bolts embedded in the cement concrete floor. The steel section at the top shall be suitably supported from the walls. Two channel section shall suitably fixed vertically below the extreme clamps in the wall and floor to avoid the shutters from going out of supports at the top and bottom. A suitable clamping arrangement will be provided at either end of the opening to avoid the shutters from rolling back into opening.
- 2.3. All the adjoining work damaged while fixing shall be made good to match the existing work.
- 2.4. All members of the sliding shutter including T-iron shall be thoroughly cleaned of rust, scales dust etc. and given a priming coat of red lead before fixing them in position.

**3.0. Mode of measurements and payment :**

- 3.1. The sliding doors shall be measured from outside to outside of the guide, rail and width outside to outside of shutters including vertical channels in sides. The rate includes providing handles, stoppers and locking arrangements etc. complete.
- 3.2. **The rate shall be for a unit of one sq.metre.**

**SECTION – 12**

**Labour for fixing fixtures & fastening**

**12.4 Fixing metallic tower bolts of sizes with necessary screws etc complete ( tower bolts and screws to be paid under separate items )**

**1.0 Workmanship :**

- 1.1 This item provides for labour for fixing metallic tower bolts of any size with screws, nuts etc.
- 1.2 The tower bolts shall be fixed in proper position as shown in the drawing or as directed. There shall be fixed truly vertical or horizontal as the case may be.
- 1.3 The screws shall be driven hom with screw driver. In no case the screws shall be hammered in.
- 1.4 All recesses and seats shall be cut to the exact size for counter sinking etc where so required.
- 1.5 Care shall be taken to see that no gaps are left between the fitting and the surface meant to receive the fittings.
- 1.6 The fittings shall be properly cleaned and left in original finish after fixing.

**2.0 Mode of measurements & payment :**

- 2.1.1. Cutting of holes, recesses, and seats involved in process of fixing.
- 2.1.2. Cost of filling and cushioning Materials : where so required for proper seating of new fittings.
- 2.1.3. Cost of nails etc for temporary positioning of fittings.
- 2.1.4. Cost of cleaning Materials : like old washed dhoti, stain remover, etc.
- 2.1.5. Cost of making good the over cut recesses or holes if any.
- 2.1.6. Cost of making hole required size on the wooden frame for housing the bolt for locking.



2.2. The rate includes cost of labour involved in all operations required for proper completion of the items, including carriage, handling fixing etc complete.

2.3 **The rate shall be for a unit of one number.**

**12.5 Fixing metallic flush bolts of size with necessary screws etc complete (flush bolts and screws shall be paid under separate items).**

**1.0 Workmanship :**

1.1 The relevant specifications shall be followed as per Item No. 12.4 except for fixing metallic flush bolts instead of tower bolts.

**2.0 Mode of measurements and payment :**

2.1 The relevant specifications of Item No. 12.4 shall be followed.

2.2 **The rate shall be for a unit of one number.**

**12.8 Fixing metallic tower bolts of sizes with necessary screws etc complete (tower bolts and screws to be paid under separate items)**

**1.0 Workmanship :**

1.1 The relevant specifications shall be followed as per Item No. 12.4 except fixing door handles instead of tower bolts.

**2.0 Mode of measurements & payment :**

2.1. The relevant specifications of Item No. 12.4 shall be followed.

2.2 **The rate shall be for a unit of one number.**

**12.10 Fixing metallic gate and shutter hooks and eyes of sized (hooks and eyes to be aid under separate items)**

**1.0 Workmanship :**

1.1 The relevant specifications shall be followed as per Item No. 12.4 except for fixing or eye and hooks instead of tower bolts.

**2.0 Mode of measurements and payment :**

2.1 The relevant specifications of Item No. 1.2.4 shall be followed.

2.2 The rate shall be for a unit of one number. (Hook & Eye)

**12.11 Fixing metallic door latches of zie with necessary screws (door latches and screws to be aid under separate items )**

**1.0 Workmanship :**

1.1 The relevant specifications of Item No. 12.4 shall be followed except that fixing metallic door latches instead of tower bolts.

**2.0 Mode of measurements and payment :**



- 2.1 The relevant specifications of Item No. 12.4 shall be followed.
- 2.2 **The rate shall be for a unit of one number.**
- 12.12 Fixing metallic mortise night latches with necessary screws including making necessary screws holes in wooden door shutters etc, complete (Mortise night latches and screws to be paid under separate items).**
- 1.0 **Workmanship :**
- 1.1 The relevant specifications of Item No. 12.4 shall be followed except that fixing metallic latches instead of tower bolts.
- 2.0 **Mode of measurements and payment :**
- 2.1 The relevant specifications of Item No. 12.4 shall be followed.
- 2.2 **The rate shall be for a unit of one number.**
- 12.18 Fixing metallic ball catchers 100 mm dia (Ball catchers to be paid under separate item)**
- 1.0 **Workmanship :**
- 1.1 The relevant specifications of Item No. 12.4 shall be followed same except fixing of ball catchers 100 mm dia.
- 2.0 **Mode of measurements and payment :**
- 2.1 The relevant specifications of Item No. 1.2.4 shall be followed.
- 2.2 **The rate shall be for a unit of one number.**
- 12.20 Fixing metallic casement window fasteners with necessary screws etc complete (Casement window fasteners and screws to be paid under separate items)**
- 1.0 **Workmanship :**
- 1.1 The relevant specifications of Item No. 12.4 shall be followed except metallic casement windows fasteners.
- 2.0 **Mode of measurements and payment :**
- 2.1 The relevant specifications of Item No. 12.4 shall be followed.
- 2.2 **The rate shall be for a unit of one number.**
- 12.21 Fixing metallic casement stays of sizes with necessary screws etc complete (Casement stays and screws to be paid under separate items)**
- 1.0 **Workmanship :**
- 1.1 The relevant specifications of Item No. 12.4 shall be followed except of metallic casement stays.
- 2.0 **Mode of measurements and payment :**
- 2.1 The relevant specifications of Item No. 12.4 shall be followed.
- 2.2 **The rate shall be for a unit of one number.**



**12.24 Fixing metallic cupboard of ward robe locks of sizes with necessary screws etc complete (Locks and screws to be aid separately)**

**1.0 Workmanship :**

1.1 The relevant specifications of Item No. 12.4 shall be followed except that fixing metallic cupboard or ward robe locks of size with necessary screws etc complete.

**2.0 Mode of measurements and payment :**

2.1 The relevant specifications of Item No. 12.4 shall be followed.

**2.2 The rate shall be for a unit of one number.**

**12.25 Fixing metallic or plastic cupboard or ward robe knobs of size with necessary screws / bolts etc (knobs and screws / bolts to be paid separately)**

**1.0 Workmanship :**

1.1 The relevant specifications of Item No. 12.4 shall be followed except that fixing metallic or plastic cupboard or ward robe knobs of sizes with necessary screws / bolts etc complete.

**2.0 Mode of measurements and payment :**

2.1 The relevant specifications of Item No. 12.4 shall be followed.

**2.2 The rate shall be for a unit of one number.**

**12.26 Fixing metallic floor door stoppers of sizes with rubber cushion, screws etc to suit shutter thickness complete. (Floor door stopper with rubber cushion and screws to be paid under separate items)**

**1.0 Workmanship :**

1.1 The relevant specifications of Item No. 12.4 shall be followed except that fixing metallic floor stoppers.

**2.0 Mode of measurements and payment :**

2.1 The relevant specifications of Item No. 12.4 shall be followed.

**2.2 The rate shall be for a unit of one number.**

**12.28 Fixing metallic door handles or knobs for mortise locks with necessary screws to be paid separately)**

**1.0 Workmanship :**

1.1 The relevant specifications of Item No. 12.4 shall be followed except that fixing metallic door handles or knobs for mortice with necessary screws etc complete.

**2.0 Mode of measurements and payment :**

2.1 The relevant specifications of Item No. 12.4 shall be followed.

**2.2 The rate shall be for a unit of one number.**



## SECTION – 13

### GLAZING

**13.1 [I] Providing and fixing sheet glass, selected quality (type-c) bedded in putty and fixed with wooden beading including cost of wooden beading of first class teak wood and necessary cutting of glass 5 m. thick.**

**1.0 Materials :**

The glass shall conform to M-38. the wood beading shall conform to M-29. Putty shall conform to I.S. 419-1967.

**2.0 Workmanship :**

The glass shall be sheet glass of selected quality of 5 mm thick.

2.1 The size of glass for glazing shall allow a clearance of 2.5 mm between the edges of glass and the wood or metal surrounds. The clearance may be increased, provided the depth of the rebate of groove is sufficient to provide not less than 1.5 m. cover to the glass. The detailed process of glazing shall be as specified in I.S. 3548-1966.

2.2 All stains from the surface of glass shall be removed and cleaned with thinner or spirit without any extra payment.

**2.3 Wooden beading :**

2.3.1 The size of the wood beads for glass panes shall be 1.5 x 3 cms unless other wise specified. Beads shall be secured to wooden frames with wither panels pins or screws and to metal frames in the way provided for in the frame.

2.3.2 Sufficient putty compound shall be applied to the rebate so that when the glass has been pressed into the rebate, a bed of compound not less than 1.5 mm thick will remain between the glass and the rebate. There should also be surplus of compound squeezed out above the rebate which should be stripped at an angle not undercut to prevent water accumulating. Beads should be bedded with compound against the glass and wood bead should also be bedded against the rebate. Care should be taken to see that no voids are left between the glass and the bead.

**3.0 Mode of measurements and payment :**

3.1 All measurements of cutting shall, unless otherwise stated, be held to include the consequent waste.

3.2 Each pane of glass shall be measured to the nearest 0.5 cms both in width and height / length.

3.3 Irregular shaped or circular panes shall be measured as the smallest rectangular area from which the irregular or circular pane can be cut.

3.4 The rate includes cost of Materials :, labour required for completion of the item including hoisting, carriage, temporary erections like scaffolding etc.

3.5 The rate also includes:

[i] The wastages and breakage involved in the process.

[ii] Straight cutting on glass and glazing sheets.

[iii] Cost of subsidiary Materials : required for proper fixing and functioning of glass i.e., nails, spirit putty, teak wood beading glass, pins etc complete.

**3.6 The rate shall be for a unit of sq. metre.**



**13.1 [II] Providing and fixing sheet glass selected quality (Type – C) bedded in putty and fixed with wooden beading including cost of wooden beadings of first class teak wood, and necessary cutting of glass 6 mm thick.**

**1.0 Materials & Workmanship :**

1.1 The relevant specifications of Item No.13.1 (I) shall be followed except that the sheet glass of selected quality shall be 6 mm thick.

**2.0 Mode of measurements and payment :**

2.1 The relevant specifications of Item No. 13.1 (I) shall be followed.

**2.2 The rate shall be for a unit of one sq. mtre.**

**13.3 [C] Providing and fixing rough cast wired glass 6 mm thick bedded in putty and fixed with wooden beading including the cost of wooden beadings of Indian teak wood and necessary cutting of glass wired figures glass.**

**1.0 Materials :**

Wire figure glass shall conform to M-38. Wooden beading shall conform to M-29. Putty shall conform to I.S 419-1969.

**2.0 Workmanship :**

1.1 The relevant specifications of Item No.13.1 (I) except that the sheet glass of ordinary quality shall be used and thickness of sheet glass shall be 3 mm thick.

**3.0 Mode of measurements and payment :**

3.1 The relevant specifications of Item No. 13.1 (I) shall be followed.

**3.2 The rate shall be for a unit of one sq. mtre.**

**13.5 [4] Providing and fixing sheet glass ordinary quality, bedded in putty and fixed with wooden beadings including the cost of wooden beadings of first class teak wood and necessary cutting of glass 4 mm thick.**

**1.0 Materials & Workmanship :**

The relevant specifications of item No. 13.5 (3) shall be followed, except that the thickness of ordinary sheet glass shall be 4 mm.

**2.0 Mode of measurements and payment :**

2.1 The relevant specifications of Item No.13.1 (I) shall be followed.

**2.2 The rate shall be for a unit of one sq. metre.**

**13.7 Extra for using ground glass (Frosted or obscured on one side) instead of plain glass.**

**1.0 Materials :**

Glass shall conform to M-38. Wooden beading shall conform to M-29. Putty shall confirm to I.S. 419-1967.

**2.0 Workmanship :**

The specification of this item shall be followed as per Item No. 13.1 except that ground glass (Frosted or obscured on one side) shall be used



**3.0 Mode of measurements and payment :**

3.1 The payment shall be made on sq. mt., basis extra over and above the payment for plain glass for using ground glass (Frosted or obscured).

3.2 The relevant specifications of Item No. 13.5 (III) shall be followed.

**3.3 The rate shall be for a unit of one sq. metre.**

**13.11 [A] Difference in cost of material and labour involved in method of glazings if changed in item No. 13.1 to front and back puttied and sprigged or fixed with glazing pins:**

**1.0 Materials & Workmanship :**

1.1 The relevant specifications of Item No. 13.1 (I) and 13.1 (II) shall be followed.

**2.0 Mode of measurements and payment :**

2.1 The relevant specifications of Item No. 13.1 (I) and 13.1 (II) shall be followed.

2.2 The extra rate for extra cost involved shall be paid over and above Item No. 13.1 (I) & 13.1 (II).

**2.3 The rate shall be for a unit of one sq. metre.**

**13.12 Grinding, polishing and round of edges glass or glazing sheets.**

**1.0 Materials :**

The glass shall conform to M-38.

**3.0 Workmanship :**

The edges of glass or glazing sheets shall be grind, polished and rounded of such that it renders uniform look throughout the length and shall be neatly finished. The work shall be carried out in best workman like manner.

**3.0 Mode of Measurement & Payment :**

3.1 The edges of glass round, polished and rounded off shall be measured in metre.

**3.1 The rate shall be for a unit of one running metre.**

**SECTION – 14**

**Paving & Floor Finishing**

**14.2 [A] 40 mm thick marble chips flooring rubbed and polished (i.e. Terrazzo) to granolithic finish with under layer 30 mm thick cement concrete (1:2:4) (1 cement : 2 coarse sand : 4 graded stone aggregate 10 mm and down gauge) and top layer, 10 mm nominal size laid in cement marble power mix 3:1 (3 cement : 1 marble powder by weight, in proportion of 4:7 (4 cement : 7 marble chips by volume) : Dark shade pigment with ordinary cement (in top layer only).**

**1.0 Materials :**

Water shall confirm to M-1. Cement shall confirm No. M-3. Sand shall confirm to M-6. Stone grit shall conform to M-8.





The pigment incorporated in terrazzo shall be of permanent colour and shall conform of requirement mentioned in Appendix – A in IS : 2114-1962. Marble chips shall conform to M-46. the marble powder shall pass through I.S. Sieve Terrozzo – 30.

## **2.0 Workmanship :**

2.1 Terrazzo finish shall be laid over a layer of base concrete in case of ground floor. When the terrazzo floor is laid over R.C.C. slabs a cushioning layer consisting of 75 mm thick lime concrete shall be provided below the terrazzo floor. The terrazzo flooring shall consist of an under layer of cement concrete and layer of terrazzo which shall be laid monolithically.

## **2.2 Under Layer :**

2.2.1 The under layer shall be of cement concrete mix 1:2:4. the maximum size of aggregate used shall not exceed 10 mm. Specification for cement concrete shall be followed as per Item No. 5.4.1.

## **2.3 Terrazzo Topping :**

2.3.1 The topping shall have mix of ordinary cement and marble powder in proportion 3:1 (3 cement : 1 marble powder by weight) and marble aggregate shall be mixed in proportion 4:7 (4 cement marble powder : 7 marble chips by volume). The thickness of concrete and cushioning layer shall not be less than 10 cm and 7.5 cms respectively. The minimum thickness of under layer and topping shall be 40 mm.

## **2.4 Panels :**

2.4.1 the floor both while laying the under layer and topping shall be divided into panales not exceeding 2 sq. m. in area so as to reduce the risk of cracking, due to differential shrinkage or expansion of terrazzo and sub-floor. The joints be so located that the layer dimensions of any panel do not exceed 2 M. the panels shall preferably be separated by means of dividing strips. However, where the butt joints are provided, the bays shall be laid alternatively allowing for an interval of atleast 24 hours between the laying of adjacent bays.

## **2.5 Mixing of Materials :**

2.5.1 With a view to avoid variation in colour, mixing shall be done in through or tub and the complete quantities of cement and pigments required for one unit shall be mixed at the beginning of the work. Colour cement or cement and pigment mix shall be dry mixed with marble powder. The mix thus obtained shall be mixed with aggregate. Care shall be taken not to get the Materials : into a heap as this would result in coarser aggregates moving on the sides and cement to the centre. To the dry mix thus prepared, water shall be added in small quantities while Materials : are being worked to get a mix of proper consistency. The mixture shall be plastic but not so wet as to flow. The wet mix shall be used within half an hour mix of addition of water during preparation laying.

## **2.6 Laying :**

2.6.1 The base shall be divided into panels with the help of dividing strips including the strips required for decorative design up to the finished surface level of the floor. Screed strips shall be used where the dividing strips are not used. The base shall be cleaned of all dust, dirt maintenance and any loose Materials : It shall be then wetted with water mopped and smeared with cement slurry at 2.75 kg. / sq. mt. Under layer shall be then be spread and leveled with a screeding board. The top surface shall be left rough to provide a good bond to the terrazzo.

2.6.2 The terrazzo topping shall be laid while the under layer is still plastic but has hardened enough to prevent cement from rising to the surface. This is normally achieved between 18 to 24 hours after laying of under layer. A cement slurry preferably of the same colour as the topping shall be brushed on the surface immediately before laying the topping. The terrazzo mix shall be laid to a uniform thickness on the screed bad and be completed thoroughly by taping or rolling and trowelled smooth. Excessive trowelling or rolling early stages shall be avoided as it results in working up cement to the surface which will produce a surface liable to cracking and will require more grinding to expose marble chips. The terrazzo surface shall be tamped, trowelled, and brought true to required level by a straight edge and steel floats in such a manner that



the maximum amount of marble chips come up and are spread uniform over the surface and no part of the surface is left without chips.

## **2.7 Curing :**

- 2.7.1 The surface shall be left dry for air curing for a period of 12 to 18 hours. Thereafter, water shall be allowed to stand overnight in pools for a period of a minimum of four days. The floor shall be prevented from being subjected to extreme temperature.

## **2.8 Grinding and finishing :**

- 2.8.1 Grinding and finishing shall be done either by hand or by machine. In case of manual grinding, the process of grinding shall begin after two days, while in case of machine grinding, the process shall be started after seven days, after completion of laying.
- 2.8.2 First grinding shall be done by carborundum stones of 60 grit size. The surface shall then be washed clean and grouted with a grout of cement or / and colouring matter in the same mix and proportion as the topping in order to fill any pin holes that appear. It shall be allowed to dry for 24 hours and wet cured for four days in the same manner as mentioned in para 2.7 above.
- 2.8.3 The second grinding shall be done with carborundum stone of 80 grit size. The surface shall then be prepared as after first grinding. The third grinding shall be done with carborundum stone of 120 to 150 grit size. The surface shall then be washed again and allowed to dry for 12 hours, and wet cured for four days as before. The fourth grinding shall be done with carborundum stone of 320 to 400 grit size. The surface shall again be washed clean and rubbed hard with felt and slightly moistened Oxalic acid powder @ 5 oxalic acid solution and dried for floor polishing, machine fitted with felt or session bobs shall then be run over it until floor shines. In case wax-polished surface is required, wax – polished shall be applied on the surface with the help of soft linen over a clean and dry surface. The polishing machine fitted with bobs shall be run over it, clean saw dust shall be spread over the floor surface and polishing machine again operated which will remove excess wax and leave glossy surface. Floor shall not be left slippery.

## **3.0 Mode of measurements and payment :**

- 3.1 Terrozzo flooring shall be measured as laid in sq. metres. Length and breadth shall be measured for visible area of work done. No deduction shall be made for nor extra for any opening in floor or area up to 0.10 sq. metre. The rate shall cover laying the floor at different levels in the same room or court – yard and nothing extra shall be paid on that account.
- 3.2 The rate includes the cost of all Materials : and labour involved in all operations described above. The rate shall also not include dividing strip.
- 3.3 **The rate shall be for a unit of one sq. metre.**

- 14.2 [B] **40 mm thick marble chips, flooring rubbed and polished (i.e., Terrozzo) to granolithic finish with under layer 30 mm thick cement concrete (1:2:4) (1 cement : 2 coarse sand : 4 graded stone aggregate 10 mm and down gauge) and top layer, 10 mm thick with white, black or white and black marble chips of required sizes from 1 mm to 4 mm nominal size laid in cement marble powder mix 3:1 (3 cement : 1 marble powder by weight) in proportion of 4:7 (4 cement : marble powder mix : 7 marble chips by volume): light shade pigment with white cement (in top layer only).**

## **1.0 Materials & Workmanship :**

- 1.1 The relevant specifications of Item No. 14.2 (A) shall be followed except that light shade pigment with white cement shall be used in top layer.

## **2.0 Mode of measurements and payment :**

- 2.1 The relevant specifications of Item No. 14.2 (A) shall be followed.



- 2.2 The rate shall be for a unit of one sq. metre.
- 14.2 [C] 40 mm thick marble chips, flooring rubbed and polished (i.e., Terrozzo) to granolithic finish with under layer 30 mm thick cement concrete (1:2:4) (1 cement : 2 coarse sand : 4 graded stone aggregate 10 mm and down gauge) and top layer, 10 mm thick with white, black or white and black marble chips of required sizes from 1 mm to 4 mm nominal size laid in cement marble powder mix 3:1 (3 cement : 1 marble powder by weight) in proportion of 4:7 (4 cement : marble powder mix : 7 marble chips by volume): medium shade pigment with approx. 50% white cement and 50% ordinary cement (in top layer only).
- 1.0 Materials & Workmanship :
- 1.1 The relevant specifications of Item No. 14.2 (A) shall be followed except that medium shade pigment with approx. 50% white cement and 50% ordinary cement in top layer only shall be used.
- 2.0 Mode of measurements and payment :
- 2.1 The relevant specifications of Item No. 14.2 (A) shall be followed.
- 2.2 The rate shall be for a unit of one sq. metre.
- 14.2 [D] 40 mm thick marble chips, flooring rubbed and polished (i.e., Terrozzo) to granolithic finish with under layer 30 mm thick cement concrete (1:2:4) (1 cement : 2 coarse sand : 4 graded stone aggregate 10 mm and down gauge) and top layer, 10 mm thick with white, black or white and black marble chips of required sizes from 1 mm to 4 mm nominal size laid in cement marble powder mix 3:1 (3 cement : 1 marble powder by weight) in proportion of 4:7 (4 cement : marble powder mix : 7 marble chips by volume): white cement without any pigment (in top layer only).
- 1.0 Materials & Workmanship :
- 1.1 The relevant specifications of Item No. 14.2 (A) shall be followed except that white cement without any pigment in top only shall be used.
- 2.0 Mode of measurements and payment :
- 2.1 The relevant specifications of Item No. 14.2 (A) shall be followed.
- 2.2 The rate shall be for a unit of one sq. metre.
- 14.2 [E] 40 mm thick marble chips, flooring rubbed and polished (i.e., Terrozzo) to granolithic finish with under layer 30 mm thick cement concrete (1:2:4) (1 cement : 2 coarse sand : 4 graded stone aggregate 10 mm and down gauge) and top layer, 10 mm size laid in cement marble powder mix 3:1 (3 cement : 1 marble powder by weight) in proportion of 4:7 (4 cement : marble powder mix : 7 marble chips by volume): light shade pigment with ordinary cement (in top layer only).
- 1.0 Materials & Workmanship :
- 1.1 The relevant specifications of Item No. 14.2 (A) shall be followed except that light shade pigment with ordinary cement (in top layer only) shall be used.
- 2.0 Mode of measurements and payment :
- 2.1 The relevant specifications of Item No. 14.2 (A) shall be followed.
- 2.2 The rate shall be for a unit of one sq. metre.
- 14.4 [A] Marble chips skirting (Terrozzo) or dedo rubbed and polished to granolithic finish top layer 6 mm thick with white black or white and black marble chips of sizes from smallest of 4 mm nominal



size laid in cement marble powder mix 3:1 (3 cement : 1 marble powder by weight) in proportion of 4:7 (4 cement : marble powder mix : 7 marble chips by volume): 20 mm thick with under layer 14 mm thick in cement plaster 1:3 (1 cement : 3 coarse sand) : Dark shade pigment with ordinary cement (in top layer only).

**1.0 Materials :**

1.1 The relevant specifications of Item No. 14.2 (A) shall be followed.

**2.0 Workmanship :**

2.1 Under layer : The under layer for terrazzo on vertical surfaces like skirting and dedos shall be of stiff cement mortar 1:3 (1 cement : 3 coarse sand) finished rough so as to give as to give a good bond to the topping.

2.2 Tarozzo topping shall not less than 6 mm thick and the combined thickness of under layer and topping shall be not less than 20 mm. The other details shall be of allowed same as per specifications of its No. C 24 except that the light shade pigment with white cement in top layers shall be used.

**3.0 Mode of measurements and payment :**

3.1 The skirting and dedo shall be measured in square metres correct to two places of decimals. The height shall be measured from the finished level of floor.

3.2 **The rate shall be for a unit of one sq. metre.**

**14.4 [B] Marble chips skirting (Terrozzo) or dedo rubbed and polished to granolithic finish top layer 6 mm thick with white, black or white and black marble chips of sizes from smallest of 4 mm nominal size laid in cement marble powder mix 3:1 (3 cement : 1 marble powder by weight) in proportion of 4:7 (4 cement : marble powder mix : 7 marble chips by volume): 20 mm thick with under layer 14 mm thick in cement plaster 1:3 (1 cement : 3 coarse sand) : light shade pigment with ordinary cement (in top layer only).**

**1.0 Materials & Workmanship :**

1.1 The relevant specifications of Item No. 14.4 (A) shall be followed except that the light shade pigment with white cement in top layers only shall be used.

**2.0 Mode of measurements and payment :**

2.1 The relevant specifications of Item No. 14.4 (A) shall be followed.

2.2 **The rate shall be for a unit of one sq. metre.**

**14.4 [C] Marble chips skirting (Terrozzo) or dedo rubbed and polished to granolithic finish top layer 6 mm thick with white, black or white and black marble chips of sizes from smallest of 4 mm nominal size laid in cement marble powder mix 3:1 (3 cement : 1 marble powder by weight) in proportion of 4:7 (4 cement : marble powder mix : 7 marble chips by volume): 20 mm thick with under layer 14 mm thick in cement plaster 1:3 (1 cement : 3 coarse sand) : medium shade pigment with approximate 50% white cement and 50% ordinary cement (in top layer only).**

**1.0 Materials & Workmanship :**

1.1 The relevant specifications of Item No. 14.4 (A) shall be followed except that the medium shade pigment with approximate 50% white cement and 50% ordinary cement in top layers only shall be used.

**2.0 Mode of measurements and payment :**



2.1 The relevant specifications of Item No. 14.4 (A) shall be followed.

2.2 **The rate shall be for a unit of one sq. metre.**

**14.4 [D] Marble chips skirting (Terrozzo) or dedo rubbed and polished to granolithic finish top layer 6 mm thick with white, black or white and black marble chips of sizes from smallest of 4 mm nominal size laid in cement marble powder mix 3:1 (3 cement : 1 marble powder by weight) in proportion of 4:7 (4 cement : marble powder mix : 7 marble chips by volume): 20 mm thick with under layer 14 mm thick in cement plaster 1:3 (1 cement : 3 coarse sand) : light shade pigment with ordinary cement (in top layer only).**

**1.0 Materials & Workmanship :**

1.1 The relevant specifications of Item No. 14.4 (A) shall be followed except that the light shade pigment with white cement in top layers only shall be used.

**2.0 Mode of measurements and payment :**

2.1 The relevant specifications of Item No. 14.4 (A) shall be followed.

2.2 The rate shall be for a unit of one sq. metre.

**14.4 [E] Marble chips skirting (Terrozzo) or dedo rubbed and polished to granolithic finish top layer 6 mm thick with white, black or white and black marble chips of sizes from smallest of 4 mm nominal size laid in cement marble powder mix 3:1 (3 cement : 1 marble powder by weight) in proportion of 4:7 (4 cement : marble powder mix : 7 marble chips by volume): 20 mm thick with under layer 14 mm thick in cement plaster 1:3 (1 cement : 3 coarse sand) : light shade pigment with ordinary cement (in top layer only).**

**1.0 Materials & Workmanship :**

1.1 The relevant specifications of Item No. 14.4 (A) shall be followed except that the light shade pigment with white cement in top layers only shall be used.

**2.0 Mode of measurements and payment :**

2.1 The relevant specifications of Item No. 14.4 (A) shall be followed and except that the light shade pigment with ordinary cement in top layers only shall be used.

2.2 The rate shall be for a unit of one sq. metre.

**14.16 Providing and laying cushioning layer on R.C.C. slab consisting of 75 mm thick lime concrete using brick aggregate of 20 mm nominal size 50% mortar comprising of 1 lime : 2 fine sand.**

**1.0 Materials :**

1.1 Water shall conform to M-1. Lime mortar of proportion 1:2 shall conform to M-10. Brick aggregate 20 mm nominal size shall conform to M-14.

**2.0 Workmanship :**

2.1 The relevant specification of Item No. 5.1.8 shall be followed except that the proportion of mix shall be 50% mortar comprising of 1 lime : 2 coarse sand and the size of brick aggregate shall be 20 mm nominal size. The lime concrete work shall be carried out in 7.5 cms average thickness as a cushioning layer on R.C.C. slab.

**3.0 Mode of measurements and payment :**

3.1 The lime concrete work shall be measured for visible area of work done.



3.2 **The rate shall be for a unit of one sq. metre.**

14.19 [A] **Precast terrazzo (Mosaic) tiles 20 mm thick with white, black or white and black marble chips of sizes up to 6 mm laid in floors, treads of steps and landings on a bed of 25 mm average thickness of lime mortar 1: 1.5 (1 lime putty : 1.5 fine sand) or C.M. 1:6 jointed with neat cement slurry mixed with pigment to match the shade of the tiles including rubbing and polishing complete with precast tiles of light shades, using white cement.**

**1.0 Materials :**

1.1 Water shall conform to M-1. Cement shall conform to M-3. Lime mortar shall conform to M-10. Cement mortar shall conform to M-1. the precast terrazzo tiles of 20 mm. thick shall be of light shade using white cement and conform to M-47.

**2.0 Workmanship :**

2.1 The work shall be carried out as per I.S. 1443 – 1972.

**2.2 Bedding :**

2.2.1 Before spreading the mortar, the sub-base of the floor shall be cleaned of all dirt. Scum and loose Materials : and then well wetted without forming any pools of water on the surface.

2.2.2 In case of R.C.C. floors, the top shall be left a little rough, all points of level for the finished surface shall be marked out. The lime mortar of proportion 1:1.54 (a lime putty : 1.5 fine sand) or cement mortar of proportion C.M. 1 : as directed shall be then evenly and smoothly spread over the base. Bedding layer of mortar shall be not less than 10 mm and average thickness of bedding shall be 25 mm.

**2.3 Laying :**

2.3.1 Before laying the terrazzo (Marble Mosaic) tiles, the tiles shall be thoroughly wetted with water. Neat cement grout of required consistency at 4.4 kg cement / sq. mt., shall be spread on the mortar bed. The tiles shall be laid on the neat cement float and shall be evenly and firmly bedded to the required level and slope. There shall be no hollows left. The joints shall be of uniform thickness and in straight line as per the pattern.

2.3.2 The surface of flooring shall be checked frequently with a straight edge at-least two metres long so as to obtain a true surface with required slope.

2.3.3 The tiles which are fixed in the floor adjoining the wall shall go about 10 mm under plaster. Skirting or dado shall be left unfinished for about 50 mm above finished floor level and unfinished strip then left earlier shall be finished.

2.3.4 In places where full tiles cannot be fixed, the tiles shall be cut of the size and smoothed at edges to give straight and true joints.

2.3.5 After the tiles have been laid, the surplus cement slurry and the joints shall be cleaned and washed fairly deep before cement hardens.

2.3.6 The day after tiles have been laid the joints shall be cleaned of grey cement grout with a wire brush to a depth of about 5 mm and then grouted with white cement with or without pigment to match the shade of the topping of tiles. The same cement slurry shall then be spread over the whole surface in a thin coat to protect the surface from abrasive damage and to fill pin holes that may exist on the surface.

2.4.1 The flooring shall be kept wet with damp sand or water for seven days. It shall be kept undisturbed at least for 14 days. The grinding shall normally be commenced after 14 days.

**2.5 Polishing :**



- 2.5.1 After the tiles are properly cured, first grinding shall be done with carborundum stone of 48 to 60 grade grit fitted in machine. Water shall be properly used during grinding. When the chips show up and the floor has been uniformly rubbed, it shall be cleaned with water, baring all pin holes. It shall then be covered with a thin coat of white cement mixed with or without pigments to match the colour of the topping of the tiles. In holes if any shall thus be filled. This grout shall be kept moist for a week. Thereafter second grinding shall be started with carborundum of 120 grit. Grouting and curing shall follow again. Final grinding shall be done when other works are finished. The machine shall be fitted with carborundum of grit 220 to 350 using water in abundance. The floor shall then be washed clean with water. Oxalic acid powder shall then be dusted at 33 grams per square metre on the surface and the surface rubbed with machine fitted with Hessian bobs or rubbed hard with pad of woolen rags. The floor shall then be washed clean and dried with a soft cloth or linen. The finished floor shall not sound hollow when tapped with mallet.
- 2.5.2 If any tile is disturbed or damaged it shall be refitted or replaced properly jointed and polished.
- 2.5.3 Testing of the tiles shall be carried out by the contractor at his own cost as per IS requirement for required tests.

### **3.0 Mode of measurements and payment :**

- 3.1 The terrazzo tiles flooring shall be measured in sq. metre for visible area of work done.
- 3.2 No deductions shall be made nor extra paid for any opening in the floor area up to 0.1 sq. mt. Nothing extra shall be paid for use of cut tiles or for laying the floors at different levels in the same room or court yard. Mosaic tiles laid in floor borders and bands etc shall be measured in the same item and noting extra shall be payable on account of these or similar bonds formed of half or multiples of half size, standard tiles or other uncut tiles.
- 3.3 The treads of stairs and steps paved with tiles without nosing shall also be measured under this item.
- 3.4 Extra rate shall however be paid for such area where width of treads does not exceed 30 cms.
- 3.5 The rate shall include the cost of all Materials :, labour involved in all the operations as described above.
- 3.6 The rate shall be for a unit of one sq. metre.

**14.19 [B] Precast terrazzo Mosaic tiles 20 mm thick with white, black or white and black marble chips of sizes up to 6 mm laid in floors, treads of steps and landings on a bed of 25 mm average thickness of lime mortar 1 : 1.5 (1 lime putty : 1.5 fine sand) or C.M. 1:6 jointed with neat cement slurry mixed with pigment to match the shade of the tiles including rubbing and polishing complete with precast tiles of dark shades, using white cement.**

### **1.0 Materials & Workmanship :**

- 1.1 The relevant specifications of Item No. 14.19 (A) shall be followed except that the precast tiles shall be of dark shade using ordinary Portland cement.

### **2.0 Mode of measurements and payment :**

- 2.1 The Mode of measurements and payment : shall be same as Item No. 14.19 (A).
- 2.2 **The rate shall be for a unit of one sq. metre.**

**14.21 [A] Precast terrazzo (Marble Mosaic) tiles 20 mm thick with marble chips of size up to 6 mm laid in skirting and risers of steps not exceeding 30 cms in height on 10 mm thick cement plaster 1:3 (1 cement : 3 coarse sand) jointed with neat cement slurry including rubbing and polishing complete with tiles of light shades using white cement.**

### **1.0 Materials :**



Water shall conform to M-1. Cement mortar shall conform to M-11. the recast terrazzo (Marble / Mosaic) tiles of light shades using white cement tiles 20 mm thick shall conform to M-47.

**2.0 Workmanship :**

**2.1 Laying :**

The work shall be carried out for skirting or dedo. Before fixing recast terrazzo (Mosaic marble) tiles of shade and size as specified, the surface shall be prepared by heavy scarping, making joints etc to the required line, level and plumb. The surface shall be thoroughly wetted before commencing the laying work. There after about 10 mm thick backing of cement mortar in specified proportion shall be applied on the surface in true line and level generally as per specifications of plaster item.

**2.2 Fixing :**

The back of each tile to be fixed shall be smeared with cement paste of matching colour and the mosaic tiles shall then be gently tapped against the surface with a wooden mallet. The skirting shall be done only after the flooring is completed. Any pipes coming out of the wall through the dedo or skirting shall only be at the inter section of the horizontal and vertical joints. The tiles shall not have staggered joints. The joints shall be true to entire line both ways and vertical joints shall be in line with joints or flooring. Tiles shall be fixed as close as possible to the adjoining tiles and any difference in the thickness of the mosaic tiles shall be evened out in the cement paste so that all the tiles faces are set in conformity with one another. The skirting shall project uniformly and not more than 6 mm thickness beyond the finished surface above. Top of skirting or dedo shall be truly horizontal. The risers of steps, skirting or dedo shall rest on top of treads of flooring. Wherever required the tiles shall be cut (sawn) and thin edges smoothed before use.

**2.3 Curing :**

Curing shall be done for 7 days continuously.

**2.4 Finishing :**

Skirting and dedo shall be hand polished to have an even smooth and shining surface. In case of skirting only 10 mm x 10 mm groove shall be provided at the junction of cement plaster and cement tiles.

**3.0 Mode of measurements and payment :**

3.1 The terrazzo tiles with light shade using white cement base shall be paid under this item. The length shall be measured along finished surface of the riser, skirting or dedo, correct to a centimeter height measured from finished level of treads, or floor to the top (under side of treads in case of steps).

3.2 The rate shall include all Materials : and labour required for all the operations involved and described above.

3.3 **The rate shall be for a unit of one sq. metre.**

**14.21 [B] Precast terrazzo tiles 20 mm thick with marble chips of size up to 6 mm laid in skirting and risers of steps not exceeding 30 cms in height on 10 mm thick cement plaster 1:3 (1 cement : 3 coarse sand) jointing with neat cement slurry including rubbing and polishing complete with tiles of medium shades using approximately 50% white cement and 50 % ordinary cement.**

**1.0 Materials & Workmanship :**

1.1 The relevant specifications of Item No. 14.21 (A) shall be followed except that the tiles of dark shade using Portland cement shall be used.

**2.0 Mode of measurements and payment :**

2.1 The Mode of measurements and payment : shall be followed as per Item No. 14.21 (A)





2.2 The rate shall be for a unit of one sq. metre.

**14.21 [C] Precast terrazzo tiles 20 mm thick with marble chips of size up to 6 mm laid in skirting and risers of steps not exceeding 30 cms in height on 10 mm thick cement plaster 1:3 (1 cement : 3 coarse sand) jointing with neat cement slurry including rubbing and polishing complete with tiles of dark shades using ordinary cement.**

**1.0 Materials & Workmanship :**

1.1 The relevant specifications of Item No. 14.21 (A) shall be followed except that the tiles of dark shade using Portland cement shall be used.

**2.0 Mode of measurements and payment :**

2.1 The Mode of measurements and payment : shall be followed as per Item No. 14.21 (A)

2.2 The rate shall be for a unit of one sq. metre.

**14.25 [A] Chequered terrazzo tiles 25 mm thick with marble chips of sizes of up to 6 mm in floor on 25 mm thick bed of lime mortar 1:1.5 (a lime putty : 1.5 coarse sand) or C.M. 1:6 jointed with neat cement slurry mixed with pigment to match the shade of the tiles including rubbing and polishing etc complete light shade using white cement.**

1.0 Materials : water shall conform to M-1. White cement shall conform to M-4. Lime mortar of proportion 1:1.5 shall conform to M-10. Cement mortar shall conform to M-11. Chequered tiles shall conform to M-47.D.

**2.0 Workmanship :**

2.1 The relevant specifications of Item No. 14.21 (A) shall be followed except that chequered tiles of light shade using white cement shall be used.

**3.0 Mode of measurements and payment :**

3.1 The relevant specifications of Item No. 14.21 (A) shall be followed.

3.2 **The rate shall be for a unit of one sq. metre.**

**14.25 [B] Chequered terrazzo tiles 25 mm thick with marble chips of sizes of up to 6 mm in floor on 25 mm thick bed of lime mortar 1:1.5 (a lime putty : 1.5 coarse sand) or C.M. 1:6 jointed with neat cement slurry mixed with pigment to match the shade of the tiles including rubbing and polishing etc complete: Dark shade using white cement.**

**1.0 Materials & Workmanship :**

1.1 The relevant specifications of Item No. 14.21 (A) shall be followed except that chequered tiles of dark shade using white cement shall be used.

**2.0 Mode of measurements and payment :**

2.1 The relevant specifications of Item No. 14.21 (A) shall be followed.

2.2 **The rate shall be for a unit of one sq. metre.**

**14.25 [C] Chequered terrazzo tiles 25 mm thick with marble chips of sizes of up to 6 mm in floor on 25 mm thick bed of lime mortar 1:1.5 (a lime putty : 1.5 coarse sand) or C.M. 1:6 jointed with neat cement slurry mixed with pigment to match the shade of the tiles including rubbing and polishing etc complete: Dark shade using white cement.**



**1.0 Materials & Workmanship :**

1.1 The relevant specifications of Item No. 14.25 (A) shall be followed except that chequered tiles of dark shade using white cement shall be used.

**2.0 Mode of measurements and payment :**

2.1 The relevant specifications of Item No. 14.25 (A) shall be followed.

2.2 **The rate shall be for a unit of one sq. metre.**

**14.27 [A] Chequered terrazzo tiles 28 mm thick with marble chips of sizes up to 6 mm in treads of stairs and staircases in 12 mm thick bed of lime mortar 1:1.5 coarse sand) or C.M. 1:6 jointed with neat cement slurry mixed with pigment to match the shade of the tiles including rubbing and polishing etc complete, light shade using white cement.**

**1.0 Materials :**

1.1 The relevant specifications of Item No. 14.25 (A) shall be followed except that chequered tiles 28 mm of light shade using white cement shall be used in treads, stair cases etc.

**2.0 Mode of measurements and payment :**

2.1 The relevant specifications of Item No. 14.25 (A) shall be followed.

2.2 **The rate shall be for a unit of one sq. metre.**

**14.27 [B] Chequered terrazzo tiles 28 mm thick with marble chips of sizes up to 6 mm in treads of stairs and staircases in 12 mm thick bed of lime mortar 1:1.5 coarse sand) or C.M. 1:6 jointed with neat cement slurry mixed with pigment to match the shade of the tiles including rubbing and polishing etc complete: Medium shade using approximately 50% white cement and 50% ordinary cement.**

**1.0 Materials :**

1.1 The relevant specifications of Item No. 14.25 (A) shall be followed except that chequered tiles 28 mm thick of medium shade using approximately 50% white cement and 50% ordinary cement shall be used in treads, stair cases etc.

**2.0 Mode of measurements and payment :**

3.1 The relevant specifications of Item No. 14.25 (A) shall be followed.

3.2 **The rate shall be for a unit of one sq. metre.**

**14.27 [C] Chequered terrazzo tiles 28 mm thick with marble chips of sizes up to 6 mm in treads of stairs and staircases in 12 mm thick bed of lime mortar 1:1.5 (1 Lime putty : 1.5 coarse sand) or C.M. 1:6 jointed with neat cement slurry mixed with pigment to match the shade of tiles including rubbing and polishing complete: Dark shade using ordinary cement.**

**1.0 Materials :**

1.1 The relevant specifications of Item No. 14.25 (A) shall be followed except that chequered tiles 28 mm thick of dark shade using ordinary cement shall be used in treads, stair cases etc.

**2.0 Mode of measurements and payment :**



2.1 The relevant specifications of Item No. 14.25 (A) shall be followed.

2.2 **The rate shall be for a unit of one sq. metre.**

**14.29 White glazed tiles 6 mm thick in flooring, treads of steps and landings laid on a bed of 12 mm thick cement mortar 1:3 (1 cement : 3 coarse sand) finished with flush pointing in white cement.**

**1.0 Materials :**

Water shall conform to M-1. Cement mortar shall conform to M-11. White glazed tiles shall conform to M-55.

**2.0 Workmanship :**

2.1.1 The subgrade shall be cleaned, wetted and mopped. The bedding shall then be laid evenly over the surface tamped and corrected to desired level and allowed to harden enough to offer a rigid cushion to tiles and to enable the mason to place wooden planks across and squat on it.

2.1.2 The white glazed tiles shall be laid on cement mortar bedding of 12 mm thick in C.M. 1:3 The mortar shall have sufficient plasticity for laying and there be no hard lumps that would interfere with the evenness of bedding. The base shall be cleared and well wetted. The mortar shall then be spread in thickness not less than 10 mm at any place and average 12 mm thickness. The proportion of the cement mortar shall be as specified in the item.

**2.2 Fixing tiles:**

2.2.1 The tiles before laying shall be soaked in water for atleast two hours. Neat gray cement grout at 33 kg. cement / sq. mt., of honey like consistency shall be spread over the mortar bedding as directed. The edges of the tiles shall be smeared with neat cement slurry. The tiles shall be well pressed and gently tapped with a wooden mallet till they are properly bedded and in level with the adjoining tiles. There shall be no hollows in bed or joints. The joints between the tiles shall be as possible in straight line or as per pattern.

2.2.2 The tiles shall not have staggered joints. The joints shall be true to centre line both ways. The Nehani trap corning in the flooring shall be so positioned that its grating shall be cut (Swan) to the required size and the edges rubbed smooth to ensure straight and true joints. The joints shall be filled with grey cement grout with wire brush or trowel to a depth of 5 mm and loose material removed. White cement shall be used for pointing the joints. After fixing the tiles finally in an even plane the flooring shall be kept wet and allowed to nature undisturbed for 7 days.

**2.3 Cleaning :**

2.3.1 The surplus cement grout that may have come out of the joints shall be cleaned off before its sets. Once the floor has set, it shall be carefully washed, cleared by dilute acid and dried. Proper precautions and measures shall be taken to ensure that the tiles are not damaged in any way till the completion of the construction.

**3.0 Mode of measurements and payment :**

3.1 The work done shall be measured in sq. mt., for visible area of work done. The length and width of the flooring shall be measured not between the faces of skirting or dedos or plastered face of wall as the case may be. The paving under dedo or skirting shall not be measured. No deduction shall be made nor extra paid for any opening in the floor of area up to 0.1 sq. mt. Nothing extra shall be paid for laying the floors at different levels in the same rooms.

3.2 **The rate shall be for a unit of one sq. metre.**

**14.32 White glazed tiles 6 mm thick in skirting, risers of steps and dedo on 10 mm thick cement plaster 1:3 (1 cement : 3 coarse sand) and jointed with white cement slurry.**

**1.0 Materials :**



Water shall conform to M-1. Cement mortar shall conform to M-11. White glazed tiles shall conform to M-55.

## **2.0 Workmanship :**

### **2.1 Preparation of Surface :**

In case of brick masonry wall, the joints shall be raked out to a depth of atleast 15 mm while the masonry is being laid. In case of concrete wall the surface shall be chiseled and roughened with wire brushes. The surface shall be cleaned and wetted thoroughly before commencing the laying work.

### **2.2 Laying :**

- 2.2.1 The wall surface shall be covered with 10 mm thick plaster of cement mortar 1:3 mix and allowed to harden. The plaster shall be roughened with wire brushes both way. The back of tiles shall be floated with grey cement slurry and edges with white cement slurry set in bedding mortar. The tiles shall be gently tapped in position one after the other keeping the joints as thin as possible. Top of skirting or dedo shall be truly horizontal and the joints vertical or as per required pattern.
- 2.2.2 Risers of steps, skirting and dedo shall rest on top of treads or flooring. Where full size tiles cannot be fixed, they shall be cut to the required size and the edges be smoothed.
- 2.2.3 The joints shall be cleaned and flush pointed with white cement. The surface shall be kept wet for seven days. After curing the surface shall be washed clean.

### **3.0 Mode of measurements and payment :**

- 3.1 The rates shall include the cost of all material and labour required for various operations described above. Risers of steps, skirting and dedo shall be measured in square metres. Length and height shall be measured along the finished face of the skirting or dedo including curves, where special such as covers, internal and external angles, etc used. The length and height shall be measured correct of the centimeter except in case of risers and skirting where height shall be measured correct to 3 mm.

### **3.2 The rate shall be for a unit of one sq. metre.**

## **14.34 Providing and fixing 50 mm internal or external angles of white glazed tiles.**

### **1.0 Materials :**

Water shall conform to M-1. Cement mortar shall conform M-11. Glazed tiles shall conform to M-55.

### **2.0 Workmanship :**

- 2.1 The relevant specifications of Items 14.32 shall be followed except that the internal or external angles of glazed tiles shall be of thickness not less than the tiles with which they are used. The fixing shall be done as per directions.

### **3.0 Mode of measurements and payment :**

- 3.1 Rate shall be including the cost of Materials : and labour involved in the all the operations described above. Internal or external angles of glazed tiles shall be measured in running metres correct up to a centimeter, length being measured on the exposed face of the special at its centre line. No extra payment shall be made for corner places at angles junctions of cover beds and cornices for using cut length of special.

### **3.2 The rate shall be for a unit of one sq. metre.**



**14.36 [A] Providing and laying marble stone slab flooring over 20 mm (Average) base of cement mortar 1:6 (1 cement : 6 coarse sand) or L.M. 1:1.5 laid and jointed with grey cement slurry including rubbing and polishing complete : Marble slab 25 mm thick.**

**1.0 Materials :**

Water shall conform to M-. Cement mortar shall conform M-11. Marble stone slab 25 mm thick shall conform to M-51.

**2.0 Workmanship :**

**2.1 Dressing of slabs:**

Every stone shall be cut or required size and line chisel dressed to give a smooth and even surface on all sides to full depth. A straight edge laid along the sides of the stone shall be fully in contact with it. Chisel dressing shall also be done on top surface to remove any waviness. This sides and top surface of marble slabs shall be machine rubbed or table rubbed with coarse sand before using. All angles and edges of slabs shall be true, square and free from chippings.

2.2 The thickness of stone shall be 25 mm. the allowable tolerance shall be 2 mm allowable. The tolerance shall + 5 mm in length and breadth.

**2.3 Bedding:**

Bedding or marble slabs shall either be lime mortar 1:1.5 (1 Lime putty: 1.5 coarse sand) or cement mortar 1:6 (1 cement : 6 coarse sand) or average thickness 20 mm thick as given in description of item. Minimum thickness at any place shall not be less than 10 mm.

**2.5 Laying:**

The surface of sub-grade shall be cleared, wetted and mopped. Mortar of specified mix and thickness shall then be spread on an area sufficient to receive one marble slab. The slab shall be washed clean before laying. It shall be laid on top pressed and tapped gently to bring it in level with other slabs. It shall then be lifted and laid a side. The top surface of the mortar shall then be corrected by, adding fresh mortar at hollows, or depressions. The mortar shall then be allowed to harden it over this surface cement slurry of honey like consistency at 4.4 kg. of cement per sq. metre. The edges of slabs already paved shall be butter with grey cement. The slab shall then be gently placed in position and tapped with wooden mallet till it is properly bedded in level with and close to the adjoining slab. The slab fixed in the floor adjoining the walls shall enter not less than 10 mm under the plaster skirting or dedo. The junction between the walls and floors shall be finished neatly. The finished surface shall be true to level and slopes as directed.

**2.6 Curing:**

The floor shall be cured for a minimum period of seven days.

**2.7 Polishing and finished:**

Unevenness at the meeting edges of slab shall be removed by line chiseling. Finishing etc shall be done as per relevant specifications of Item No.14.21 (A) of terrazzo tiles flooring except that cement slurry with / or without pigments shall not be applied on the surface before each polishing.

**3.0 Mode of measurements and payment :**

3.1 Marble stone flooring with various kinds of marble shall be measured in sq. metre. The length and breadth shall be measured between the finished face of skirting or dedo or wall plaster. No deduction shall be made nor extra shall be paid for any opening in the floor of area up to 0.05 sq. mt. Nothing extra shall be paid for laying stone at different levels in the same room. Treads and steps of stairs paved with marble stone slabs shall also be measured under flooring.

3.2 **The rate shall be for a unit of one sq. metre.**



**14.43 [A] Kota stone slab (Polished, Green colour) flooring over 20 mm (average) thick base of cement mortar 1:6 (1 cement : 6 coarse sand) or lime mortar 1:1.5 laid over and jointed with grey cement slurry including rubbing and polishing complete 25 mm thick.**

**1.0 Materials :**

1.1 Water shall conform to M-1. Lime mortar shall conform to M-10. Cement mortar shall conform to M-11. Polished kota stone shall conform to M-49.

**2.0 Workmanship :**

2.1 Each slab shall be cut to the required size and shape and fine chisel dressed at all the edges. The sides thus dressed shall have a full contact if a straight edge is laid along. The sides shall be table rubbed with coarse sand before paving. All angles and edges of the slabs shall be true square and free from chippings and giving a plane surface. The thickness shall be 25 mm (Average) as specified in the item but not less than 20 mm at any place of the slab.

2.2 Bedding for the Kota stone slabs shall be cement mortar 1:6 (1 cement : 6 coarse sand) or L. M. 1:1.5 of average thickness 20 mm as given in the description of the item. Sub grade shall be cleaned, wetted and mopped. Mortar of the specified mix and thickness shall then be spread on an area sufficient to receive one Kota stone slab. The slab shall be washed clean before laying. It shall be laid on to, pressed, tapped gently to bring it in level with the other slabs. It shall then be lifted and laid aside. Top surface of the mortar shall then be corrected by adding fresh mortar at hollows or depressions. The mortar shall then be allowed to harden bit. Over this surface, cement slurry of boney-like consistency shall be applied. The slab shall be gently placed in position and tapped with wooden mallet till it is properly padded in level with and close to the adjoining slab. The joint shall be as fine as possible. The slabs fixed in the floor adjoining the walls shall enter not less than 10 mm under the plaster, skirting or dedo. The junction between the wall and floor shall be finished neatly. The finished surface shall be true to levels and slopes as directed.

2.3 The floor shall be kept wet for a minimum period of 7 days so that bedding and joints set properly.

2.4 Polishing shall be normally commenced after 14 days of laying the stone slab. First polishing shall be done with carborundum stones of 120 grade grit fitted in the heavy machine and then second polishing shall be done with carborundum stones of 220 to 350 grade grit fitted in heavy machine. Water shall be properly used during polishing. The stone shall then be washed clean with water. When directed by the Engineer-in-charge, wax polish of approved quality shall be applied on the surface with the helps of soft cloth over a clean and dry surface. Then the polishing machine fitted with bobs shall be run over it.

2.5 The holes required for Nahni traps, pipes and any other fittings shall be made without any extra cost.

**3.0 Mode of measurements and payment :**

3.1 The rate shall include the cost of all Materials : and labour involved in all the operations described above. The Kota stone flooring shall be measured in square metres correct to two places of decimal, length and breadth shall be measured correct to a centimeter and between the finished face of skirting dedo or wall plaster and no deduction shall be made nor extra paid for any opening in floor of areas up to 0.1 sq. mt.

3.2 **The rate shall be for a unit of one sq. metre.**

**14.43 [B] Kota stone slab flooring over 20 mm (average) thick base of cement mortar 1:6 (1 cement : 6 coarse sand) or L. M. 1.5 laid over and jointed with grey cement slurry including and polishing complete : 30 mm thick.**

**1.0 Material and Workmanship :**

1.1 The relevant specification of Item No. 14.43 (A) shall be followed except that the thickness of stone shall be 30 mm.



**2.0 Mode of measurements and payment :**

2.1 The relevant specifications of Item No. 14.43 (A) shall be followed.

2.2 **The rate shall be for a unit of one sq. metre.**

14.44 **Kota stone slab 25 mm thick in riser of steps dedo and pillars laid on 10 mm thick cement mortar 1:3 (1 cement : 3 coarse sand) and jointed with grey cement slurry including rubbing and polishing etc complete.**

**1.0 Materials :**

Water shall conform to M-1 Cement mortar shall conform to M-11. Kota stone 25 mm thick shall conform to M-49.

**2.0 Workmanship :**

2.1 The relevant specifications of Item No. 14.43 (A) shall be followed except that the kota stone shall be fixed for risers of steps, dedo or skirting in C.M. 1:3 and the polishing shall be done manually instead of machine polishing.

**3.0 Mode of measurements and payment :**

3.1 The risers of steps, skirting or dedo shall be measured in Sq. metres. Length shall be measured along the finished faces of risers, skirting or dedo. Height shall be measured from finished level of treads or floor to top. Lining of pillars shall be measured under this item.

3.2 **The rate shall be for a unit of one sq. metre.**

14.46 [A] **Rough chiseled dressed (Kota Stone Green) stone flooring over 20 mm thick base of cement mortar 1:5 (1 cement : 5 coarse sand), or L. M. 1:1.5 including pointing with cement mortar 1:2 (1 cement : 2 stone dust) etc complete – 25 mm thick.**

**1.0 Materials :**

Water shall conform to M-1. Lime mortar shall conform to M-10. Cement shall conform to M-11. Rough Chisel dressed stone shall conform to M-48.

**2.0 Workmanship :**

2.1 The relevant specifications of Item No. 14.43 (A) shall be followed except that the rough chisel dressed stone of 25 mm average thickness.

**2.2 Dressing of stone slab:**

Every stone slab shall be cut to the required size and shape and rough chisel-dressed on top, if required, so that the dressed surface shall not be more than 6 mm from straight edge placed on it. The sides shall also be chisel-dressed to a minimum depth of 20 mm so that the dressed edge shall at no place be more than 30 mm from straight edge butted against it. Beyond this depth, the sides may be dressed slightly splayed so as to form an inverted 'V' shaped joint with adjoining slab. The surface shall be reasonably true and plane and all the angles and edges shall be square and free from chippings. Where the stone slabs are to be used for nosing, exposed edges shall be rough chisel-dressed to full depth and cut to the uniform thickness.

2.3 thickness of the stone slab shall be 25 mm with permissible tolerance of + 2 mm.

**2.4 Laying:**



The surface of the sub-grade concrete shall be cleaned, wetted and mopped. The bedding of specified mortar mix shall be spread under each slab to the specified thickness. The slab be washed clean before laying. It shall be than laid on top. Pressed and so that all hollows underneath filled surplus mortar works up through the joints. The top shall be tapped and brought level to the adjoining slab. The thickness of the joints shall not exceed 5 mm. Subsequent slabs shall be laid in the same manner.

## **2.5 Curing and finishing:**

Any surplus mortar on the surface of the slab shall be cleaned off and joints finished flush. The joints shall be raked out uniformly to a minimum depth of 12 mm when the mortar is still green. The slabs which are fixed in the floor adjoining the wall shall enter not less than 12 mm under the plaster, skirting or dedo. The junctions between wall plasters and floor shall be finished neatly and without waviness. The pointing shall be done with C.M. 1:2 the pointing shall be cured for a minimum period of seven days. Te finished floor shall not sound hollow when tapped with wooden mallet and the finished surface shall be true to level and slopes as directed.

## **3.0 Mode of measurements and payment :**

3.1 The relevant specifications of item No. 14.43 (A) shall be followed.

3.2 **The rate shall be for a unit of one sq. metre.**

**14.46 [B] Rough chiseled dressed (Kota Stone Green) stone flooring over 20 mm thick base of cement mortar 1:5 (1 cement : 5 coarse sand), or Lime Mortar 1:1.5 including pointing with cement mortar 1:2 (1 cement : 2 stone dust) etc complete – 40 mm thick.**

### **1.0 Material and Workmanship :**

1.1 The relevant specifications of Item No. 14.46 (A) shall be followed except that the thickness of stone slabs shall be 40 mm thick.

### **2.0 Mode of measurements and payment :**

2.1 The relevant specifications of Item No. 14.46 (A) shall be followed.

**14.71 [A] Cement concrete flooring for I.P.S. 1:2:4 (for Indian Patent Stones) 1 Cement : 2 coarse sand : 4 graded stone aggregate 20 mm nominal size) laid in one layer finished with a floating coat of neat cement 40 mm thick.**

### **1.0 Materials :**

Water shall confirm to M-1 Cement shall conform to M-3 Sand conform to M-6 Stone aggregate 20 mm nominal size shall confirm to M-12. Cement concrete of 1:2:4 proportion measured by volume shall conform to relevant specifications of ordinary grade 1:2:4 concrete.

### **2.0 Workmanship :**

2.1 The cement concrete flooring of 40 mm thick (Average) is to be laid as per the site condition. The concrete shall be mixed in a mechanical mixer at the work. Hand mixing may however be allowed for smaller quantities of work and in case of failure of machineries or as permitted by the Engineer-in-charge. It shall be carried out on a water tight platform and care shall be taken to ensure that mixing is continued until the mass is uniform in colour and consistence. However is such cases 10% more cement than otherwise required shall have to be used 2without any extra cost. The mechanical mixing shall be done for period of 1.1/2 to 2 minutes. The quantity of water shall be just sufficient to produce a dense concrete of required workability for the purpose. Flooring of specified thickness shall be laid in accordance with approved pattern or as directed. Finishing operation shall start shortly after cessation of beating and shall be spread over a period of one to six hours depending upon the temperature and atmospheric conditions. The surface shall be mixed with water to form a thick slurry and spread over the surface while the concrete is still green. Use of dry cement or cement and sand mixture sprinkled on this surface to stiffen the concrete or absorb





excessive moisture shall not be permitted. The cement slurry shall then be properly pressed twice by means of iron floated smooth. The surface shall be marked with string or B.R.C. fabric jall to make the surface non-slippery as and when directed. The junction of floors with wall plaster, dedo rooms shall be laid after fixing of water closet and squatting pans and floor traps which shall be plugged while laying the floors and opened after the floors are completed. Any damage done to water supply or sanitary fittings during execution of work shall be made good.

2.2 After the final set, the concrete shall be kept continuously wet, if required by ponding for a period of not less than 7 days from the date of placement.

2.3 The form work shall be provided if necessary as directed by the Engineer – in – charge. Concreting shall be done as per alternate bay method with necessary centering either by mastic or cement mortar as directed.

**3.0 Mode of measurements and payment :**

3.1 The rate shall include the cost of all Materials : and labour involved in all the operations described above. No deduction shall be made or extra paid for any opening up to 0.1 sq. mt. In area in the floor, nothing extra shall be paid for laying the floor at different levels in the same room or the counter yard.

3.2 **The rate shall be for a unit of one sq. metre.**

**14.71 [B] Cement concrete flooring (Indian patent stone) 1:2:4 (1 Cement : 2 coarse sand : 4 graded stone aggregate 20 mm nominal size) laid in one layer finished with a floating coat of neat cement 50 mm thick.**

**1.0 Material and Workmanship :**

1.1 The relevant specifications of Item No. 14.71 (A) shall be followed except that the thickness of concrete flooring shall be 50 mm.

**2.0 Mode of measurements and payment :**

2.1 The relevant specifications of Item No. 14.71 (A) shall be followed.

2.2 The rate shall be for a unit of one sq. metre.

**14.74 Cement concrete pavement (25 mm to 50 mm thick) with 1:2:4 (1 cement : 2 coarse sand : 4 stone aggregate 20 mm nominal size) including finishing with a floating coat of neat cement complete.**

**1.0 Material and Workmanship :**

1.1 The relevant specifications of Item No. 14.71 (A) shall be followed except that the thickness of concrete flooring vary from 25 mm to 50 mm.

**2.0 Mode of measurements and payment :**

2.1 The relevant specifications of Item No. 14.71 (A) shall be followed except that the thickness shall be measured correct up to 1 mm, flooring laid in borders, margins and treads of steps, shall be measure under Item of flooring in respective of width.

2.2 **The rate shall be for a unit of one sq. metre.**

**14.81 [C] 20 mm thick precast concrete tile with aggregate of zies up to 6 mm laid in floors, treads of steps and landing on 20 mm bed of cement mortar 1:6 (1 cement : 6 coarse sand) or L. M. a: 1.5 jointed with neat cement slurry with pigment to match the shade of the tiles complete with precast tiles of Dark shades using ordinary cement.**

**1.0 Materials :**



Water shall conform to M-1. Cement shall conform to M – 3. Sand shall conform to M-6. Lime mortar 1:1.5 shall conform to M-10. Cement mortar shall conform to M-11. Tiles shall conform to M-47 (A). Cement concrete tiles shall conform to I.s. 1237 – 1959 and pigments to be admixed with mortar or for grouting shall conform to I.S. 2114-1962.

**2.0 Workmanship :**

2.1 The tiles shall be laid on the sub-grade of concrete of the R.C.C. Slab. Bedding shall be in lime mortar 1: 1.5 or cement mortar (1:6). The amount of water added shall be minimum required for sufficient plasticity and workability in C.M. or lime mortar where the ingredients shall be thoroughly mixed dry, hard lumps removed and water added to give a good workability.

2.2 The base shall be cleaned of all dust, dirt and scum and properly wetted without allowing water pools. For a bedding of cement mortar the mortar shall be than spread evenly over the base of two rows of tiles and three to five metres in length. The top shall be kept rough so that cement slurry can be absorbed. The thickness of the bedding shall be not less than 10 mm at any place. The laying of tiles shall be commenced with neat cement slurry of hone-like consistency and shall be spread over the mortar bed over an area sufficient to receive about 20 tiles. The tiles shall then be fixed in this grout one after the other, each tile being gently tapped and properly bedded in line and level with the adjoining tiles. The joints shall be as narrow as possible and normally shall not exceed 1.5 mm. After the day's work the excess cement slurry on top shall be cleaned as also the joints with a broom stick and washed before the slurry sets hard. Next day the joints shall be filed with the cement grout of the same shade as the matrix of the tiles. Tiles which are fixed in the floor adjoining the wall shall go a minimum of 10 mm under the wall plaster, skirting or dedo. For the purpose, plaster etc may be left unfinished by about 50 mm above the proposed finished level of the floor. The unfinished strip shall be plastered after laying the floor tiles. Where full tiles cannot be used, tiles shall be cut to the size to be used.

2.3 The flooring shall be cured for 7 days.

**3.0 Made of measurements and payment :**

3.1 The rate shall include the cost of all Materials : and labour involved in all the operations described above.

3.2 **The rate shall be for unit of one sq. metre.**

**14.86 Chequered precast cement concrete tiles 22 mm thick with aggregate of sizes up to 6 mm in floors, treads of steps and landings on 20 mm thick bed of C. M. 1:6 (1 cement : 6 sand) or lime mortar 1:1.5 (1 Lime putty : 1.5 coarse sand) jointed with neat cement slurry with pigment to match the shade of tiles.**

**1.0 Materials :**

1.1 The relevant specifications of Item No. 14.25 (A) shall be followed.

**2.0 Workmanship :**

2.1 The relevant specifications of Item No. 14.25 (A) shall be followed except that chequered precast cement concrete tiles 22 mm thick shall be used in floors, treads of steps and landings on average 20 mm thick bed of C.M. 1:6 or L. M. 1:1.5.

**3.0 Mode of measurements and payment :**

3.1 The relevant specifications of Item No. 14.21 (A) shall be followed.

3.2 **The rate shall be for a unit of one sq. metre.**

**14.87 Extra for rubbing polishing the precast cement concrete tiles in flooring, skirting or dedo.**



## **1.0 Workmanship :**

- 1.1 Grinding and rubbing shall normally be commenced after 14 days of laying the tiles, except for skirting or small areas, machine shall be used for the purpose.
- 1.2 First grinding shall be done with carborundum stones of 48 to 60 grade grit fitted in machine, water shall be properly used during grinding. When the chips show up and the floor has been uniformly rubbed, it shall be cleaned with water baring all pin holes. It shall then be covered with a thin coat of grey or white cement mixed with or without pigments to match the colour of the topping of the tiles. Pin holes if any shall thus be filled. This grout shall be kept moist for sufficient period as directed. Thereafter, second grinding shall be started with carborundum of 120 grit. Grouting and curing shall be followed again. Final grinding shall be done when other works are finished. The machine shall be fitted with carborundum of grit 220 to 350 using water in abundance. The floor shall then be washed clean with water. Oxalic acid powder shall then be dusted as needed on the surface and the surface rubbed with machine fitted with Hessian bobs or rubbed hard with pad of woolen rags. The floor shall then be washed, cleaned and dried with a soft cloth of linen. The finished floor shall not sound hollow when taped with a mallet.
- 1.3 If any tiles is disturbed or damaged it shall be refitted or replaced properly jointed and polished.
- 1.4 For skirting, dedo or small areas where it is not possible to do machine polishing all the above operations are to be done manually.

## **2.0 Mode of measurements and payment :**

- 2.1 The rate shall include the cost of all Materials : and labour involved in all the operations as described above.
- 2.2 **The rate shall be for a unit of one sq. metre.**

## **14.90 Providing and laying brick on edge flooring laid dry, grouted with C. M. a:6 (1 cement : 6 coarse sand) including finishing the joints flush, curing etc complete.**

### **1.0 Materials :**

Water shall conform to M-1. Cement mortar shall conform to M-11. Burnt bricks shall conform to M-15.

### **2.0 Workmanship :**

- 2.1 The flooring shall be laid on concrete sub grade where so provided. The slope in the floor shall be provided in the sub-grade. Where sub – grade is not provided, the earth below shall be properly sloped, watered, rammed and consolidated. Before laying the flooring it shall be moistured. Plinth masonry offsets shall be depressed so as to allow the sub-grade concrete to rest on it.

### **2.2 Laying:**

The brick shall be laid in plain, diagonal herring bond, or other pattern as directed. The brick shall be dry laid properly and set home by gently tapping. One completion of the portion of flooring the vertical joints shall be grouted with C. M. 1:^ and all joints shall be finished flush. The joints shall be as fine as possible and not exceeding 5 mm. These points shall be filled with cement mortar 1:6.

### **2.3 Curing:**

The brick paving shall be cured for 7 days

### **3.0 Mode of measurements and payment :**

- 3.1 The length and breadth shall be measured correct to centimetre between skirting dedo or wall plaster. No deductions shall be made not extra paid for any opening up to 0.1 sq. mt., in area in the floor. Nothing extra shall be paid for laying the floors at different levels in the same room or courtyard.
- 3.2 **The rate shall be for unit of one sq. metre.**



## SECTION – 15

### Roof Covering

**15.1 Providing corrugated G.I. sheets roofing fixed with galvanized iron 'J' or 'L' hook bolts and nuts 8 mm dia with bitumen and G. I. limpet washers filled with white lead complete excluding the cost of purline, rafters and trusses (1) 0.8 mm thick sheet.**

#### **1.0 Materials :**

1.1 Corrugated G.I. sheets shall confirm to M-23.

#### **2.0 Workmanship :**

2.1 Spacing of purlins : One purlin shall be provided at the ridge and one at the eaves. The spacing of other purlins for 0.8 mm thick G. I. sheet shall not exceed 1.80 metres. The purlin shall coincide with the centre line of the end lap. The ridge purlins shall be placed in such a way that the ridges can be fixed properly. The portion overhanging the wall support shall not be more than one fourth of the spacing of purlins.

2.2 The top surfaces of the purlins shall be painted before the sheets are fixed over them. Embedded portions of purlins shall be finished with two coats of coat – tar.

#### **2.3 Laying of sheets:**

2.3.1 The sheets shall be laid in purlins to a true plane with the line of corrugations truly parallel or normal to the sides of area to be covered. The sheets shall not generally be built into gables and parates. They shall be bent up along their side edges close to the wall, and the junction shall be protected by suitable flashing or by projecting drip course.

2.3.2 The laps at end shall be provided 15 mm minimum for roof slopes 1 in 2 (1 vertical : 2 horizontal) and steeper but 200 mm shall be provided for flatter slopes than those above. The side lap shall be provided two ridges of corrugations at each side.

2.3.3 The sheets shall be cut to the dimensions or the shape of the roof either along their lengths or their width or in slant across the line of corrugations at hips and valleys. The sheets shall be cut carefully with a straight edge and chisel to give a straight finish. The sheets shall be laid such that the laps are turned away from the usual direction of local heavy rain.

#### **2.3.4 Fixing of sheets:**

2.3.4.1 Sheets shall be fixed to the purlines or other roof members such as hips or valley rafter etc with 'J' or 'L' galvanized hook bolts, and galvanized nuts 8 mm dia with bitumen limpet washers and G.I. washers. Limpet washers with white lead shall be used. Length of hook bolt shall be varied to suit the site requirement. Bolts shall be sufficiently long so that after fixing the project above the top of their nuts by not less than 12 mm. the grip of 'J' or 'L' book bolts on the sides of purlins shall not be less than 25 mm. there shall be minimum of three hooks bolts placed at the ridge of corrugations in each sheet in every purline and their spacing shall not exceed 300 mm. Coach screw shall not be used for fixing the sheets to purlin, where the slopes of roof are not less than 2.1/2 degree (1 vertical and 2.1/2 horizontal). Sheets shall be jointed together at the side laps by galvanized iron bolts and nuts 25 mm x 6 mm size each bolted with a bitumen and G.I. impact washer filled with white lead. Where the overlaps at the sides extend to two corrugations, these bolts shall be placed zig-zag over the two overlapping corrugations, so that the ends of the overlapping sheets are drawn tightly to wards each other. The spacing of same bolts shall not exceed 600 mm along each of the staggered rows.

2.3.5 Holes for all bolts shall be drilled and not punched in the ridges of the corrugations from the under side, while the sheets are on the ground. The holes in the sheets shall be at least 50 mm from the edge. Sheets drilled wrongly shall be rejected. The holes in the washers shall be of the exact diameter of the hook bolts or the seam bolts. The nuts shall be tightened from above to give a leak – proof roof.

2.3.6 The roof when completed shall be true to lines and slopes and shall be leak-proof.



### **3.0 Mode of measurements and payment :**

- 3.1 The measurements of C.G.I. sheet be taken for finished work in superficial area in general plane (not girthed on the roof). The laps between the C.G.I. sheets both at their ends and along the side edges shall not be measured. The overlaps of C.G.I. sheets over the valley piece and their underlap the ridge, hip and flashing piece shall be included in the measurements.
- 3.2 No deduction in measurement shall be made for opening for chimney stacks, sky lights etc of area up to 0.40 sq. mt., nor extra be paid for extra labour in cutting and for wastage etc in forming such openings.
- 3.3 The rate of roof shall include the cost of all Materials : and labour involved in all operations described above. The rate also includes the cost of provision, erection and removal of the scaffolding, benching, ladders, templates and tools required for the proper execution and erection of the work. The rate includes the cost of purlins, rafters and trusses.
- 3.4 **The rate shall be for a unit of one sq. metre.**

### **15.7 Providing rides of hips 600 mm overall in plain G.I. sheets fixed with G.I. 'J' or 'L' hooks bolts and nuts 8 mm dia G.I. limper and bitumen washer etc complete 0.90 mm thick sheet.**

#### **1.0 Materials :**

- 1.1 The G.I. Valley gutters and ridges shall conform M-23-A.

#### **2.0 Workmanship :**

- 2.1 The relevant specification of Item No. 15.1 shall be followed except that the work shall be carried out for ridges or hips, the overlaps for ridges and hips or either side over the C.G.I. sheets and end legs shall be minimum 225 mm. Width of the ridges and hips shall be as described in the item.
- 2.2 Ridges shall be fixed to the purlins with same 8 mm dia. G.I. hook bolts and nuts and bitumen and G.I. limpet washers, which fix the sheets for the purline. Hips shall be fixed to the roof members with the same 8 mm dia G. I. hook bolts and nuts and bitumen and G. I. limpet washers which fixed the sheets. At least one of the fixing bolts shall pass through the end laps of the ridges and hips on other sides. If this is not possible extra hook bolt shall be provided. End laps of ridges and hips shall be jointed together by galvanized iron seam bolts and G.I. Washers. There shall be atleast two such bolts in each end lap.
- 2.3 Ridges and hips shall fit in squarely on the sheets.

### **3.0 Mode of measurements and payment :**

- 3.1 The measurements or ridges or hips shall be taken for finished work in length along their centre lines.
- 3.2 The rate of gutter shall include the cost of all labour and Materials : specified above. Including all specials such as angles, junctions drop ends or funnel shaped connecting pieces, stop ends etc flat iron brackets and bolts and nuts required for fixing the latter to the roof members.
- 3.3 **The rate shall be for a unit of one running metre.**

### **15.20 [A] [1] Providing asbestos cement sheets, roofing fixed with G.I. palin and bitumen washers complete excluding cost of purlins, rafters and trusses : 7 mm thick, corrugated sheet.**

#### **1.0 Materials :**

- 1.1 Asbestos cement sheets shall conform to M-24.

#### **2.0 Workmanship :**



- 2.1 The maximum spacing of purlins shall be 1.6 metres in case of 7 M. thick A.C. sheets and 1.4 metres for 6 mm thick A.C. sheets.

**2.2 Laying and fixing of sheets :**

The sheets shall be laid on the purlins and other roof members as per code of practice. The top bearing surfaces of all purlins and other roof members shall be in one plane so that the sheets when being fixed shall not be required to be forced down to rest on the purlins. The finished roof shall present uniform slope and the line of corrugation shall be straight and true. The sheets shall be laid with smooth side up wards. Corrugated sheets shall be laid starting at the eaves wither from left to right or right to left depending upon the direction of wind. Before actual laying of the sheets is started, the purlins spacing and the size of sheets shall be checked to ensure that the arrangements shall provide the laps required and the specified overhang at the eaves. In case the sheets are laid from right to left, the first sheet shall be laid uncut but the remaining sheets in the bottom row shall have the top left hand corners cut or mitred. The sheets in the second and other immediate rows shall have bottom right hand corner of the first sheet cut. All other sheets except the last sheets shall have only top left hand corner cut. The last of the top row sheets shall have the bottom right hand corner cut with exception of the last sheet which shall be left uncut. If the sheets are laid from left to right, the first sheet shall be laid uncut and the remaining procedure shall be reserved.

- 2.3 The free overhang of the sheets at the eaves shall not exceed 400 mm in case of 7 mm thick sheets and 300 mm in case of 6 mm thick sheets.

- 2.4 The mitre described above is necessary to provide snug fit. Where 4 sheets meet at a lap the length of mitre shall be 150 mm and the width of mitre shall be equal to the width of the side lap. The cutting may be done with ordinary wood saw at site.

**2.5 Laps:**

The sheets shall be laid with an end LAP OF 150 MM MINIMUM. In case of roof with a pitch flatter than 1 vertical to 2.1/2 horizontal (Approx. 22°) or in the case of very exposed situations appropriate larger laps may be provided. The sheets shall be laid with side lap of half a corrugation.

**2.6 Fixing Accessories:**

The sheets shall be secured to the purlins and other roof members by means of 8 mm dia galvanized iron bolt "j" type hook bolts in case of angle iron purlins and 'L' type bolts in case of R.S. joints, precast concrete, or timber purline and nuts bearing on galvanized iron washers and bitumen washers. The grip of 'J' or 'L' bolts shall have a bitumen washer and galvanized iron washer placed over the sheets before the nut is screwed down from above. On each purlin there shall be one hook bolt on the crown adjacent to the side lap on either side. Bitumen washer shall be of approved quality. The G.I. flat washer shall be 25 mm in diameter and 1.60 mm thick and bitumen washer shall be 35 mm in dia and 1.5 mm thick with hole to suit the required size of fixing accessory. Each nut shall be screwed lightly at first. After a dozen or more sheets are laid, the nuts shall be tightened to ensure a leak – proof joint and also nuts tightened only to extent so as to prevent damage to the sheets. The length of the 'J' bolts or crank bolt shall be 75 mm more than the depth of purlins for single sheet fixing and 90 mm more where two sheet overlap or where ridges or other accessories are to be fixed. The minimum length of coach screw for timber purlins shall be 110mm.

**2.8 Holes:**

The holes for fixing the sheet shall be drilled in the centre of end lap of sheets to suit the purlins i.e., on the centre line of the purlins, if these are of timber and square head coach screws are used, or as close as possible to the back of purlins if 'J' or 'L' bolts are used as with steel angles or precast concrete or timber purlins. Holes for hook bolts etc shall be 2 mm more than the diameter of the fixing bolts. No holes shall be nearer than 40 mm to any edge of sheet or accessory.

**3.0 Mode of measurements and payment :**

- 3.1 The relevant specifications of Item No. 15.1 shall be followed except that the over lap of the corrugated sheets over valley gutters, roof lights, caves, filler pieces and underlay of the corrugated sheets below ridges, hips, north light curves, flushing pieces, roof light sheets and barge board shall be included in the



measurement. No deduction shall be made for holes cut for extra catorcators or cowl type ventilators. Deductions shall be made for roof light sheets.

**3.2 The rate shall be for a unit of one sq metre.**

**15.20 [A] [III] Providing asbestos cement sheets roofing fixed with G.I. Plain and bitumen washers complete excluding the cost of purlins, rafter and trusses: 6 mm thick corrugated sheets.**

**1.0 Materials :**

1.1 The relevant specifications of item No. 15.20 (A) (I) shall be followed except that the thickness of A.C. sheets shall be 6 mm.

**2.0 Mode of measurements and payment :**

2.1 The relevant specifications of Item No. 15.20 (A) (I) shall be followed.

**2.2 The rate shall be for a unit of one sq. metre.**

**15.25 [D] Providing and fixing ridges and hips in asbestos cement sheets roofing with G.I. 'J' or 'L' hook, bolts, and nuts 8 mm dia G.I. plain and bitumen washers complete : North light adjustable ridges.**

**1.0 Materials :**

1.1 The rides and hips of asbestos cement sheets roofing shall conform to M-24.

**2.0 Workmanship :**

2.1 the relevant specifications of Item 15.20 (A) (I) shall be followed except that the work is to be carried out for ridges and hips in A.c. sheet roofing.

2.2 The ridges shall be laid as per manufacturer's instructions with rolls of the two wings in case of adjustable ridges, fitting closely and with a separation of serrated ridges registering correctly with the sheet underneath. The staggered lapping of two wings of adjustable ridge section and the lap between the adjustment pieces on the same wings of ridges shall be as per manufacturer's instructions. The end portion of the wing of the adjustable ridges which project beyond the verges of the roof shall be cut and trimmed off neatly.

**2.3 Hips:**

In laying hips pieces, serrations to suit the corrugations in the sheets below should be cut in them so that they shall be snug fire over the sheets. The wings of ridges shall be fixed to the sheet below with seam bolts and nuts 8 mm dia. G.I. 'J' or 'L' hook bolts and bitumen and G.I. washers which fix the sheets to the paulins. In addition, in north light adjustable ridges, the roll of the two wings shall be jointed together at their crown, with 8 mm dia G.I. seam bolts and nuts at the rate of two numbers per pair wings. Each seam bolt shall be provided with one bitumen and a pair of G.I. washers. Where the plain wing angular or plain wing adjustable ridges are sued, the gaps formed by roofing corrugation and the wings shall be filled with C.C. (1:2:4) up to a full length of the overlaps. The exposed face shall be finished perpendicular to the sheeting. Wings of hips shall be fixed to the roof members below with the same 8 mm dia G.I. 'J' or 'L' bolts end nuts which fix the sheets to the member. In addition they shall be secured to the sheet below with 8 mm dia G.I. seam bolts, nuts and washers so that taken together with hook bolts, there shall be bolt on each wing at least at every fifth corrugation of the sheets below in case of corrugated and at least every second corrugation of the sheet below in case of semi corrugated sheets. Each seam bolt shall be provided with one bitumen and pair of G.I. washers.

**3.0 Mode of measurements and payment :**



- 3.1 Measurements of ridges, hips and other accessories shall be for finished work and the length shall be taken along the centre line. The lap shall not be measured. The under lap of ridges under expansion joints pieces shall be measured.
- 3.2 The rate of ridges and hips shall not include the cost of expansion joint pieces, closing of gap between plain and the sheet corrugation with concrete.
- 3.3 **The rate shall be for a unit of one running metre.**

**15.26 Filling cement concrete 1:32:4 (1 cement : 2 coarse sand : 4 graded stone aggregate 12.5 mm nominal size) in gaps of A.C. sheet corrugation and wing of ridges.**

**1.0 Materials :**

- 1.1 Water shall conform to M-1. Cement shall conform to M-3. Coarse sand shall conform to M-6. Stone grit shall conform to M-8.

**2.0 Workmanship :**

- 2.1 The relevant specifications of item No. 5.4.1 of C.C. shall be followed except that the work shall be for filling gaps of A.C. sheet corrugation and wings of ridges.

**3.0 Mode of measurements and payment :**

- 3.1 The measurements of filling gaps in ridges, hips of A.C. sheet corrugation and wings of ridges shall be for finished work. The length shall be measured along the centre line.

- 3.2 **The rate shall be for a unit of one running metre.**

**15.27 [III] Providing and fixing asbestos cement roofing accessories with galvanized iron 'J' or 'L' hook bolts and nuts, G.I. plain and bitumen washer etc., complete : North light and ventilator curves.**

**1.0 Materials :**

- 1.1 The relevant specifications of Item No. 15.10 (I) shall be followed except that the work is carried out for accessories for asbestos cement roofing north light and ventilator curves.

- 1.2 The accessories such as north light and ventilator curves shall be laid and secured with same G.I. hook bolt to secure the sheets to the roof, or with separate G.I. hook bolts to the roof members below and / or with 8 mm dia G.I. seam bolts nuts and washers to the sheeting, generally as per manufacturer's written instructions.

**2.0 Mode of measurements and payment :**

- 2.1 The relevant specifications of item No. 15.25 (D) shall be followed.

- 2.2 **The rate shall be for a unit of one running metre.**

**15.29 [I] Providing and fixing asbestos cement socketed half round eaves gutter with bolts, nuts bitumen washer etc and flat iron brackets 40 mm x 3 mm size including asbestos rope and plastic roofing compound in joints complete : 150 mm nominal size.**

**1.0 Materials :**

- 1.1 The relevant specifications of ItemNo. 15.10 (I) shall be followed except that the asbestos cement socketed half round eaves gutter shall be provided, the size of gutter shall be 150 mm nominal.





- 1.2 Gutters shall be laid with a minimum fall of 1 in 120 which should be increased where possible. Gutters shall be true to line and slope and shall be laid with requisite accessories such as drop ends, stop ends, nozzles angles and union slips, as directed. The size of outlet of drop ends and nozzles shall be the same as the size of rain water pipe into which they discharge water. Gutters and their accessories shall be supported by M. s. Flat / Iron Bracket. Where there are required to be fixed to the side of gutter they shall be fixed with 40 mm by 3 mm section bent to shape and fixed rightly to the sides of the rafter with 3 Nos. of 10 mm dia bolts, nuts and washers. The brackets shall overlap the rafter not less than 300 mm and connecting bolts shall be 115 mm centres.
- 1.3 Where the brackets are to be fixed with purlins, these shall consist of 40 x 3 mm M.S. flat iron bent to shape with one / and turned at a right angle and fixed to the purlins face with a 10 mm dia bolt, nut and washer. The perpendicular overhang proportion of 40 mm x 3 mm bracket shall be stiffened by another 40 x 3 mm flat bent to right angle shape with its longer leg connected to the bracket with two numbers of 6 mm dia M.S. bolts nuts and washers and its shorter legs fixed to the face of purlins with one number 10 mm dia bolts, nuts and washers. The overhang of the vertical portion of the flat iron bracket from the face of the purlin not exceed 225 mm.
- 1.4 Requisite slope in the gutter shall be given in the line of bracket. The brackets shall be placed at not more than 900 mm centres.
- 1.5 The gutters shall be fixed to the brackets with 2 Nos. 8 mm dia. G.I. seam bolts and nuts, each bolt and nut being equipped with a pair of bitumen and G. I. washers. These connecting bolts shall normally be above the water line of the gutter.
- 1.6 Spigot and socket end of gutters of socketed half round gutter and their accessories shall be connected together at their laps with one row of 8 mm dia G.I. bolts and nuts. Each of the bolts and nuts shall be provided with a pair of bitumen and a pair of G.I. washers. The gap between socket and spigot shall be packed with approved plastic roofing compound and flanked on the both sides with 6.35 mm dia asbestos rope. The connecting G.I. Bolt shall be then tightened so that the lapped joint becomes leakproof. The outer face of packed asbestos rope shall not be further than 6 mm from the edges of the spigot and socketed ends. Where both ends of gutters and / or their accessories to be connected together are spigot ends, they shall be laid as butt jointed with 1.5 mm gap in between over union clips. The union clips connected to the two butt ends of the gutter or other sections with two rows. The gap between union clips and ends of gutter sections or accessories shall be packed with plastic roofing compound flanked with edges of 6.35 mm dia asbestos ropes as before. The whole joint shall be made leak proof by tightening the bolts.

## **2.0 Mode of measurements and payment :**

- 2.1 The asbestos socketed half round eaves gutter shall be measured for finished work and the length shall be measured along the centre line.
- 2.2 The rate of gutters shall include the cost of providing and fixing accessories such as drop ends, stop ends, nozzles, and fixing union clips together with bolts, nuts and washers.
- 2.3 **The rate shall be for a unit of one running metre.**

## **15.29 [II] Providing and fixing Asbestos cement socketed half round eaves gutters with bolts, nuts, bitumen washers etc and flat iron brackets 40 mm x 3 mm size including Asbestos rope and plastic roofing compound in joints etc complete 300 mm nominal size.**

### **1.0 Materials & Workmanship :**

- 1.1 The relevant specifications of Item No. 15.29 (I) shall be followed except that the size of the Asbestos socketed eaves half round gutter shall be 300 mm nominal size.

### **2.0 Mode of measurements and payment :**

- 2.1 The relevant specifications of Item No. 15.29 (I) shall be followed.



2.2 **The rate shall be for a unit of one running metre.**

**15.51 Tiled roofing with Mangalore pattern roof tiles including teak reepers of size 50 mm x 25 mm.**

**1.0 Materials :**

1.1 Mangalore pattern roof tiles shall conform to M-25. (2) Teak wood batten shall conform to M-29.

**2.0 Laying :**

2.1 The maximum distance between centre to centre of rafters shall be not more than 600 mm. Teak wood reepers 50 mm x 25 mm long shall be nailed to each rafter at central distances suited to the size of the tiles by means of nails 50 mm long. The reepers shall be of well seasoned teak wood and shall be straight pieces of uniform size and colour and not shorter than the length necessary to cover at least four rafter. The under face and sides of the reepers shall be planned before fitting up. Joints shall come over the rafters. The joints of two adjacent rows or reepers shall not come over the same rafter. At the eaves, there shall be two reepers of such thickness and shape so that the uniformity of the slope of the roof shall be preserved.

**2.2 The work of valleys shall be executed as under:**

Galvanised iron sheet 1200 mm wide and 1.25 mm thick shall be used for valleys. The sheet shall be extended by about 450 mm under the tiles on either side in a depth of 100 mm at centre. The sheet shall be carried 75 mm into the wall and set with cement mortar unless flushing is specified. The laps, if any on the slope shall be 300 mm. The sheets shall be laid over the reepers and nailed. Two reepers 50 mm x 25 mm each shall be fixed over the galvanized iron sheet 150 mm away from the centre line of the valley, on either side to keep the tiles and mortar from falling into the gutter of the valley.

**2.3 Laying:**

The tiles shall be laid from the eaves towards the ridges after fitting of the reepers, the rebate of the tiles resting fully against the reepers. The joints of the hips and ridges tiles and also those between them and the plain tiles shall be set in and well grouted with lime mortar and the mortar surface painted and finished off with a mixture of red paint and Portland cement to preserve uniformity of colour. The finished slope of roof shall be uniform from ridges to eaves. The eaves line shall be perfectly straight, horizontal and parallel to each other. The end over gables shall be protected by lime borders and neatly finished.

2.4 At the side of valleys and for 230 mm on either side of the roof at valleys, cement plastering 12 mm thick shall be done to prevent the rain water from the gutter leaking by the sides of valleys.

2.5 At the eaves, wind tie shall be placed over the ends of the last tiles and secured by means of galvanized iron washers and screws 25 mm into the rafter to prevent tiles from being blown up. Care shall be taken to put the screws in the ridges and not in the gutter or the tiles. Where full tiles are not necessary, half tiles manufactured for the purpose shall be used.

**3.0 Mode of measurements and payment :**

3.1 The measurements of the roof shall be taken for finished work for superficial area flat in the plane of the roof and not girthed. Laps shall not be measured.

3.2 No deduction in measurements of roof shall be made for openings of area up to 0.40 sq. mt., nor shall any extra be paid for labour and wastage informing such openings.

3.3 The rate includes the cost of all Materials : and labour including ridges, hips eaves and bottoms.

**3.4 The rate shall be for a unit of one square metre.**

**15.75 Providing and fixing five courses water proofing treatment with bitumen felt consisting of second and fourth course of blown bitumen or / and residual bitumen applied hot 1.20 Kg / Sq. Mt., of area for**



each course and first course with fibre base bitumen saturated underlay type and third course with fibre base self finished felt type 2 Grade-I, fifth and final course of stone grit 6 mm and down size or pea sized gravel spreaded at 0.008 Cum. / Sw. Mt., including preparation of surface, excluding grading complete.

## 1.0 Materials :

The tar felt shall confirm to M-76. The bitumen primer shall confirm to I.S 3388-1965. The bitumen shall conform to I.S. 702-1961. The grit or gravel shall conform to M-8.

## 2.0 Workmanship :

### 2.1 Preparation of surface :

- 2.1.1 Well defined cracks other than hair cracks in the roof structure shall be cut to 'V' section cleaned and filled up flush with cement sand slurry or with bitumen conforming to I.S. 702-1961. The surface to be treated shall have a minimum slope of 1 in 120. The grading shall be carried out prior to the application of water proofing treatment by cement mortar or line surkhi mortar or as specified in description of item.
- 2.1.2 The surface of room, part of parapet and gutters, drain mouths etc over which the water proofing treatment is to be applied shall be cleaned of all foreign matter such as fungus, moss and dust by wire brushing and dusting.
- 2.1.3 Drain outlet shall be suitably placed with respect to the roof gradient to ensure rapid drainage and prevent local accumulation of water on the roof surface. Masonary drain mouth shall be widen sufficiently and rounded with cement mortar.
- 2.1.4 For cast iron drain outlets, a groove shall be cut all round to touch the treatment.
- 2.1.5 When a pipe passes through a roof on which water proofing treatment is to be laid a cement concrete angle fillet shall be built round it and the water proofing treatment taken over the fillet.
- 2.1.6 In case of parapet wall over 450 mm in height for tucking in the water proofing treatment, a horizontal groove 75 mm wide and 65 mm deep at minimum, height of 150 mm above roof level shall be left in the vertical face at the time of construction. The horizontal face of the groove shall be shaped with cement mortar 1:4.
- 2.1.7 In case of low parapet where the height does not exceed 450 mm no groove shall be provided and the water proofing treatment shall be carried right over the top.
- 2.1.8 In case of existing R.C.C. and stone walls cutting the chase for tacking in the water proofing treatment is not recommended.
- 2.1.9 At the drain mouths the fillet shall be suitably cut back and rounded off for easy application of water proofing treatment and easy flow of water.
- 2.1.10 At the drain mounts the fillet shall be suitably cut back and rounded off for easy application of water proofing treatment and easy flow of water.
- 2.1.11 Outlet at every low dividing wall about less that 300 mm in height cut open to full depth and the bottom and the sides shall be rounded smooth and corners rounded off for easy application of water proofing treatment.

### 2.2 Priming coat;

- 2.2.1 Bitumen primer shall confirm to I.S. 3385-1965. A priming coat consisting of bituminous solution of low viscosity shall be applied with brush on the roof and wall surface at specified weight per unit area to assist adhesion of bonding Materials : as specified in the description of the item.
- 2.2.2 Where a floating treatment of water proofing with self finished bitumen felt is required i.e., where water proofing treatment is required to be isolated from the roof structure, a layer of bitumen saturated felt (under lay) shall be spread over the roof surface and tucked into the flashing grooves. To keep the underlay free



from the structure no bonding Materials : shall be used below underlay. Overlapping to the adjoining strip of underlay shall be minimum of 75 mm as sides and 10 mm at ends, and shall be sealed with the same bonding Materials :, as used for the self finished felt treatment. The underlay shall be of type – I saturated felt conforming to I.S. 1322-1970.

### 2.3 Laying felt :

- 2.3.1 The self – finished tar felt shall be cut to the required lengths, brushed clean of dusting Materials :, laid out flat on the roof to eliminate curls and subsequent stretching. The felt shall be laid in lengths running at right angles to the direction of run off gradient commencing at the lowest level and working up to crest, so that the lower laps of the adjacent felt layer offer minimum obstruction to the flow of water. The felt shall not be laid in a single piece of very long lengths as it is likely to shrink. 6 to 8 metres are suitable length. The roof shall be cleaned and dried before the felt treatment is begun. Each length shall be laid in position and rolled up for a distance of half its – lengths. The hot bonding Materials : heated to correct working temperature as specified by manufacturer shall be poured on to the roof across the full width of the felt as the letter is steadily unrolled and pressed down. The excess of bonding Materials : which squeezes out at the ends shall be removed as the laying proceeds. The pouring shall be so regulated that the correct weight of the bonding material as per unit area is spread uniformly over the surface. When the first half of the tar felt has been bounded to the roof, the other half shall be rolled up and then unrolled on the hot bonding Materials : in the same way. Subsequent strips shall also be laid in the same manner. Each strip shall overlap the preceding one by at least 75 mm at the longitudinal edges and 100 mm at the ends. All overlaps shall be firmly bonded with hot bitumen. Streaks and trailings of bitumen near edges of laps shall be leveled by heating the overlaps with blow lamp and leveling down unevenness.
- 2.3.2 Third layer of bonding Materials : in four course treatment shall be carried out in similar manner after the flashing has been complete.
- 2.3.3 Water proofing treatment shall be carried out in the drain pipe or out lets by at least 100 mm. the water proofing treatment laid on the surface shall over lap the upper edge of water proofing treatment in the drain outlets by atleast 100 mm. Flashing felts shall be laid as flashing. Wherever junction of vertical horizontal surfaces occurs longitudinal laps shall be 100 mm. the lower layer of flashing felt shall overlap the roofing felt by 100 mm on vertical and sloping faces. Last course of flashing should not be of stone grit or pea sized gravel but it shall be replaced by providing two coats of bitumen solution of approved quality.
- 2.3.4 The lower edge of flashing shall overlap the flat portion of the roof and the upper edge of the flashing shall be tucked into the horizontal groove 75 mm thick wide, 65 mm deep provided at minimum height of 150 mm from top of the roof surface. The flashing treatment shall be firmly held in place in the grooves with wooden wedges at intervals and the grooves shall be filled with cement mortar 1:4 (1 cement : 4 coarse sand) or cement concrete (1:2:4) (1 cement : 2 coarse sand : 4 graded stone aggregate 6 mm nominal size) and surface finished smooth with the rest of wall. The cement work shall be cured for 7 days. When dry, the exposed plaster joints of grooves shall be pointed with bitumen and two coats of bituminous solution shall be applied on the vertical and slopping surface of flashing.
- 2.3.5 After the top flashing felt layer has been laid, the penultimate layer of bonding material shall be applied over the roofing felt and horizontal overlap, and vertical and slopping surfaces of flashing shall be spread uniformly over the hot bonding Materials : on the horizontal roof surface and pressed into it with wooden roller.
- 2.3.6 The material for surface finish shall be spread as described in the item over top layer.
- 2.3.7 If ballooning occurs the defects may be rectified as under:-
- 2.3.8 Remove the gravel on the ballooned surface. The cut open and squeeze out the trapped vapour by firm pressure applied by hand, seal the bitumen felt so lifted back on the surface by applying additional bitumen, finally seal the cut with piece of bitumen felt with bitumen application.

### 3.0 Mode of measurements and payment :

- 3.1 The measurements for this items shall be taken as under :



- [a] Water proofing of roof with bitumen shall be measured in sq. mt. Length and breadth shall be measured correct to centimeter.
- [b] Measurement shall be taken for the superficial area of roofing and flashing treatment including flashing over the parapet wall, low dividing walls and expansion joints and at the pipe projections etc. Overlapping and tucking into flashing grooves shall not be measured.
- [c] Sloping and vertical surface of water proofing treatment shall be measured under the four of five course treatment as the case may be irrespective of the fact that the final course of grit or gravel is replaced by bitumen primer.
- [d] In measurements, no deductions shall be made for either openings or recesses for chimney stacks, roof lights etc for areas up to 0.40 sq. mt., nor anything extra shall be paid for extra labour and Materials : in forming such openings. For similar area exceeding 0.40 sq. mt, deduction shall be made in measurements for full opening but nothing extra shall be paid for extra labour and Materials : in forming such openings.
- [e] The grading (coba bedding shall be paid separately but cleaning of surface and treating the cracks shall not be paid separately.
- [f] Cutting of horizontal grooves in parapet walls for tucking in water proofing treatment shall not be measured or paid separately.

3.2 The rate includes cost of all Materials : and labour.

3.3 **The rate shall be for a unit of one sq. metre.**

**15.87 [A] Providing and fixing on wall face C.I. rain water pipe including filling the joints with spun yarn soaked in neat cement slurry and cement mortar 1:2 (1 cement : 2 fine sand) 75 mm dia.**

**1.0 Materials :**

1.1 Water shall conform to M-1. The C.I. rain water pipes and fittings shall conform to m-68. Cement mortar shall conform to M-11.

**2.0 Workmanship :**

2.1 C.I. rain water pipes shall be of the specified diameter and shall be in full lengths of 1.8 metres including socket ends of the pipes unless shorter lengths are require at junctions with fittings.

**2.2 Fixing:**

The pipe and fittings shall be fixed in vertical alignment unless otherwise specified and shall be secured to the walls at joints with M.S. clamps. The clamps shall be M. S. sheet 30 mm bent to required shape and size so as to fit tightly on the socket of pipe when tightened with screw bolts. It shall be formed out of two semi-circular pieces, hinged with 6 mm dia. M. S. pin on one side and provided flanged ends on the other side with holes to fit in the screw bolt and nut 40 mm long. The clamps shall be provided with hook made out of 275 mm long, 10 mm dia M. S. bar riveted to the ring at the centre of one semicircular piece. The clamps shall be fixed to the walls. The clamps shall be kept above 25 mm clear of finished face of wall so as to facilitate cleaning and painting the pipes.

2.3 The pipe shall be fixed vertically. The spigot of the upper pipe shall be properly fitted in the socket of the lower pipe such that there is uniform annular space for filling with the jointing Materials : The annular space between the spigot and socket shall be filled with a few turns of spun yarn soaked in cement slurry or blow bitumen 85 / 25 grade. These shall be pressed home by caulking tools. The joints shall then be filled with stiff cement mortar 1:2 (1 cement : 2 fine sand) well pressed with caulking tools and finished smooth at top at an angle of 45°, sloping up. The joint shall be kept we at least for 7 days by tying four folds of gunny bag to the pipe and keeping it moist constantly.



**3.0 Mode of measurements and payment :**

3.1 The relevant specifications of Item No. 15.93 (B) of A.C. rain water pipes shall be followed except that the C.I. rain water pipe shall be fixed.

3.2 **The rate shall be for a unit of one running metre.**

**15.88 [A] Providing and fixing M. S. Holder bat clamps at approved design to C.I. or S.C.I. pipes embedded and including cement concrete blocks (100 mm x 100 mm x 100 mm size) in 1:2:4 (1 cement : 2 coarse sand : 4 graded stone aggregate 20 mm nominal size) and cost of cutting holes and making good the walls etc complete : 75 mm dia.**

**1.0 Materials :**

1.1 The relevant specification of Item No. 15.94 (B) shall be followed except that the M.S. holder bat clamps of approved design shall be for C.I. rain water pipe – 75 mm dia.

1.2 The bat clamps shall be fixed as directed with C.C. blocks of 100 mm x 100 mm. The relevant specifications of Item No. 5.4.1 shall be followed for concrete work.

**2.0 Mode of measurements and payment :**

2.1 The bat clamp of M.S. holder suitable for 75 mm dia shall be measured for finished item.

2.2 The rate includes cost of all Materials : and labour etc required for satisfactory completion of this item.

2.3 **The rate shall be for a unit of one Number.**

**15.93 [A] Providing and fixing and embedding sand C.I. rain water pipe in the mason surrounded with 12 mm thick cement mortar of the same mix as that of masonry : 75 mm dia pipe.**

**1.0 Materials :**

1.1 Water shall conform to M-1. Cement mortar shall conform to M-11. The C.I. Pipe and fittings shall conform to M-68.

**2.0 Workmanship :**

2.1 Asbestos cement rain water pipes and fittings shall be of the diameter, size and type specified in the item. The pipe shall be fixed in full lengths of 2 metre as far as possible. All the pipes shall be fixed on wall face at locations indicated on drawings or as ordered by the Engineer – in – charge. Pipe shall be secured to face of wall below all joints by M. S. clamps with wooden gutties.

2.2 The spigot of the upper pipe shall be properly fitted into the socket of the lower pipe such that there is uniform annular space for fitting with the jointing Materials : One third depth of annular space between the socket and the spigot shall be filled with spun-yarn soaked in bitumatic jointing compound and shall be pressed home by means of caulking tool. The remaining 2/3 depth of the joints shall be filled in with stiff cement mortar 1:2 and shall be pressed with caulking tool and finished smooth at top at an angle of 45<sup>0</sup> sloping up.

**3.0 Mode of measurements and payment :**

3.1 The pipe shall be measured including all fittings along its length in running metre. No allowance shall be made for the portion of pipe length entering the sockets of the adjacent pipe or fittings.

3.2 The rate includes the cost of all Materials : and labour involved in all the operations including jointing.

3.3 **The rate shall be for a unit of one running metre.**



**15.93 (C) Providing and fixing on wall face Asbestos cement rain water pipe including jointing with spun yarn soaked in bitumen and cement mortar 1:2 (1 cement : 2 coarse sand) complete : 100 mm. dia.**

**1.0 Materials :**

1.1 The relative specifications of item No. 15.93 (B) shall be followed except that the diameter of pipes shall be 100 mm.

**2.0 Mode of measurements and payment :**

2.1 The pipe shall be measured including all fittings along its length in running metre. No allowance shall be made for the portion of pipe length entered into the sockets of the adjacent pipe or fittings.

2.2 The rate includes the cost of all Materials : and labour involved in all the operations including jointing.

2.3 **The rate shall be for a unit of one running metre.**

**15.94 [B] Providing and fixing for A.C. pipe on wall plugs and standard holder bat clamps comprising of two semi circular halves of flat iron and cast iron base screwed on wooden plugs : 80 mm dia.**

**1.0 Materials :**

1.1 The bat clamps shall consist of a cast iron base with a projecting 'I' shaped lay, teeth web of which the semicircular halves of the flat iron clamps are bolted. The base on the holder bat clamp shall be screwed on a pair of wooden plugs fixed in the wall with screw slotted driven through the holes in the base. The screws shall be not less than 75 mm long for 80 mm diameter pipes and 100 mm for 100 mm diameter pipes. The plugs shall be fixed in the wall to a depth of 150 mm in cement mortar 1:2 centrally to the holes in the base of the bat clamps and with their frong face projecting to such a length from the brick face that when the bat clamps is fixed, the outer base of its base shall be flush with the plaster face of the wall. The plugs shall be 110 mm x 50 mm wide at face increasing to 160 mm x 70 mm width at rear and shall be 70 mm deep through out.

**2.0 Mode of measurements and payment :**

2.1 The work shall be measured on number basis of clamps prescribed with accessories including cost of all Materials : and labour involved in all the operation including jointing etc complete fixing in position etc complete.

2.2 **The rate shall be for a unit of one number.**

**15.94 [C] Providing and fixing for A.C. pipe on wall plugs and standard holder bat clamps comprising of two semi circular halves of flat iron and cast iron base screwed on wooden plugs : 100 mm dia.**

**1.0 Materials :**

1.1 The relevant specifications of Item No. 15.94 (B) shall be followed except that the standard holder bat claims shall be for A.C. pipe of 100 mm dia.

**2.0 Mode of measurements and payment :**

2.1 The work shall be measured on number basis of clamps including cost of all Materials : and labour involved in all the operation including jointing, fixing in position etc complete.

2.2 The rate shall be for a unit of one number.



**15.95 [A] Providing and fixing on wall face asbestos cement fittings for rain water pipe including jointing with spun yarn soaked in bitumen and cement mortar 1:2 (1 cement : 2 coarse sand). Bend of required degree 80 mm dia without door 100 mm dia without door.**

**1.0 Materials :**

1.1 The bend of required degree and size as specified in item shall be best quality and make as approved by the Engineer-in-charge. The fittings shall conform to I.S. 1626-1960.

**2.0 Workmanship :**

2.1 The fitting (Bend of required degree) shall be fixed as per relevant specifications of Item No. 15.93 (B) except that the A.C. bends of required degree shall be provided instead of pipe.

**3.0 Mode of measurements and payment :**

3.1 The rate shall be for a unit of One Number.

**15.95 [B] Providing and fixing on wall face asbestos cement fittings for rain water pipe including jointing with spun yarn soaked in bitumen and cement mortar 1:2 (1 cement : 2 coarse sand). Off set 50 mm (2) 80 mm dia (3) 100 mm dia.**

**1.0 Materials : & Workmanship :**

1.1 The relevant specifications of Item No. 15.95 (A) shall be followed except that off-set 75 mm of specified size of A.C. pipes shall be provided instead of bends.

**2.0 Mode of measurements and payment :**

2.1 The rate shall be for a unit of One Number.

**15.95 [J] Providing and fixing on wall face Asbestos cement fittings for rain water pipe including jointing with spun yarn soaked in bitumen and cement mortar 1:2 (1 cement : 2 coarse sand) junction equal angle (3) 80 mm dia without door (5) 100 mm dia without door.**

**1.0 Materials : & Workmanship :**

1.1 The relevant specifications of Item No. 15.95 (A) shall be followed that junction of equal of angle of specified size of A.C. pipes shall be provided instead of bends.

**2.0 Mode of measurements and payment :**

2.1 The rate shall be for a unit of One Number.

**15.95 [K] Providing and fixing on wall face Asbestos cement fittings for rain water pipe including jointing with spun yarn soaked in bitumen and cement mortar 1:2 (1 cement : 2 coarse sand) junction equal angle (3) 80 mm dia without door (5) 100 mm dia without door.**

**1.0 Materials : & Workmanship :**

1.1 The relevant specifications of Item No. 15.95 (A) shall be followed that junction of equal of angle of A.C. rain water pipes of specified size shall be provided instead of A. C. bends.

**2.0 Mode of measurements and payment :**

2.1 The rate shall be for a unit of One Number.





**15.95 [L] Providing and fixing on wall face Asbestos cement fittings for A. C. rain water pipe including jointing with spun yarn soaked in bitumen and cement mortar 1:2 (1 cement : 2 coarse sand) : Standard shoe. (2) 80 mm dia (3) 100 mm dia**

**1.0 Materials : & Workmanship :**

1.1 The relevant specifications of Item No. 15.95 (A) shall be followed that the standard shoe of A.C. pipes of specified size shall be provided instead of A. C. bends.

**2.0 Mode of measurements and payment :**

2.1 **The rate shall be for a unit of One Number.**

**SECTION – 16**

**Ceiling Lining**

**16.3 (A) Providing and fixing wooden planks ceiling with tongued and grooved jointing and wood screws (frame work and cover fillets to be measured and paid separately : Indian Teak Wood (i) 12 mm. thick (ii) 20 mm. thick (iii) 25 mm. thick.**

**1.0 Materials :**

1.1 The Indian Teak wood shall conform to M-29.

**2.0 Workmanship :**

**2.1 General :**

The planks shall be clean sawn in the direction of the grain, cut square and straight. Each plank shall have tongued and grooved jointing. On exposed faces, it shall be planed for full face.

2.2 The frame for supporting the ceiling may be wooden or metal and the size and the other details of frame work shall be as directed. Suspenders of M.S. angles or other sections may be used suspending the frame. Use of wooden suspenders shall be permitted. The bottom surface of the frame shall be checked and corrected to true surface and slope.

**2.3 Fixing :**

Planks of a specified timber and thickness shall be used. The width of the planks shall not be more than 100 mm. up to 20 mm. thick planks and 150 mm. for planks above 20 mm. thick and length shall both exceed 3 metres. The planks shall be of uniform width except in the first and last lines of planks adjacent to the two walls where remaining additional odd width shall be adjusted equally on both sides. The minimum length of planks in finished work shall be such that it will span at least two spacings of the supporting frame work except where shorter lengths are unavoidable. The planks shall be planed true on the exposed sides.

2.4 The outer lines of planks shall be accurately fixed parallel and close to the wall. Each subsequent plank shall be carefully jointed up. The plank shall be fixed to the frame above with two screws at each end joint of frame and one at every intermediate joint. (The screws shall not be thinner than designations 8 and of a length not less than twice the thickness of the boards). The screws shall be counter sunk and the screw holes filled with putty or sloping out way. The unexposed face of planks shall be treated with wood preservative before the board is fixed.

**3.0 Mode of measurements and payment :**

3.1 The supporting frame, cover fillets, and suspenders shall not be included in rate of ceiling.

3.2 No deductions in measurements shall be made for opening not exceeding 0.40 Sq.m. and no extra payment shall be made for forming such openings.



3.3 Each type work in ceiling shall be measured separately.

3.4 **The rate shall be for a unit of One Sq. metre.**

**16.4 Providing and fixing fiber insulation board lining with butt jointing and nails (frame work and cover fillets to be measured and paid separately. (i) 12 mm. thick (ii) 18 mm. thick (iii) 25 mm. thick.**

**1.0 Materials :**

1.1 The fiber insulation board of specified thickness shall conform to I.S. 3348-1965.

2.1 **Fixing :**

The work shall be carried out as per detailed drawings for panel arrangements.

2.2 All boards are subject to slight movements due to moisture and temperature changes, and this shall be allowed for in fixing. Preferably the board shall be stored up for atleast 24 hours before use in the same environment as the one in which they are to be fixed.

2.3 **Frame work :**

The studs and grounds for fixing the boars shall be spaced at 300 mm. to 450 mm. centres both ways, the actual spacing selected depending on the width of the cut board in the panel arrangements. All edges of the boards shall be supported. Intermediate supports shall be provided at dedo heights for picturerails and cornices etc.

2.4 Planked battens 40 mm. × 20 mm. shall be used for grounds on solid walls. The batten shall be plugged to wall as described under. The batten shall be fixed on tapering plugs with 50 mm. long wood screws. The tapering plug shall be trapezoidal in shape having base 50 × 50 mm. at bottom 38 × 38 mm. at top which depth of 50 mm. plugs shall be embedded in C.M. 1:3 and shall be placed at 450 × 500 mm. centres. The plugs shall treated with coal tar and battens shall be treated with wood preservative before use. On uneven wall faces the battens shall be plugged and fitted with packing pieces at the back where necessary. The frame shall be treated with wood preservative before boars are nailed on.

Nailing shall be done by nails having a shank diameter of 2.5 mm. and head diameter of about 8 mm. Nails shall have length as per requirements. The nails shall be placed at supports at 100 mm. To 150 mm. centre to centre and at edges 75 mm. centres. Minimum clearance for nails from edges shall be 10 mm. The nails shall be rustles where the nail heads are exposed. Where the joints are to be covered with beading, felt headed (clout) nails shall be used instead of lost head nails.

**3.0 Mode of measurements and payment :**

3.1 The relevant specifications of item No. 16.3 (A) shall be followed.

3.2 **The rate shall be for a unit of One Sq. metre.**

**16.13 (I) Providing and fixing plywood lining with butt jointing and nails (frame work and cover fillets to be measured and paid for separately) 6 mm. thick play.**

**1.0 Materials :**

6 mm. thick plywood shall conform to M-37.

**2.0 Workmanship :**

The relevant specification of item 16.4 shall be followed except that 6 mm. thick plywood shall be fixed in lining.



**3.0 Mode of measurements and payment :**

3.1 The relevant specifications of item 16.4 shall be followed.

3.2 **The rate shall be for a unit of One Sq. metre.**

**16.13 (II) Providing and fixing plywood lining with butt jointing and nails (frame work and cover fillets to be measured and paid for separately) 9 mm. thick play.**

**1.0 Materials & Workmanship :**

1.1 The relevant specifications of item No. 16.13 (I) shall be followed except that the thickness of plywood to be fixed shall be 9 mm.

**2.0 Mode of measurements and payment :**

2.1 The relevant specifications of item No. 16.4 (I) shall be followed.

2.2 **The rate shall be for a unit of One Sq. metre.**

**16.21 (I) Providing and fixing plain asbestos sheet lining with butt jointing and wood screws (frame work and cover fillets to be paid for separately) Class-A-6.5 mm. thick.**

**1.0 Materials :**

1.1 Plain A.C. Sheets 6.5 mm. thick shall be conform to M-24.

**2.0 Workmanship :**

2.1 The relevant specifications of item No. 16.4 shall be followed except that the plain A.C. sheet class A of 6.5 mm. thickness shall be fixed in lining.

2.2 In fixing asbestos cement sheets, care shall be taken to avoid rigid fixing as this may cause cracking if the supporting structure expands or shrinks. The sheet shall be fixed with wood screws to wooden ground and the screw holes shall be drilled slightly longer than the screws. Asbestos sheet may also be advantageously fixed on to walls with cement plaster backing. The screws shall be fixed at 150 mm. to 200 mm. at supports. The boards shall be fitted either with wooden cover fillets or asbestos strips as described in item.

**3.0 Mode of measurements and payment :**

3.1 The relevant specifications of item No. 16.4 shall be followed.

3.2 **The rate shall be for a unit One Sq. metre.**

**16.21 (II) Providing and fixing plain asbestos sheet lining with butt jointing to wood screws (frame work and cover fillets to be paid for separately) Class-B-5 mm. thick.**

**1.0 Materials : & Workmanship :**

1.1 The relevant specifications of item No. 16.21 (I) shall be followed except that the plain A.C. sheet of Class-B, 5 mm. thick shall be fixing in lining.

**2.0 Mode of measurements and payment :**

2.1 The relevant specifications of item No. 16.21 (I) shall be followed.

2.2 **The rate shall be for a unit of One Sq. metre.**



## SECTION – 17

### Plastering and paints

**17.58 (I) 10 mm. thick cement plaster in single coat on fair side of brick concrete walls for interior plastering up to floor two level and finished even and smooth in (i) C.M. 1:3.**

**1.0 Materials :**

1.1 Water shall conform to M-1. The cement mortar of proportion 1:3 shall conform to M-13.

**2.0 Workmanship :**

**2.1 Scaffolding**

Wooden ballies, bamboos, planks, treatles and other scaffolding shall be sound. These shall be property examined before erection and use. Stage scaffolding shall be provided for ceiling plaster which shall be independent of the walls.

**2.2 Preparation of back-ground :**

2.2.1 The surface shall be cleaned of all dust, loose mortar dropping, traces of algae, afflorescence and other foreign matter by water or by brushing. Smooth surface shall be toughened by brushing if it is not hard and by hacking if it is hard. In case of concrete, is a chemical retarder has been applied to the form work, the surface shall be roughend by wire brushing and all the resulting dust and loose particles cleaned off and care shall be taken that none of the retarders is left on the surface. Trimming of projections on brick/ concrete surfaces where necessary shall be carried out to get an even surface.

2.2.2 Raking of joints in case of masonry where necessary shall be allowed to dry out for sufficient period before carrying out the plaster work.

2.2.3 The work shall not be soaked but only damped evenly before applying the plaster. If the surface becomes dry, such area shall be moistened again.

2.2.4 For external plaster, the plastering operation shall be started from top floor and carried downwards. For internal plaster, the plastering operations may be started wherever the building frame and cladding work are ready and the temporary supports of the ceiling resting on the wall of the floor have been removed. Ceiling plaster shall be completed before starting plaster to walls.

**2.3 Application of plaster :**

2.3.1 The plaster about 15×15 cms. shall be first applied horizontally and vertically at not more than 2 metres intervals over the entire surface to serves as gauge. The surfaces of these gauges shall be truly in plan of the finished plastered surface. The mortar shall then be applied in uniform surface slightly more than the specified thickness, then brought to a true surface by working a wooden straight edge reaching across the gauges with small upward and sideways movements at a time. Finally, the surface shall be finished off true with a trowel or wooden float according as a smooth or a sandy granular textures required. Excessive troweling or overworking the float shall be avoided. All corners, arises, angles and junctions shall be truly vertical or horizontal as the case may be and shall be avoided. All corners, arises, angles and junctions shall be truly vertical or horizontal as the case may be and shall be carefully finished. Rounding or chamfering, corners, arises junctions etc. shall be carried out with proper templates to be size required.

2.3.2. Cement plaster shall be used within half an hour after addition of water. And mortar or plaster which is partially set shall be rejected and removed forthwith from the site.

2.3.3. In suspending the work at the end the day, the plaster shall be left out clean to the line both horizontally and vertically. When recommencing the plaster, the edges of the old work shall be scraped clean and wetted with cement putty before plaster is applied to the adjacent areas to enable the two to properly join together. Plastering work shall be closed at the end of the day the body of the



wall and nearer than 15 cm. to any corners or arises. Horizontal joints in plaster work shall not occur on parapet tops and copings as these invariably lead to leakage. No portion of the surface shall be left out initially to be packed up later on.

- 2.3.4 Each coat shall be kept damp continuously till the next coat is applied or for minimum period of 7 days. Moistening shall commence as soon as plaster is hardened sufficiently. Soaking of walls shall be avoided and only as much water as can be readily absorbed shall be used, excessive evaporation on the sunny or windward side of building in hot air or dry weather shall be prevented by hanging matings or gunny bags on the outside of the plaster and keeping them wet.

### **3.0 Mode of measurements and payment :**

- 3.1 The rate shall include the cost of all Materials :, labour and scaffolding etc. involved in the operations described under Workmanship :

3.2 All plastering shall be measured in square meters unless otherwise specified. Length, breadth or height shall be measured correct to a centimeter.

3.3 Thickness of the plaster shall be exclusive of the thickness of the key i.e. grooved or open joints in brick work, stone work, etc. or space between laths. Thickness of plaster shall be average thickness with minimum 10 mm., at any point on the surface.

3.4 This item includes plastering up to floor two level.

3.5 The measurement of wall plastering shall be taken between the walls or partitions (dimensions before plastering being taken) for length and from the top of floor or skirting to ceiling for height. Depth of cover of cornices if any shall be deducted.

3.6 Soffits of stairs shall be measured as plastering on ceilings. Flowing/folding soffits shall be measured separately.

3.7 For jambs, soffits, sills, etc., openings exceeding 0.5 sqm each in area for ends of joints, beams, posts, girders, steps etc. for opening not exceeding 0.5 sq.mt. each in area and for openings exceeding 0.5 sq mt and not exceeding 3.0 sqm, in each area deductions and additions shall be made in the following manner:

(a) No deductions shall be made for end of joints, beams, posts, etc. for openings not exceeding 0.5 sqm. each and no addition shall be made for reveals, jambs, soffits, sills, etc. of these opening for finish to plaster around ends of joints, beams, posts, etc.

(b) Deduction for openings exceeds 0.5 sqm. but not exceeding 3.0 sqm. each shall be made as follows and no addition shall be made for reveals, jambs, soffits, sills, etc. of these openings.

(i) When both faces of any wall are plastered with same plaster, deduction shall be made for one face only.

(ii) When two faces of any wall are plastered with different types of plasters or if one faces is plastered and the other pointed, deductions shall be made from the plaster or pointing on the side of frame for door, windows, etc. on which width of reveals is less than that on the other side but no deductions shall be made on the other side. Where width of reveals on both faces of all are equal, deductions of 50% of area of opening on each face shall be made from area of plaster and/or pointing as the case may be.

3.8 For openings having door frames equal to projection beyond the thickness of wall, full deduction for opening shall be made from each plastered face of the wall.

3.9 In case of openings of area above 3 sq.mt. each, deduction shall be made for openings but jambs soffits, and sills shall be measured.

3.10 **The rate shall be for a unit of one Sq.meter.**



**17.58 (II) 10 mm. cement plaster in single coat on fair side of brick/ concrete walls for interior plastering up to floor two level and finished even and smooth in C.M. 1:4.**

**1. Materials & Workmanship :**

1.1 The relevant specifications of item No. 17.58(I) shall be followed except that the proportion of mortar is C.M. 1:4 instead of C.M. 1:3.

**2.0 Mode of Measurement & Payment :**

2.1 The Mode of measurement and payment shall be the same as for Item No. 17.58(I).

2.2 **The rate shall be for a unit of One Sq. meter.**

**17.58 (III) 10 mm. cement plaster in single coat on fair side of brick/ concrete walls for interior plastering up to floor two level and finished even and smooth in C.M. 1:6.**

**1. Materials & Workmanship :**

1.1 The relevant specifications of item No. 17.58(I) shall be followed except that the proportion of mortar is C.M. 1:4 instead of C.M. 1:6.

**2.0 Mode of Measurement & Payment :**

2.1 The Mode of measurement and payment shall be the same as for Item No. 17.58(I).

2.2 **The rate shall be for a unit of One Sq. meter.**

**17.61(I) 20 mm. thick cement plaster in single coat on rough side of single or half brick wall for interior plastering up to floor two level and finished even and smooth in cement mortar 1:3 (1 cement : 3 sand).**

**1. Materials & Workmanship :**

1.1 The relevant specifications of item No. 17.59(I) shall be followed except that the thickness of cement plaster shall be 20 mm. The plastering work shall be in single coat on rough side of half brick wall for interior plastering up to floor two level finished even and smooth in C.M. 1:3.

**2.0 Mode of Measurement & Payment :**

2.1 The relevant specification of Item No. 17.59(I) shall be followed.

2.2 **The rate shall be for a unit of One Sq. meter.**

**17.61(II) 20 mm. thick cement plaster in single coat on rough side of single or half brick wall for interior plastering up to floor two level and finished even and smooth in cement mortar 1:4 (1 cement : 4 sand)**

**1. Materials & Workmanship :**

1.1 The relevant specifications of item No. 17.59(II) shall be followed except that the thickness of plastering shall be 20 mm in C.M. 1:4.

**2.0 Mode of Measurement & Payment :**

2.1 The relevant specification of Item No. 17.59(I) shall be followed.



2.2 **The rate shall be for a unit of One Sq. meter.**

**17.61(III) 20 mm. thick cement plaster in single coat on rough side of single or half brick wall for interior plastering up to floor two level and finished even and smooth in cement mortar 1:6 (1 cement : 6 sand)**

**1. Materials & Workmanship :**

1.1 The relevant specifications of item No. 17.59(III) shall be followed except that the thickness of plastering shall be 20 mm. C.M. 1:6.

**2.0 Mode of Measurement & Payment :**

2.1 The relevant specification of Item No. 17.59(I) shall be followed.

2.2 **The rate shall be for a unit of One Sq. meter.**

**17.69 Extra over items 51 to 65 for finishing with a floating coat of neat cement slurry.**

**1. Materials & Workmanship :**

1.1 The relevant specifications of item No. 17.58 and 17.61 shall be followed for Materials : except that this work is only providing smooth cement finish with floating coat of neat cement slurry.

1.2 The coat of cement and fine sand mortar of proportion 1:1 (1.5 mm thick about) shall be applied to the plastered surface with atrowel to provide uniform texture while the base coat is still plastic.

1.3 In any continuous face of wall the finishing treatment should be carried out continuously and day to day breaks made to coincide with arthitectual breaks in order to avoid unsightly junctions.

1.4 **Curing :** All the plaster work shall be kept damp continuously for a period of 7 days.

**2.0 Mode of Measurement & Payment :**

2.1 The payment shall be made for a unit of 1.0 sq.mt. of work done over and above the finishing of work of base coat.

2.2 The relevant specifications of item of base coat shall be followed for measurements and payment.

2.3 **The rate shall be for a unit of One Sq. mtere.**

**17.69 Extra over items 17.58 to 71.61 for providing and mixing water proofing Materials : in cement mortar in proportion recommended by the manufacturers.**

**1. Materials & Workmanship :**

1.1 The relevant specifications of item No. 17.58 and 17.61 shall be followed except that water proofing Materials : of approved make shall be added to the cement at the rate specified or as directed by the Engineer-in-Charge. The proportion of water proofing Materials : to be mixed with 50 kg. bags shall be as recommended by the manufacturers of the water proofing Materials :

**2. Mode of Measurement & Payment :**



- 2.1 The payment shall be made for this work over and above the plaster work.
- 2.2 The rate shall be for a unit of 1 kg. of water proofing Materials : used in 1 bag weighing 50 kgs. cement used extra over the rate of plastering work.
- 17.91 Extra over item No. 17.59 to 17.61 for plastering on ceiling and soffits of stair up to floor two level instead of plastering on walls.**
- 1. Materials & Workmanship :**
- 1.1 The relevant specifications of item No. 17.59 (I) shall be followed except that this work is for ceiling, soffits of stairs up to two floor level instead of plaster on walls.
- 1.2 The smooth concrete surface shall be suitably roughened to provide necessary bond before plastering.
- 2. Mode of Measurement & Payment :**
- 2.1 The payment shall be made for a unit of One Sq. meter of work done, extra work and above payment of plaster work on walls surfaces.
- 2.2 **The rate shall be for a unit of one sq. meter.**
- 17.94 ( I ) Extra over item No. 1 to 69, 71 to 87 and 90 for interior plastering above floor two level for every additional storey height (i), single coat plaster.**
- 1.0 Materials : & Workmanship :**
- 1.1 The relevant specifications of item No. 17.59(I) shall be followed except that the whole work is to be carried out above floor two level.
- 2.0 Mode of measurements and payment :**
- 2.1 The Mode of measurements and payment : shall be same as item No. 17.59(I)
- 2.2 The extra payment shall be made over and above the floor two level for every additional floor height.
- 2.3 The unit rate shall be for a unit of One Sq. meter.
- 17.94 ( II ) Extra over item No. 1 to 69, 71 to 87 and 90 for interior plastering above floor two level for every additional storey height (i), two coat plaster.**
- 1.0 Materials : & Workmanship :**
- 1.1 The relevant specifications of item No. 17.94(I) shall be followed except that extra payment for shall be for a two coat plaster.
- 2.0 Mode of measurements and payment :**
- 2.1 The relevant specification of item No. 17.94(I) shall be followed.
- 2.2 **The rate shall be for a unit of One Sq. meter.**
- 17.94 ( III ) Extra over item No. 1 to 69, 71 to 87 and 90 for interior plastering above floor two level for every additional storey height (i), floating coat of neat cement.**





**1.0 Materials : & Workmanship :**

1.1 The relevant specifications of item No. 17.94(I) shall be followed except that extra payment for shall be made for a work of floating coat neat cement slurry.

**2.0 Mode of measurements and payment :**

2.1 The relevant specification of item No. 17.59(I) shall be followed.

2.2 **The rate shall be for a unit of One Sq. meter.**

**17.95 20 mm thick sand face cement plaster on walls up to height of 10 mm and above ground level consisting of 12 mm. thick backing coating of C.M. 1:3 (1 cement : 3 sand) and 8 mm. thick finishing coat in CM 1:1 (1 cement : 1 sand) etc. complete.**

**1.0 Materials :**

1.1 water shall confirm M-1. Cement mortar shall confirm to M-11.

**2.0 Workmanship :**

2.1 The work shall be carried out in the coats. The backing coat (base coat) shall be 12 mm, thick in CM 1:3. The relevant specifications of item No. 17.58(I) shall be followed except that the thickness of back coat shall be 12 mm average. Before the first coat hardens its surface shall be beaten up by edges of wooden tappers and close dents shall be made on the surface. The subsequent coat shall be applied after this coat has been allowed to set for 3 to 5 days, depending upon the weather conditions, the surface shall not be allowed to dry during this period.

2.2 The second coat shall be completed to 8 mm. thickness in CM 1:1 as described above, including raising sand facing by bushing. The sample of sand face shall be got approved before the work is started. The whole work shall be carried out uniformly as per sample approved.

**2.3 Curing :**

The curing shall be started overnight after finishing of plaster. The plaster shall be kept wet for a period of 7 days. During this period, it shall be protected from all damages.

**3.0 Mode of Measurement & Payment :**

3.1 The relevant specifications of item No. 17.58(I) shall be followed except that the sand face plaster on outside up to 10 m above ground level shall be measured under this item.

3.2 **The rate shall be for a unit of One sq.meter.**

**17.116 (A) Pointing on brick work with cement mortar 1:3 (1 cement : 3 coarse sand) – flush pointing**

**1.0 Materials :**

1.1 water shall confirm M-1. Cement mortar shall confirm to M-11.

**2.0 Workmanship :**

2.1 The flush pointing work shall be carried out with cement mortar of proportion 1:3 (1 part of cement and 3 part of coarse sand) by volume.

**2.2 Preparation of surface :**



2.2.1 the joints shall be raked to such a depth that the average of new mortar measured from either the sunk surface of finished pointing or from the edge of the brick shall be average 10 mm.

2.3 **Application of Mortar and Finishing :**

2.3.1 The mortar shall be pressed into the raked out joints with a pointing trowel according to the type of pointing specified in item. The mortar shall not spread over the corner edge or surface of the masonry. The pointing shall then be finished with the pointed tools.

2.4 **Curing :**

2.4.1 The pointing shall be kept wet for 7 days. During this period, it shall be suitably protected from all damages.

**3.0 Mode of Measurement & Payment :**

3.1 No deductions shall be made for end of joints, beams and posts etc. and openings not exceeding 0.5 sq.mt. each and no addition shall be made for reveals, jambs, soffits sills etc. of these openings.

3.2 Deductions for opening exceeds 0.5 sq.mt. but not exceeding 3 sq.mt. each shall be paid as follows and no addition shall be made for reveals, jambs, soffits, sills etc. of these openings.

(i) When both faces of walls are pointed with same type of pointing, deductions shall be made for one face only.

(ii) When both faces of walls are pointed with different type of pointing or if one face is plastered and the other is pointed, deductions shall be made in the plaster or pointing on the side of frame for door, windows etc. on which the width of reveals is less than that on the other side but no deductions shall be made from plaster or pointing on the other side.

(iii) When only one face is treated and the other face is not treated, full deductions shall be made, if the width of the reveals on the treated side is less than on the untreated side, but if the width of the reveals is more, than no deductions shall be made not any addition shall be made for reveals, jambs, soffits, sills etc.

3.3 In case of openings of area above 3 sq.mt. each deductions shall be made for opening but jambs, sills and soffits shall be measured.

3.4 **The rate shall be for a unit of One Sq.mt.**

**17.116 (B) Pointing on brick work with cement mortar 1:3 (1 cement : 3 coarse sand) Ruled pointing.**

**1.0 Materials & Workmanship :**

1.1 The relevant specifications of item No. 17.116 (A) shall be followed except that the pointing to be done ruled pointing as under :

1.2 The joints shall be initially formed as for flush pointing and then while the mortar is still green, a groove of specified shape shall be formed by running forming tool straight along the centre line of joints till a smooth and hard surface is obtained. The vertical joints shall also be finished in a similar ways. The pointing lines shall be uniform in width and truly horizontal and paralld in case of floor and ceiling.



**2.0 Mode of measurements and payment :**

2.1 The Mode of measurements and payment : shall be the same as per the Item No. 17.116(A)

2.2 **The rate shall be for a unit of One Sq. Meter.**

**17.117 (A) Pointing on brick work with cement mortar 1:4 (1 cement : 4 sand) Flush pointing.**

**1.0 Materials & Workmanship :**

The relevant specifications of item No. 17.116 (A) shall be followed except that the pointing work shall be carried out with CM 1:4.

**2.0 Mode of measurements and payment :**

2.1 The relevant specification of item No. 17.116(A) shall be followed.

2.2 **The rate shall be for a unit of One Sq. Meter.**

**17.117 (B) Pointing on brick work with cement mortar 1:4 (1 cement : 4 sand) Flush pointing.**

**1.0 Materials & Workmanship :**

The relevant specifications of item No. 17.116 (A) shall be followed except that the proportion of CM 1:4 shall used for ruled pointing.

**2.0 Mode of measurements and payment :**

2.1 The relevant specification of item No. 17.116(A) shall be followed.

2.2 **The rate shall be for a unit of One Sq. Meter.**

**17.140 (A) Pointing on coursed stone masonry with cement mortar 1:3 (1 cement : 3 sand) flush pointing.**

**1.0 Materials & Workmanship :**

1.1 The relevant specifications of item No. 17.116 (A) shall be followed except that the pointing shall be done on coursed stone masonry with CM 1:3 and the mortar shall be simply struck off with a trowel and the work left showing the natural irregularities in line and the surface of the stones themselves.

**2.0 Mode of Measurement & Payment :**

2.1. The relevant specifications of item No. 17. 116 (A) shall be followed.

2.2. **The rate shall be for a unit of One sq. metre.**

**17.140 (B) Pointing on course stone masonry with cement mortar 1:3 (1 cement :3 sand) Ruled pointing**

**1.0. Materials & Workmanship :**

1.1. The relevant specifications of item No. 17.140 (A) and 17.116 (B) shall be followed.



**2.0. Mode of measurements and payment :**

2.1. The relevant specifications of item No. 17. 116 (A) shall be followed.

2.2. **The rate shall be for a unit of One sq. metre.**

**17.144 (A) Pointing on uncoursed stone masonry with cement mortar 1:3 (1 cement :3 sand) Flushing pointing.**

**1.0. Materials & Workmanship :**

1.1 The relevant specifications of item No. 17.116 (A) shall be followed except that the flush pointing shall be done on uncoursed rubble masonry work in C.M. 1:3 and the mortar shall be simply struck off with a trowel and the work left showing the natural irregularities in line and the surface of the stone themselves.

**2.0. Mode of measurements and payment :**

2.1. The relevant specifications of item No. 17.116 (A) shall be followed.

2.2. **The rate shall be for a unit of One sq. metre.**

**17.144 (B) Pointing on course stone masonry with cement mortar 1:3 (1 cement :3 sand) Rules pointing.**

**1.0. Materials & Workmanship :**

1.1 The relevant specifications of item No. 17.116 (A) and 17.144 (A) shall be followed except that the ruled pointing work shall be carried out on uncoursed rubble masonry work in C.M. 1 : 3.

**2.0. Mode of measurements and payment :**

2.1. The relevant specifications of item No. 17.116 (A) shall be followed.

2.2. **The rate shall be for a unit of One sq. metre.**

**17.0.01. Providing cement vata (10 cms. 10 cms.) size quarter round in cement mortar 1:1 including neat cement finishing, watering, etc. complete.**

**1.0. Materials :**

1.1. Water shall conform to M-1, Cement mortar shall conform to M- 11.

**2.0. Workmanship :**

2.1. The work of cement vata of 10 cms. x 10 cms. size shall be carried out in the best workman like manner. The inter portion of rain water pipe shall be rounded off properly during constructing the vata. The work shall be cured for 7 days.

**3.0. Mode of measurements and payment :**

3.1. The work shall be measured for finished item in running metre.

3.2. **The rate shall be for a unit of one running metre.**



## Section -18

### White Washing & Distempering

**18.11. White washing with lime on undecorated wall surfaces (two coats) to give an even shade including thoroughly brooming the surface to remove all dirt, dust, mortar drops and other foreign matter.**

**1.0. Materials :**

1.1. The clearcolle shall be made from glue and boiling water by mixing. 1 Kg. mixture shall be suitably tinted where required for use under coloured distemper if directed. Glue shall conform to I.S. 852-1969 (Specifications for animal glue)

1.2. Lime used shall be freshly burnt class 'C' Lime (fat lime) and white in colour conforming to I.S. 712-1973. Water shall conform to M-1. Best quality of gum shall be used in the preparations of white wash. Ultramarine blue or Indigo: this shall conform to I.S. 55-197() for points, and shall be used for preparation of white wash. Pigments: Mineral colours, not affected by lime shall be used in preparing colour wash.

**2.0. Workmanship :**

2.1. Preparation of white wash solution: Surface already white or colour : The fat lime shall be slaked as site and shall be mixed and stirred with about five litres of water for 1 Kg. of unslaked lime to make a thin cream. This shall be allowed to stand for a period of 24 hours and then shall be screened through a clean coarse cloth, 4 Kg. of gum dissolved in hot water shall be added to each cubic metre of lime cream. Small quantity of ultramarine blue (Up to 3 gms. per Kg. of lime) shall also be added to the last two coats of white wash solution and the whole solution shall be stirred thoroughly before use.

**2.2. Preparation of surface**

2.2.1 The surface spoiled by smoke soot shall be scrapped with steel wire brushes or steel scrapers or shall be rubbed with over-burnt surkhi or brick bats. The surface shall be then broomed to remove all dust, dirt and shall be washed with clean water.

2.2.3. Oil or grease spots shall be removed by suitable chemical and smooth surface shall be rubbed with wire brushed.

2.2.4 All unsound portion of the surface plaster shall be removed to full depth of plaster in rectangular patches and plastered again after raking the masonry joints properly. Such portion shall be wetted and allowed to dry. They shall then be given one coat. of white wash.

2.2.5. All unnecessary nails shall be removed, the. holes, cracks, patches etc. shall be made good with material similar in composition to the surface to be prepared.

**2.3. Scaffolding:**

Wherever scaffolding is necessary it shall be erected in such a way that as far as possible no part of scaffolding shall rest against the surface to be white or colour washed. A properly secured strong and well tied suspended platform (Zoola) may be used for white washing. Where ladders and used, pieces of old gunny bags shall be tied at top and bottom to prevent scratches to the floors and walls. For white washing of ceilings, proper stage scaffolding shall be erected where necessary.

**2.4. Application of white wash:**

2.4.1 On the surface so prepared the white wash shall be applied with 'Moon' brush. The first stroke of the brush shall be from top downwards, another from bottom upwards over the first stroke and similarly one stroke from the right another from the left, over the first stroke brush before it dries. This will form one coat. Each coat shall be allowed to dry before next coat is applied. Number of



coats as specified in item shall be applied. It shall present smooth and uniform finish free from brush marks and it should not come off easily when rubbed with finger.

2.4.2 Splashing and dropping if any on the doors and windows, ventilators etc. shall be removed and the surface cleaned.

2.4.3. Priming and Alkali resistant treatments, scraping of surface washing etc. surface spoiled by smoke Soot removed of oil and grease spots, treatment for infection with efflorescence moulds moss, fungi, algae and lichen and patch repairs to plaster wherever done shall not be paid extra.

### **3.0. Mode of measurements and payment :**

3.1. All the work shall be measured in the decimal system as under:

(a) Dimensions shall be measured to be nearest 0.01. M.

(b) Area in individual items shall be worked out to the. nearest 0.01 Sq. M.

All the walls shall be measured in sq. mt. Deductions for jambs, soffits, sills etc. for openings not exceeding 0.5 sq. mt. each in area, for ends of joints, posts, beams, girders, steps etc. not exceeding 0.5 sq. mt each in area and for openings exceeding 0.5 sq.mt. and not exceeding 3.0 sq. mt. each in area, deductions and additions shall be made as under:

3.2 No deductions shall be made for ends of joists, beams, postes, etc. and openings not exceeding 0.5 sq. mt. each. No addition shall be made for reveals, jambs, soffits, sills etc. of these openings nor for finish around ends of joints, beams, posts, etc.

3.3 Deductions for openings exceeding 0.5 sq. mt. but not exceeding 3 sq. nit, each shall be made as follows and no addition will he made for reveals, jambs, soffits, etc. of these openings.

(a) When both the faces of walls are provided with finish, deduction shall be made for one face only.

(b) When each face of wall is provided with a different finish, deduction shall be made for that side of frame for door, windows, etc. on which width of reveals is less than that of the other wise. where width of reveals on both faces of wall are equal, deduction of 50% of area of opening on each face shall be made from total area of finish.

(c) When only one face of wall is treated and the face is not treated, full deduction shall be made if the width of reveal on the treated side is less than that on the untreated side, but if the width of the reveal is equal or more than on the untreated side neither deductions not additions to he made for reveals, jambs, sffits, sills etc.

3.4 In case of area of openings exceeding 3 sq. mt.. each, deduction shall be made for openings but jambs, soffits, sills shall be measured.

3.5. No deductions shall be made for attachment such as casing, conducts, pipe, electric wiring and the like.

3.6. Corrugated surfaces shall be measured flat as fixed and not girth. The quantities so measured shall be increased by the following percentage and the resultant shall be included with the general areas:

(a) Corrugated steel sheets. . . 14%

(b) Corrugated A.C. Sheets. . 20%

(c) Semi corrugated A.C. Sheets. 10%

(d) Nainital pattern roof (Plain sheeting with rolls) 10%

(e) Nainital pattern root (with corrugated sheets) 25%



- 3.7 Cornices and other wall features, when they are not picked out in a different, finish/colour shall be girthed and included in the general area.
- 3.8 The rate shall include the cost of all Materials :, labour, scaffolding, protective measures etc. involved in all the operations described above.
- 3.9 **The rate shall be for a unit of One sq. metre.**

**18.12 White washing with lime on decorated wall surface (One coat to give an even shade including thoroughly brooming the surface to remove dirt, dust, mortar, drops and loose scales of lime wash and other foreign matter.**

**1.0. Materials & Workmanship :**

- 1.1. The relevant specifications of item No. 18.11 shall be followed except that the white washing work shall be carried out. on decorated wall surface single coat.

**2.0. Mode of measurements and payment :**

- 2.1. The relevant specifications of item No. 18.11 shall be followed.
- 2.2. **The rate shall be for a unit of one sq. metre.**

**18.13. Extra over items 18.11 and 18.12 for every subsequent coat of white washing with lime on wall surfaces.**

**1.0. Materials :**

- 1.1. The relevant specifications of item No. 18.11 shall be followed except that this work is for extra coat over and above two coats on wall surface.

**2.0. Mode of measurements and payment :**

- 2.1. The relevant specifications of item No. 18.11 shall be followed except that the payment of subsequent coat shall be made extra over and above the item No.18.11 for every subsequent coat applied.
- 2.2. **The rate shall be for a unit of One sq. metre.**

**18.14. Extra over item 18.11 for white washing with the lime on ceiling and/or sloping roof.**

**1.0. Materials & Workmanship :**

- 1.1. The relevant specification of item No. 18.11 above shall be followed except that this work is, for ceiling and! or sloping roof.

**2.0. Mode of measurements and payment :**

- 2.1. The relevant specifications of item No. 18.11 shall be followed except that extra payment for white washing on ceiling and/or sloping roof shall be made over and above the payment of item NO. 18.11
- 2.2 **The rate shall be for a unit of One sq. metre.**

**18.15 Extra over item 18.12 for white washing with the lime on ceiling and or sloping roof.**

**1.0. Materials & Workmanship :**



1.1. The relevant specifications of item No. 18.12 shall be followed except that the white washing work shall be carried out on decorated ceiling and/or sloping roofs.

**2.0. Mode of measurements and payment :**

2.1. The relevant specifications of item No. 18.12 shall be followed except that extra payment for white washing on ceiling and/or sloping roof shall be made over and above the payment of item NO. 18.12.

2.2. **The rate shall be for a unit of One sq. metre.**

**18.16 Extra over item 18.13 for every subsequent coat white washing with the lime on ceiling and or sloping roof.**

**1.0. Materials & Workmanship :**

1.1. The relevant specifications of item No. 18.11 and 18.13 shall be followed except that this work is for extra coat over and above two coat over and above two coats of ceiling and/or sloping roofs.

**2.0. Mode of measurements and payment :**

2.1. The relevant specifications of item No. 18.11 and 18.13 shall be followed except that extra payment for white washing shall be made for ceiling and/or sloping roof for every subsequent coat applied over item NO. 18.11 and 18.13.

2.2. **The rate shall be for a unit of One sq. metre.**

**18.17 Colour washing with lime on undecorated wall surfaces (Two coats) over and including priming coat of white washing to give even shade including thoroughly brooming the surface to remove all dirt, dust, mortar drops and other foreign matter: The relevant specifications for the Materials : 18.11 shall be followed except that it shall before colour wash.**

**1.0 Materials & Workmanship :**

1.1. **Clear-colle :** This shall be made glue and boiling water by mixing 1 Kg. of glue to every 15 liters of water. The mixing shall be suitably tinted to match with colour of colour washing as directed. Glue shall conform to I.S. 852-1969.

1.2. **Lime :** Lime used shall be freshly burnt class 'C' lime (fat lime) and white in colour conforming to I.S. 712-1973.

1.3. **Water :** water shall conform to M-1.

1.4. **Gum :** Best quality of gum shall be used in the preparation of white or colour wash. The colour pigment of required tint and shade shall be mixed in lime cream. The mineral colour not affected by lime shall be used in preparing the colour wash.

**2.0. Workmanship :**

2.1. Sufficient quantity of colour wash enough 'for the complete job shall be prepared in one operation to avoid any difference in shade. the basic white wash solution shall be prepared in accordance with item.

**18.11. Mineral colours not affected by lime shall be added to the white wash solution. No colour wash shall be done until a sample of the colour has been approved, it shall be noted that small samples of colour appears lighter in shade than when the same shades are applied precisely to large surface. The colour shall be of event tint, over the whole surface If it patchy or otherwise badly applied, it shall be rejected.**

Preparation of the colour wash with pigment shall be as under :





(A) **With Yellow and Red Ochre:**

solid lumps if any in the powder shall be crushed to powder and solution in water prepared and then added to white wash sieving it through a coarse cloth, mixed evenly and thoroughly to white wash in small quantities till the required shade is obtained.

(B) **With Blue Vitriol:**

Fresh crystals of hydrous copper sulphate (i. e. blue vitriol) shall be ground to fine powder and dissolved in small quantity of water. Sufficient quantity of solution enough to produce the colour wash of required shade shall be strained through a clean cloth, the filtrate being mixed evenly and thoroughly to the white wash.

(C) Colour wash from other colouring pigment shall be prepared in accordance with the instructions of the manufacturer.

2.2. **Preparation of Surface :**

The surface shall be prepared by removing mortar dropping and foreign matter and thoroughly cleaned with wire or fibre brush or any other suitable means as directed by the Engineer-in-charge. All loose pieces and scales shall, be scrapped off and holes filled with mortar.

2.2.1. For scaffolding and application of colour wash, relevant specification of item No. 18. 11 above shall be followed. The colour wash shall be applied as under:

The colour wash shall be applied in accordance with the procedure given in item No. 18.11. Application of white wash for colour washing on undercoated surface after the surface has been prepared. The first primary coat. shall be of white wash and subsequent coats (minimum two) shall be colour wash and the entire surface shall represent a smooth and uniform finish. To start with, patch of 0.1 sq. mt. on prepared surface shall be colour washed with first coat of white wash and subsequent coats of colour wash solution in full numbers of coats as described in the item and the shade So obtained shall be examined before the entire work of colour washing is taken up in hand. it shall be noted that small areas of colour wash will appear lighter in shade than when the same shade is applied to the large surface.

2.2.2.. for colour washing on decorated surfaces, after the surface has been prepared, a coat of white. wash shall be applied for the patches and repairs. Then one coat or more of colour wash shall be applied over the entire surface, such that the colour washed surface shall present a uniform colour shade. No primary coat is needed for a decorated surface hearing colour of same shade on surface requiring change of colour after the surface has been prepared as described above. Two coats of white wash shall be applied before application of specified number (minimum two) of coats of colour wash of the new shade.

2.3. **Protecting measure.**

The surface f doors, windows, floors, articles, of furniture etc. and such other parts of the building not to he white washed shall be protected from being splashed upon. Such surfaces shall be cleaned of white wash splashed if any.

**3.0 Mode of measurements and payment :**

3.1. The relevant specifications of item No. 18.11 shall be followed.

3.2. **The rate shall be for a unit of One sq. metre.**

**18.18. Colour washing with lime on decorated wail surfaces (one coat,) to give an even shade including thoroughly brooming the surface to remove all dirt, dust, mortar drops and loose scales of lime wash and other foreign matter.**

**1.0 Materials & Workmanship :**

The relevant specifications of item No. 18.17 shall be followed except that the colour washing shall be carried out on decorated wall surface in one coat.



**2.0 Mode of measurements and payment :**

2.1. The relevant specifications of item No. 18.17 shall be followed.

2.2. **The rate shall be for a unit of One sq. metre.**

**18.19 Extra over item No. 18.17 and 18.18 for every subsequent coat of colour wash with lime on 'wall surfaces.**

**1.0. Materials & Workmanship :**

1.1. The relevant specifications of item No. 18.17 shall be followed except that this work is for extra cost of colour wash over and above two coats on wall surface.

**2.0. Mode of measurements and payment :**

2.1. The relevant specifications of item No. 18.17 shall be followed except that the extra payment for every subsequent coat of white wash shall be made over and above the rate of item 18.17 and 18.18

2.2. **The rate shall be for a unit of One sq. metre**

**18.20 Extra over item 18.17 for colour washing on ceilings and/or sloping roofs.**

**1.0. Materials & Workmanship :**

1.1. The relevant specifications of item No. 18.17 shall be followed except that this work is for colour washing on ceiling and or sloping roofs.

**2.0. Mode of measurements 'and payment**

2.1. The relevant specifications of item No. 18.17 shall be followed except that the rate shall be paid extra over and above the rate of item 1 8.17 for providing colour washing on ceiling and or sloping roof.,

2.2. **The rate shall be for a unit of One sq. metre.**

**18.29 Cement washing with Portland cement shiny on undecorated walls surfaces, (one coat to give a smooth finish including thoroughly brooming the surface to remove all dirt, dust, mortar Drops and other foreign matter.**

**1.0 Materials :**

Water shall conform to M-1, Portland cement shall conform to M-3.

**2.0 Workmanship :**

2.1. The relevant specifications of item No. 18.11 for preparation of surface, scaffolding application of wash etc. shall be followed except that the cement wash shall be applied, instead of white wash. Cement shall be mixed to water to form slurry to the consistency of good ready mix oil paint. The slurry shall be applied with brushes to form a smooth bodied opaque surface.

**3.0 Mode of measurements and payment :**

3.1 The relevant specifications item No. 18.11 shall be followed.

3.2. **The rate shall be for a unit of One Sq. metre.**



**18.30** Extra over item No. 18.29 for every subsequent coat of cement washing with Portland cement slurry.

**1.0** **Materials & Workmanship :**

1.1 The relevant specifications of item No. 18.29 shall be followed except that the work of cement slurry wash shall be provided for every subsequent coats above item No. 18.29 to be applied.

**2.0** **Mode of measurements and payment :**

2.1. The relevant specifications of item No. 18.29 shall be followed except that the rate shall be paid for every subsequent coat applied over and above the rate of item No. 18.29.

2.2 **The rate shall be for a unit of One Sq. metre.**

**18.33** **Removing dry or oil bound distemper by washing and scraping and sand papering the wall surface smooth including necessary repairs to scratches complete.**

**1.0** **Materials & Workmanship :**

1.1 All loose pieces and scales shall be removed by sand papering and surface shall be cleared of all greasycay, dust, dirt, etc. On decorated wall surfaces. Where heavy staling has taken place, the entire surface shall be scrapped by means of steel scrappers so as to remove all accumulated distemper, leaving clean surfaces. Necessary repairs to the scatches shall be made as directed.

**2.0** **Mode of measurements and payment :**

2.1. The relevant specifications of item No. 18.11 shall be followed.

2.2 **The rate shall be for a unit of One Sq. metre.**

**18.34** **Extra over item No. 18.33 for removing dry oil bound distemper on ceiling and sloping roofs.**

**1.0** **Materials & Workmanship :**

1.1. The relevant specifications of item No. 18.33 shall be followed except that removing dry/oil hound distemper from sloping roof/ceiling is to be carried out.

**2.0.** **Mode of measurements and payment :**

2.1. The relevant specifications of item No. 18.33 shall be followed except that the payment shall be made for removing dry/oil hound distemper from ceiling/sloping roof over and above the rate of item No. 18.33.

2.2. **The rate shall be for a unit of One Sq. metre.**

**18.38** **Distemping with dry (water bound) Distemper of approved brand and manufacture (two coats) and of required shade on undecorated wail surfaces to give an even shade, over and including a priming coat of white washing after thoroughly brooming the surface .free from mortar droppings and other foreign matters.**

**1.0** **Materials :**

1.1 The dry distemper and primer shall be of approved brand and manufacture. The dry distemper shall be of required colour and shade and the same shall conform to I.S. 427-1965. Whiting shall conform to I.S. 63-1964.



## 2.0 Workmanship :

2.1 **Scaffolding :** Where scaffolding is required it shall be erected in such a way that as far as possible no part of scaffolding shall rest against the surface to be distempered. A properly secured strong and well tied suspended platform (Joolas) may be used for distempering. Where ladders are used, pieces of old gunny bags shall be tied at top and bottom to prevent scratches to the walls and floors. For distempering to ceiling proper stage scaffolding shall be erected where necessary.

## 2.2 Preparation of surface :

2.2.1 The undecorated surface to be distempered shall be thoroughly brushed free from dust, dirt, grease, mortar, droppings and other foreign matter and sand papered smooth. New plaster surface shall be allowed to dry at least 2 months before application of distemper.

2.2.2. All unnecessary nails shall be removed. Pitting in plaster shall be made good with plaster of paris mixed with dry distemper of the colour to be used. The surface shall then be rubbed down again with a line grades and paper and made smooth. The surface affected by moulds, moss, fungus, algae, lichens, efflorescence etc. shall be treated in accordance with I.S.:2395 (Part-1) 1966 before applying distemper. Any unevenness shall be made good by applying putty made of plaster of paris mixed with water on entire surface including filling up the undulations and then sand papering the same after it is dry.

## 2.3. Priming coat :

2.3.1 A priming coat of whitening shall be applied as per item No. 18.11 over the prepared surface in case of new work on undecorated surface. No coat of white washing with lime shall be used as a priming coat for distemper.

2.3.2 Application of plaster shall be done as under :

The primer shall be applied with a brush on the clean dry and smooth, surface. Horizontal strokes shall be given first and vertical strokes shall be applied immediately afterwards. This entire operation will constitute one coat. The surface shall be finished as uniformly as possible leaving no brush marks. It shall be allowed to 'dry for at least 48 hours before oil bound distemper or paint is applied.

2.3.3. Distemper is not recommended to be applied within six months Of the completion of wall plaster.

2.4. Proportion of Distemper : The distemper shall be diluted with water or any other prescribed thinner in a manner recommended by the manufacturers only. Sufficient quantity of distemper required for one day's work shall be prepared.

## 2.5. Application Distemper coat :

2.5.1. For undecorated surfaces, after the primer coat is dried for at least 48 hours, the surfaces shall be lightly and papered to make them smooth for receiving the distemper, taking care not to rub out the priming coat. All loose particles shall be dusted off after rubbing. Minimum, two coats of distemper shall be applied with brushes in horizontal strokes followed immediately by vertical strokes which together shall constitute one coat. The subsequent coats shall be applied after a time interval of at least 24 hours between consecutive coats to permit proper drying of the proceeding coat. The finished surface shall be even and uniform without patches, brush marks, distemper drops etc.

2.5.2 Sufficient quantity of distemper shall be mixed to finish one room at a time. The application of a coat in each room shall be finished in, one operation and no work shall be started in any room which cannot be completed on the same day.

2.5.3 15 cm. double bristle distemper brush shall be used. After the day's work, brushes shall be thoroughly washed in hot water with soap solution and hang down to dry. Old brushes which are dirty and caked with distemper shall not be used on the work.

2.6. Protective Measures : The surfaces of doors, windows, floors, articles of furniture etc. and such other



parts of the building as are not to be distempered shall be protected from being splashed upon. Such surfaces shall be cleaned of distemper splashes if any.

**3.0. Mode of measurements and payment :**

- 3.1. Priming coat of distemper primer, scraping of surface spoiled by smoke soot, removal of oil and grease spots, treatment for infection of efflorescences, mouldmoss, fungi, algae and lichens and patch repairs to plaster shall be included in this item for which nothing extra shall be paid.
- 3.2. All the work shall be measured net in the decimal system as in places subject to the, following, limits unless otherwise stated hereinafter :
  - (a) Dimensions shall be measured to the nearest 0.101 m.
  - (b) Area in individual items shall be worked out to the nearest 0.01 sq.m. All work shall be measured in sq.metre. No deduction shall be made for reveals, jambs, soffits, sills etc. of these openings nor for finish around the ends of joints, beams, posts etc.
- 3.3. Deduction of openings exceeding 0.5 sq.m. each shall be made as follows and no addition shall be made for reveals, jambs, soffits, sills etc. of these openings.
  - (a) When each face of wall is provided with the same finish deductions shall be made for one face only.
  - (b) When each face of wall is provided with different finish, deduction shall be made for that of frame for door, windows, etc., on which width of reveals' less than that of the other side but no deductions shall be made on the other side. Where the width of reveals on the both the faces of wall are equal, deduction of 50% of area of opening on each face shall be made, from area of finish.
  - (c) When only one face of wall is treated and the other face is not treated, full deduction shall be made if the width of the reveal on treated side is less than that on untreated side but if the width of the reveals is equal or more than that of untreated side neither deduction nor additions to be made for reveal, jambs, soffits, sills etc.
- 3.4. In case of openings area exceeding 3 sq.m. each, deduction shall be made for openings, but jambs, sills and soffits shall be measured.
- 3.5. In deduction shall be made for attachments such as casing, conduits, pipes, electric wiring and the like.
- 3.6. Item includes removing nails, making good holes, cracks, patches with Materials : similar in composition to the distemper.
- 3.7. The rate includes cost of all Materials ;, labour, scaffolding, protective measures etc. involved in all the operations described above. This shall also include conveyance, delivery, handling, unloading, storing etc.
- 3.8. **The rate shall be for a unit of One Sq. Metre.**

**18.39 Distemping with dry (water bound distemper of approved brand and manufacture (one coat) and of required shade, on decorative wall surface to give an even shade after thoroughly brushing the surface clean of all grease dirt, loose pieces of scales including preparing the surface and even sand papered smooth.**

**1.0 Materials : amid Workmanship :**

- 1.1 The relevant specifications of item No. 18.38 shall be followed except that the dry distemper shall be applied on decorative wall surface in one coat.

**2.0 Mode of measurements and payment :**



2.1. The relevant specifications of item No. 18.38 shall be followed.

2.2. **The rate shall be for a unit of One sq. metre.**

**18.40 Extra over item 38 and 39 for every subsequent coat of distemper with dry distemper of approved brand and manufacture.**

**1.0. Materials :**

1.1. The relevant specifications of item No. 18.38 shall be followed except that there extra work for applying subsequent coat of dry distemper is to be carried out over and above the work of item No. 18.38 and 18.39.

**2.0 Mode of measurements and payment :**

2.1 The relevant specifications of item No. 18.38 shall be followed except that extra rate shall be paid for every subsequent coat applied over and above the rate of item No. 18.38 and 18.39.

2.2. **The rate shall be for a unit of One sq.metre.**

**18.40 Extra over item 38 for distemping with dry distemper on ceiling and sloping roofs.**

**1.0. Materials and Workmanship :**

1.1. The relevant specifications of item No. 18.38 shall be followed except that the dry distemping shall be carried out on ceiling and sloping roofs of undecorated surface.

**2.0. Mode of measurements and payment :**

2.1 The relevant specifications of item No. 18.38 shall be followed except that extra rate shall be paid for carrying out work in ceiling/sloping roof on undecorated surface over and above the rate of item 18.38.

2.2. **The rate shall be for a unit of One Sq.metre.**

**18.41 Extra over item 39 and 40 for distemping with dry distemper on ceiling/sloping roofs.**

**1.0. Materials :**

1.1 **The relevant** specifications of item No. 18.39 shall be followed except that the work shall be carried out on ceiling/sloping roofs on decorated surfaces.

**2.0 Mode of measurements and payment :**

2.1 The relevant specifications of item No. 18.39 shall be followed except that the extra rate shall be paid for the distemping work carried out by dry distemper on ceiling/sloping roofs with decorated surfaces over and above the rate of item No. 18.39.

2.2. The rate shall be for a unit of One sq. metre.

**18.42 Distemping (two coats) with oil bound distemper of approved brand and manufacture and of required shade on undecorated wall surfaces to give an even shade, over and including a priming coat with distemper primer of approved brand and manufacture after thoroughly brushing the surface free from mortar dropping and other foreign matter and also including preparing the surface even and sand papered smooth.**

**1.0. Materials :**



1.1 Oil bound washable distemper and primer shall be of approved brand and manufacture. The distemper shall be of required colour and shade and the same shall conform to I.S.: 428-1969.

## **2.0 Workmanship :**

2.1. **Scaffolding :** Where scaffolding is required, it shall be erected in such way that as far as possible no part of scaffolding shall rest against the surface to be distempered. A properly secured strong and well tied suspended platform (joola) may be used for distemping. Where ladders are used, pieces of old gunny bags shall be tied at top and bottom to prevent scratches to the walls and floor, for distemping to ceiling, proper stage scaffolding shall be erected where necessary.

## **2.2 Preparation of surface :**

2.2.1 The undecorated surface to be distempered shall be thoroughly brushed from dust, dirt, grease; mortar dropping and other foreign matter and sand papered smooth. New plaster surface shall be allowed to dry for atleast 2 months before applications of distemper.

2.2.2 All unnecessary nails shall be removed. Pitting in plaster shall be made good with plaster again with a fine grade sand paper and made smooth. A coat of distemper shall be applied over the patches. The surface shall be allowed to dry thoroughly before the regular coat of distemper is allowed. The surface affected by moulds, moss, fungi, algae lichens, efflorescence etc. shall be treated in accordance with I.S. 2395 (Part-I) 1966. Before applying distemping, any unevenness shall be made good by applying putty made of plaster of paris mixed with water on entire surface including filling up the undulation and then sand papering the same after it is dry.

## **2.3 Priming coat :**

2.3.1 A priming coat of distemper primer of approved manufacture and shade shall be applied over the papered surface in case of new work on undecorated surface. If the distemper priming is done after the wall surface dries completely, the distemper primer shall be applied.

2.3.2 Application of primer shall be done as under the primer shall be applied with a brush on the clean dry and smooth surface. Horizontal strokes shall be given first and vertical strokes shall be applied immediately afterwards. This entire operation will constitute one coat. The surface shall be finished as uniformly as possible leaving no brush marks. It shall be allowed to dry for atleast 48 hours before oil bound distemper or paint is applied.

2.3.3 Oil bound distemper is not recommended to be applied within six months of the completion of wall plaster.

## **2.4 Preparation of oil bound distemper :**

2.4.1 The distemper shall be diluted with water or any other prescribed thinner in a manner recommended by the manufacturer only. Sufficient quantity of distemper required for a day's work shall be prepared.

## **2.5 Application of distemper coat :**

2.5.1 For undecorated surface, after the primer coat is dried for atleast 48 hours, the surface shall be lightly sand papered to make it smooth for receiving the distemper, taking care not to rub out the priming coat. All loose particles shall be dusted off after rubbing, Minimum two coats of distemper shall be applied with brushes in horizontal strokes followed immediately by vertical strokes which together shall constitute one coats. The subsequent coats shall be applied after a time interval of atleast 24 hours between consecutive coats to permit proper drying of the preceding coat. The finished surface shall be even and uniform without patches, brush marks, distemper drops etc.

2.5.2 Sufficient quantity of distemper shall be mixed to finish one room at a time. The application of a coat in each room shall be finished in one operation and no work shall be started in any room which cannot be completed on the same day.



25.3 15 cm. double bristled distemper brush he used. After day's work brushes shall be thoroughly washed in hot water with soap solution and hung down to dry. Old brushes which are dirty and caked with distemper shall not be used on the work.

2.6. A Protective Measurement The surface of doors, windows, floors, articles or furniture etc. and such other parts of the buildings as are not to be distempered shall be protected from being splashed upon. Such surface shall be cleaned of distemper splashser if any.

### **3.0 Mode of measurements and payment :**

3.1 Priming coat of distemper primer, scraping of surface spoiled by srunk soots, removal of oil and grease spots, treatment for infection of efflorescence, mould moss, fungi., algae and litchen and patch repairs to plaster shall be included in this item for which nothing extra shall be paid.

3.2. All the work shall be measured net in the decimal system as in place subject to the following limits unless otherwise stated hereinafter

(a) Dimensions shall be measured to the nearest 0,01 m.

(b) Area in individual items shall be worked out to the nearest 0.01 sq.m. All work shall be made for ends of joints, beams, soffits, sills etc. of these openings not for finish around ends of joints, beams, posts, etc.

3.3. Deductions of opening exceeding 0.5 sq.m. but not exceeding 3 sq.m. each shall be made as follows and net addition shall be made for reveals, jambs. soffits etc. of these openings

(a) When both the faces of walls are provided with same finish, deductions shall be made for one face only.

(b) When each face of wall is provided with different finish, deduction shall be made for that side of frame for doors, windows, etc. on which width of reveal is less than that of the other side hut no deduction shall be made on the other side, Where the width of reveals on the both the faces of wall are equal. deduction of 50% of area of opening on each face shall be made from area of finish

(c) When only one face of wall is treated and the other face is not treated, full deductions shall be made it the width of the reveal on treated side is less. than that on untreated side but if the width of the reveal is equal or more than that on untreated side neither deductions nor additions to be made for reveals, jambs, soffits, sills etc.

3.4. In case of opening of area exceeding 3 sq.m. each deduction shall be made for openings but jaimbs, sills and soffits shall be measured.

3.5. No deductions shall be made for attachments such as casings, conduits, pipes, electric wiring and the Like.

3.6. Item includes removing nails, making good holes, cracks, patches with Materials : similar in composition of distemper.

3.7. The rates includes cost of all Materials :, labours. scaffolding, protective measures etc. involved in all the operations described above. This shall also include conveyance, delivery, handing, unloading. scoring work etc.

3.8. The rate shall be for a unit of One sq.metre.

**18.45. Distemping (two coats) with oil bound washable distemper of approved brand and manufacturer and of shade required on undecorated wall surfaces to give an even shade, over and including a priming coat with alkali resistance primer of approved brand and manufacturer after thoroughly brushing the surface free from mortar droppings and other foreign matter and also including preparing the surface even and sand-papered smooth.**

### **1.0. Materials and Workmanship :**





1.1 The relevant specifications of item No. 18.44 shall be followed except that the primer of alkali resistance primer of approved brand and manufacture shall be used instead of distemper primer.

**2.0. Mode of measurements and payment :**

2.1. The Mode of measurements and payment : shall be the same as for item No. 18.44 above.

2.2. **The rate shall be for a unit of one sq. metre.**

**18.46 Distemping (one coat) with oil bound washable distemper of approved brand of required shade on decorated wall surfaces to gibe an even shade after thoroughly brushing the surfaces clean of all grease, dirt, loose pieces of scales and including distemping with oil bound washable distemper per of preparing the surface even an smooth.**

**1.0 Materials :**

1.1 The relevant specifications of item No. 18.44 shall be followed except that the distemping with oil hound washable distemper shall be carried out on decorated wall surfaces in one coat.

**2.0 Mode of measurements and payment :**

2.1. The relevant specifications of item No. 18.44 shall be followed.

2.2. **The rate shall be for a unit of One sq. metre.**

**18.47 Extra cover items 18.44 to 18.46 for every subsequent coat of distemping with oil bound washable distemper of approved brand and manufacture.**

**1. 0. Materials :**

1.1. The relevant specifications of item No. 18.44 shall be followed except that this work is for providing extra coat of oil hound distemping aver and above two coats of distemping.

**2.0. Mode of measurements and payment :**

2.1. The relevant specifications of item No. 18.44 shall be followed except that the extra rate shall be paid over and above the rate for every subsequent coats over two coats of item 18.44 and 18.46.

2.2. **The rate shall be for a unit of One sq.metre.**

**18.48 Extra over item 18.44 and 18.45 for distemping with oil bound washable distemper on ceiling and loping roofs.**

**1.0 Materials :**

1.1 The relevant specifications of item No. 18.44 shall be followed except that the distemping shall be carried out on ceiling/sloping roofs.

**2. 0. Mode of measurements and payment :**

**2.1.1** The relevant specifications of item No. 18.44 shall be followed except that the extra rate shall be paid for carrying out distemping work on ceiling/sloping roofs over and above the rate of item No. 18.44 and 18.45.

2.2. **The rate shall be for a unit of One sq. metre.**

**18.49. Extra over item 18.46 and 18.47 for every subsequent coat of distemping on ceiling and sloping roofs.**

**1.0. Materials :**



- 1.1. The relevant specifications of item No. 18.44 shall be followed except that the distempering work shall be carried out for subsequent coats over item No. 18.46 and 18.47.

**2.0 Mode of measurements and payment :**

- 2.1 The relevant specifications of item No. 18.46 shall be followed except that the extra rate shall be paid for every subsequent coat of distemper applied over and above the, rate of item No. 18.46 and 18.47.

**2.2 The rate shall be for a unit of One sq.metre.**

**18.51 Finishing wail with water proofing cement paint of an undecorated wall surfaces (two coats) to give an approved brand and manufacturer and of required shape, even shade after thoroughly brushing the surface to remove all dirt and remains of loose powdered Materials :**

**1.0. Materials :**

- 1.1. The water shall conform to M-1, Cement water proofing paint shall conform to I.S. 5410-1969.

**2. 0. Workmanship :**

- 2.1. Scaffolding : The relevant specifications of item No. 18.11 shall be followed.

**2.2. Preparation of surface :**

2.3.

The relevant specifications of item 18.11 shall be followed except that the word white wash colour wash shall be substituted with water proofing cement paint. The surface shall be thoroughly wetted with clean water before cement water proofing paint is applied.

**2.4. Preparation of paint :**

Portland cement shall be prepared by adding paint powder to water and stirring to obtain a thick paste, which shall then be diluted to a brushable consistency. Generally, equal volumes of paint powder and water, make a satisfactory paint. In all cases, the manufacturers instructions shall be followed. The paint shall be mixed in such quantities as can be used up within an hour of mixing as otherwise the mixture will set and thicken, affecting flowing and finish. The lids of cement paint drums shall be kept tightly when not in use.

**2.4. Application of Paint :**

- 2.4.1 No painting shall be done when the paint is likely to be exposed to a temperature of below 70<sup>0</sup> C within 48 hours after application.

- 2.4.2 When weather conditions are such as to cause it to be carried out "in the shadow" as far as possible. This helps the proper hardening of the paint film by keeping the surface moist for a longer period.

- 2.4.3 To maintain the uniform mixture and to prevent segregation, the paint shall be stirred frequently in the bucket.

- 2.4.4 For undercoated surfaces, the surface shall be treated with minimum two coats of water proof cement paint. Not less than 24 hours shall be allowed between two coats. Next coat shall not be started until the preceding coat has become sufficiently hard to resist marking by the brush being used. In hot dry weather, the preceding coat shall be slightly moist before applying the subsequent coat.

- 2.4.5 The finished surface shall be even and uniform in shade, without patches, brush marks, paint drops.

- 2.4.6 The cement paint shall be applied with a brush with relatively short stiff hog or fibre bristles. The paint shall be brushed in uniform thickness and shall be free from excessively heavy brush marks. The surface shall be well brushed out.

- 2.4.7 Water proof cement paint shall not be applied on surfaces already treated with white Wash colour wash, distemper dry or oil bound varnishes, paint etc. It shall not be applied on gypsum, wood and metal surfaces.



2.5 **Curing** : Painted surfaces shall be sprinkled with water two or three times a day. This shall be done between coats and for atleast two days following the final coats, The curing shall be started as soon as the paint has hardened so as not to be damaged by the sprinkling of water say about 12 hours after the application.

2.6. Protection measures shall be taken as per item No. 18.11 para 2.6.

3.0. **Mode of measurements and payment :**

3.1. The relevant specifications of item No. 18.11 shall be followed.

3.2 **The rate shall be for a unit of One sq.metre.**

**18.53 Extra over item 18.51 for every subsequent coat of water proofing cement paint of approved brand and manufacture.**

**1.0 Materials :**

1.1. The relevant specifications of item No. 18.51 shall be followed except that the work is for applying subsequent coat of cement water proofing paint.

**2.0. Mode of measurements and payment :**

2.1. The relevant specifications of item No. 18.51 shall be followed except that the extra rate shall be paid for applying every subsequent coat of cement water proofing paint over and above the rate of item No. 18.51.

2.2 **The rate shall be for a unit of One sq.metre.**

**18.54 Extra over item 18.51 for finishing with cement paint an ceiling / sloping roofs.**

**1.0. Materials :**

1.1. The relevant specifications of item No. 18.51 shall be followed except that the cement water proofing paint shall applied on ceiling and sloping, roofs.

**2.0 Mode of measurements and payment :**

2.1 The relevant specifications of item No. 18.51 shall be followed except the extra shall be paid for applying cement water proofing paint on ceiling and sloping roofs, over and above the rate of item No, 18.51.

2.2 **The rate shall be for a unit of One sq. metre.**

**18.55 Extra over item 18.53 shall be followed except that the work shall be carried out for subsequent coat on ceiling and sloping roofs.**

**1.0. Materials and Workmanship :**

1.1 The relevant specifications of item No; 18.51 shall be followed except that the work shall be carried out for subsequent coat on ceiling and sloping, roofs.

**2.0 Mode of measurements and payment :**

2.1 The relevant specifications of item No. 18.53 shall be followed expect that extra rate shall be. paid for every subsequent coat applied with cement water proofing paint over and above the rate of item No. 18.53.

**18.57 Wall painting (two coats.) with plastic emulsion paint of approved brand and manufacture on under coated wall surfaces to give an even shade including thoroughly brushing the surface free from mortar dropping and other foreign matter and sand paper smooth.**

**1.0. Materials :**

Water shall be conform to M-1, The plastic emulsion shall conform to I.S : 5411 - 1969(part-I)



## **2.0. Workmanship :**

2.1 **Scaffolding :** The relevant specifications of item No, 18.11 para 2.1. shall be followed.

2.2. **Preparation of surface :** The relevant specifications of item NO. 18.44 para 2.2. shall be followed.

### **2.3. Preparation of Mix :**

This shall be done as per manufactures instructions. The thinning of emulsion is to be done with water and not with turpentine The quantity of thinner to be added shall be as per manufacturer instructions.

### **2.4. Applications :**

2.4.1. Before pouring into small containers for use, the paint shall be stirred thoroughly in its container. When applying also, the paint shall be continuously stirred in the smaller container, so that its consistency is kept uniform.

2.4.2 The paint shall be laid on evenly and smoothly by means of crossing and laying off the crossing and consist of covering the area over with paint, brushing the surface hard for the first time over and then brushing alternately in opposite direction two or three times and then finally brushing lightly in a direction at right angles to the same. In this process, no brush marks shall be left the laying off is finished. No hair marks from the brush or clogging of paint puddles in the corners of panels, angles of moldings etc. shall be left on the work. The full process of crossing and laying off will constitute one coat.

2.4.3 The paint shall be applied with brush or rollers. For undecorated surfaces, the surface shall be treated with minimum two coats of cement water proofing paint. The second or subsequent coat shall not be started until the proceeding coat has become sufficiently hard to resist marking by brushing being used.

2.4.4 The surface on finishing shall present a flat velvety smooth finish. It shall be even and uniform in shade without patches, brush marks, paint drops etc.

### **2.5. Precautions :**

(a) Old brushes if they are to be used with emulsion paints, shall be completely dried of turpentine or oil paint by washing in warm soap water. Brushes shall be quickly washed in water immediately after use and kept immersed in water during break periods to prevent the paint from hardening on the brush.

(b) In the preparation of walls for plastic emulsion painting, no oil base putties shall be used in filling cracks, holes etc.

(c) Splashes on floors etc. shall be cleaned out without delay as they will be difficult to remove after hardening.

(d) Washing of surface treated with emulsion paint shall not be done within 3 to 4 weeks of application.

2.6 **Protective measures :** The relevant specifications of item No. 18.17 para 2.3. shall be followed.

## **3.0. Mode of measurements and payment :**

3.1 The relevant specifications of item No. 18.11 shall be followed.

3.2 **The rate shall be for a unit of One sq. metre.**

**18.59 Extra over item No. 18.57 for every subsequent coat of wall painting with plastic emulsion paint of approved brand.**

## **1.0. Materials and Workmanship :**

1.1 The relevant specifications of item No. 18.57 shall be followed except that the painting work shall be for subsequent coat of plastic emulsion paint.



**2.0. Mode of measurements and payment :**

2.1 The relevant specifications of item No. 18.57 shall be followed except that the extra rate shall be paid for every subsequent coat of plastic emulsion paint applied over and above the rate of item No. 18.57.

2.2. **The rate shall be for a unit of One sq. metre.**

**18.60. Extra over item 18.57 for painting with plastic emulsion paint of approved brand on ceiling and sloping roofs.**

**1.0. Materials and Workmanship :**

1.1. The relevant specifications of item No. 18.57 shall be followed, except that the painting shall, be done on ceiling' and sloping roots.

**2.0. Mode of measurements and payment :**

2.1. The relevant specifications of item No. 18.57 shall be followed except that the extra payment shall be made for applying plastic emulsion paint on ceiling and sloping roots over and above the rate of item NO. 18.57.

2.2 **The rate shall be for a unit One sq. metre.**

**18.62 Extra over item 18.59 for paint on ceiling and sloping roofs.**

**1.0. Materials and Workmanship :**

1.1. The relevant specifications of item No. 18.57 shall be followed except that the work for subsequent coat of plastic emulsion paint shall be carried out on ceiling and sloping roofs.

**2.0 Mode of measurement and payment :**

2.1 The relevant specifications of item No. 18.57 shall be followed except that the extra rate shall be paid for carrying out painting on sloping roots and ceiling with plastic emulsion paint over and above the rate of item No. 18.59.

2.2 **The rate shall be for a unit of One sq. metre.**



## SECTION 19

### Paintings & Polishing

**19.7 Painting two coats excluding priming coat on new steel and other metal surface with enamel paint, brushing, interior to give an even shade including cleaning the surface of all dirt, dust and other foreign matter:**

**1.0 Materials :**

1.1 The, enamel paint shall conform to M-44.B.

**2.0. Workmanship :**

2.1 **General :** The Materials : required for work of painting work shall be obtained directly from approved manufacturers or approved dealer and brought to the site in makers drums, kegs etc. with seal unbroken.

2.1.2 All Materials : not in actual use shall be kept properly protected, lids of containers shall be kept to prevent formation of skin, The Materials : which have become state or fiat due to improper and long storage shall not be used. The paint shall be stirred thoroughly in its container before pouring into small containers. While applying also, the paint shall be continuously stirred in smaller container. No left over paint shall be put back into stock tins. When not in use the containers shall be kept properly closed.

2.1.3 If for any reasons, thinning is necessary, the brand of thinner recommended by the manufacturer shall not be used.

2.1.4 The surface to be painted shall be thoroughly cleaned and dusted. All rust, dirt and grease shall be thoroughly removed before painting is started. No painting on exterior or other exposed parts of the work shall be carried out in wet, damp or otherwise unfavourable weather and all the surface shall be thoroughly dry before painting work is started.

**2.2. Application of paint :**

2.2.1 Brushing operations are to be adjusted to the spreading capacity advised by the manufacture of particular paint. The paint shall be applied evenly and smoothly by means of crossing and laying off. The crossing and laying off consists of covering the area over with paint, brushing the surface hard for the first time over and then brushing alternately in opposite direction two or three times and then finally brushing lightly in a direction at right angles to the same. In this process no brush marks shall be left after the laying off is finished. The full process of crossing and laying off will constitute one coat.

2.2.2 Each coat shall be allowed to dry completely and lightly rubbed with very fine grade, of sand-paper and loose panicles brushed off before next coat is applied. Each coat shall, vary slightly in shade and shall be got approved from Engineer-in-charge before next coat is started.

2.2.3 Each coat except the last coat shall be lightly rubbed down with sand-paper of fine pumice stone and cleaned of dust before the next coat is applied. No hair marks from the brush or clogging of paint puddles in the corners of panels, angles of mouldings etc. shall be left on the work.

2.2.4 Special care shall be taken while painting over bolts, nuts., rivets, overlaps etc. Approve best quality brushes shall be used.

**3.0. Mode of measurements and payment :**

3.1 The relevant specifications of item No. 19.12 shall be followed for Mode of measurements and payment :. The rate is excluding priming coat.

3.4 **The rate shall be for a unit of One sq.metre.**



**19.11 Painting one coat (excluding priming coat) on previously painted steel and other metal surface with enamel paint, brushing to give an even shade including cleaning the surface of all dirt, dust and other foreign matter:**

**1.0. Materials :**

1.1. The relevant specification of item No. 19.7 shall be followed except that painting shall be carried out in one coat with enamel paint on previously painted steel and metal surface,

**2.0. Mode of measurements and payment :**

2.1. The relevant specification of item No. 19.7 shall be followed.

2.2. **The rate shall be for a unit of one sq.metre.**

**19.12 Applying priming coat new steel and other metal surface after and including preparing the surface by thoroughly cleaning oil, grease, dirt and other foreign matter and secured with brushes, fine steel, wool scrapers and sand paper, with ready mixed priming paint, brushing red lead.**

**1.0. Materials :**

1.1. The ready mixed primer, brushing red lead shall conform to I.S : 102-1962.

1.2. The thinner (linsed oil) shall conform to I.S. 75-1973. If for any reason, thinning is necessary in case of ready mix paint, the brand of thinner recommended by manufacturer shall be used.

**2.0. Workmanship :**

2.1. **Preparation of surfaces :** The surfaces painting shall be cleaned of all rust, scale, dirt and other foreign matter sticking to it with wire brushes, steel wool, scrapers. and paper etc. This surface shall then be wiped finally with mineral turpentine which shall also remove grease and perspiration of hand marks. The surface shall then be allowed to dry.

**2.2. Application of primer :**

2.2.1. After the preparation of the surface painting shall be applied immediately. The brushing operations are to be adjusted to the spreading capacity advised by the manufacturer of the particular primer. The paint shall be applied evenly and smoothly by means of crossing and laying off, The crossing and laying off consists of covering the area over with paint, brushing. alternately in opposite direction, two or three times and then finally brushing lightly in a direction at right angles to the same. In this process, no brush marks shall be left after the laying off is finished. The full process of crossing and laying off will constitute one coat.

2.2.2. During painting, every time, after the priming coat has been worked out of the brush bristles or after the brush has been unloaded, the bristles of the brush shall be opened up by striking the brush against portion of the unpainted surface with the end of the bristles, held at right angle into a paint container. The priming coat shall be allowed to dry completely before painting is started.

2.2.3. No hair marks from the brush or clogging at paint puddles in the corner of panels angles of moulding etc. shall be left on the work.

2.2.4. Special care shall be taken while painting over bolts, nuts, rivets, overlaps etc.

2.2.5. The container when not in use shall be kept close and free from air so that paint does not thicken and also be kept guarded from dust,

**3.0. Mode of measurements and payment :**

3.1. The new steel and other metal surface shall be measured under this item.



- 3.2 All the work shall be measured net in the decimal system as executed subject to the following limits unless otherwise stated hereinafter
- Dimensions shall be measured to the nearest 0.01 metre.
  - Areas shall be worked out to the nearest 0.0.1 sq.metre.
- 3.3. No deductions shall be made for opening not exceeding 0.5 sq.mt. each and addition shall be made for painting to headings, mouldings, edges, jambs, soffits, sills etc. of such opening.
- 3.4. In case of fabricated structural steel and iron work, priming coat of paint shall be included with fabrication. In case of trusses if measured in sq.m. compound griders, stanchions,. lattices, girder and similar work, actual area shall be measured in sq.mt and no extra shall be paid for painting on bolts heads, nuts, washers etc. No addition shall be made to the weight calculated for the purpose of measurements of steel and iron works for paint applied on shop or at side.
- 3.5. The different surface shall be grouped into one general item, areas of uneven surface being converted into equivalent plain areas in accordance with the table given as per Annexure - II. for payment.
- 3.6 The rate shall be for a unit of One sq.metre.

**19.15 Extra over item No. 19.7 and 19.11 for every subsequent coat of paint.**

**I. 0. Materials and Workmanship :**

- 1.1. The relevant and specifications of item No. 19.7 shall be followed except that the work of painting shall be carried out for subsequent coat.

**2.0. Mode of measurements and payment :**

- 2.1. The relevant specifications of item No. 19.7 shall be followed except that the extra rate shall be paid for every subsequent coat of paints applied over and above the rate of item No. 19.7 and 19.11,

**2.2 The rates shall be for a unit of One sq.metre.**

**19.19 Painting two coats (excluding priming coat,) on new steel and other metal surfaces with synthetic enamel paint, brushing to give an even shade including cleaning the surface of alt dirt, dust and other foreign matter :**

**1.0. Materials :**

Synthetic enamel paint shall conform to I.S. 1932-1964.

**2.0. Workmanship :**

- 2.1 The relevant specification of item No. 19.7 shall be followed except that the painting shall be carried out with synthetic enamel paint.

**3. 0. Mode of Measurement & Payment :**

- 3.1 The relevant specil3caiton of item No. 19.7 shall. he followed.

**3.2. The rate shall be for a unit of One sq.metre.**

**19.21 Painting one coat (excluding priming coat on previously painted steel and other metal surface with synthetic enamel paint brushing to give an shade including cleaning the surface of all dirt dust and other foreign matter :**

**1.0 Materials Materials and Workmanship :**





1.1 The relevant specification of item No: 19.19. shall be followed except that the painting shall be carried out on previously painted steel and other metal surfaces using synthetic enamel paint in; one coat.

**2.0. Mode of measurements and payment :**

2.1 The relevant specification of item No. 19.19 shall be followed.

2.2 **The rate shall be for a unit of One sq. metre.**

**19.23 Extra over item No. 19.19 and 19.21 for every subsequent coat of paint.**

**1.0. Materials and Workmanship :**

1.1 The relevant specification of item No. 19.19 shall be followed except that the work shall be carried out for subsequent coat or paint.

**2.0 Mode of measurements and payment :**

2.1 The relevant specification of item No. 19.19 shall be followed except that the extra rate shall be paid for applying subsequent coat of oil paint over and above the item No. 19.19 and 19.21.

2.2 **The rate shall be for a unit of One sq. metre.**

**19.50. (B) Painting two coats (excluding priming coat) on external surfaces of new rain water soil, waste vent pipes and fittings with ready mixed bituminous paint, brushing, black . anticorrosive to an even shade including cleaning of all dirt, dust and other foreign matter (75 mm dia.).**

**1.0. Materials :**

1.1 Ready mixed bituminous paint shall conform to I.S. 158 : 1968.

**2.0 Workmanship :**

2.1 The relevant specification of item No. 19.7 shall be followed except that the painting work of external surfaces of 75 mm dia, rain water pipe, soil, waste, and vent, pipe and fittings with ready mixed bitumenous shall be for a unit of one running metre.

**3.0 Mode of measurements and payment :**

3.1 **The rate shall be for a unit of One sq. metre.**

**19.50 (C) Painting two coats (excluding priming coat) on external surface of rain water, soil. waste and vent pipe and fittings with ready mixed bituminous paint brushing, black anticorrosive to give an even shade including cleaning off all dirt, dust and other foreign matter 100 mm, dia.**

**1.0. Materials and Workmanship :**

1.1 The relevant specification of item No, 19.50 (B) shall be followed except that the pipes' to be palmed on is 100 mm. dia. metre.

**2.0 Mode of measurements and payment :**

2.1 The relevant specification of item No. 19.50 (B) shall be followed. The rate is excluding the cost of priming coat but including cost of painting all fittings coming in line.



2.2. **The rate shall be for a unit 01 one running metre,**

**19.59.(B). Applying priming coat over new wood and wood based surfaces after and including preparing the surface is thoroughly, cleaning oil, grease, dirt and other foreign matter ; sand papering and knotting : ready mixed paint brushing wood primer pink.**

**1.0. Materials :**

1.0. The ready mixed paint, brushing wood primer pink shall conform to I.S. 3536-1966.

**2.0. Preparation of Surfaces :**

2.1.1 All wood work shall be dry and free from any foreign matter incidental to building operations. Nails shall be punched well below the surface to provide a firm key for stopping. Mouldings shall be carefully smoothed with abrasive paper and projecting fibres shall be removed. Flat portions shall be smoothed off with abrasive paper used across the grain prior to painting and with the grain prior to staining or if the wood is to be left in its natural colour, wood work which is to be stained may be smoothed by scraping instead of by glass papering if so required.

2.1.2 Any knots, resinous, strickes or blueish sap wood that are not large enough to justify cutting out shall be treated with two coats of pure shellac knotting applied thinly and extended about 25 mm. beyond the actual area requiring treatment.

**2.2. Application of primer :**

2.2.1 The relevant, specification of item No 19.12 shall be followed for application of primer.

**3.0. Mode of Measurement & Payment :**

3.1. The relevant specification of item No. 19.12 shall be followed except that work done, on wood and wood based surfaces shall be paid under this item.

3.2 **The rate shall be for a Unit, of One sq.metre.**

**19.59. (D). Applying priming coat over new wood and wood based surface after and including preparing the surface by thoroughly cleaning oil, grease, dirt and other foreign matter sand papering and knotting : Ready mixed paint brushing printing, for enamel.**

**1.0. Materials :**

1.1. The ready mixed paint for brushing priming for enamels wood shall conform to I.S. 106-1962.

**2.0. Workmanship :**

2.1 The relevant specification of item No. 19.59 (B) shall be followed except that ready mixed paint brushing priming for enamel shall be used instead of ready mixed paint brushing wood primer pink.

**3.0 Mode of measurements and payment :**

3.1 The relevant specification of item No. 19.12. shall be followed.

3.2 **The rate shall be lbr a unit of One Sq.metre.**

**19.62. (B) Extra over item 19.59 (B) for every subsequent coat of priming coat. Ready mix paint, brushing wood primer pink.**



**1.0. Materials :**

- 1.1. The relevant specification of item No. 19.59(B) shall be followed except that the painting work shall be carried out with ready mix paint, brushing wood primer pink for subsequent coat.

**2.0. Mode of measurements and payment :**

- 2.1. The relevant specification of item No, 19.59 (B) shall be followed except that the extra rate shall be paid for every subsequent coat applied with Ready mix paint, brushing wood primer pink over and above the rate of item No. 19.59 (B), 19.62 (D) Extra over item No. 19.59 (D) for every subsequent coat of ready mix paint brushing priming for enamel,

**19.62. (C). Extra over item 19.59 (C) for every subsequent coat of priming coat. Ready mix paint, brushing wood primer for enamel.**

**1.0. Materials and Workmanship :**

- 1.1 The relevant specifications of item No, 19.59 (B) shall be followed except that the painting work shall be carried out with ready mix paint brushing priming for enamel.

**2.0. Mode of measurements and payment :**

- 2.1 The relevant specification of item No. 19.59 (B) shall be followed except that the extra rate shall be paid for every subsequent coats of priming coats of priming coat with ready mixed paint, brushing priming for enamel

2.2. **The rate shall be for a unit of One sq.metre.**

**19.71. Painting two coats(excluding priming coat) on new wood and wood based surfaces with enamel paint interior to give an even shade including cleaning the surface off all dirt, dust and other foreign matter sand papering and stopping.**

**1.0. Materials :**

- 1.1 The enamel paint shall conform to I.S, 133-1975.

**2.0. Workmanship :**

- 2.1. The relevant specification of 19.16 shall be followed for general and application of paint, except that the enamel paint shall be used for painting on new wood /wood based surfaces.

2.2 In painting doors and windows, the putty, round the glass panes also he painted but care shall be taken to see that no paint, stain etc. are left on the glass. Top of shutters and surfaces in similar hidden locations shall not he left out in painting.

**3.0 Mode of measurements and payment :**

- 3.1 The relevant specification of item No. 19.12 shall be followed, for Mode of measurements and payment :s. The rate excludes cost of priming coat,

3.2. **The rare shall be for a unit One sq.metre.**

**19.73 Painting one Coat (excluding priming coat,) on previously painted wood and wood based surfaces with enamel paint to give even shade including cleaning of all dirt, dust and other foreign matter.**

**1.0. Materials and Workmanship :**



1.1 The relevant, specifications of item No. 19.71 shall be followed except that the painting work shall be carried out on previously painted wood and wood based surfaces with enamel paint to give even shade in one coat.

**2.0. Mode of measurements and payment :**

2.1 The relevant specification of item No. 19.71 shall be followed.

2.2 **The rate shall be for a unit of One sq.metre.**

**19.75. Extra over item 19.71 and 19.73 for every subsequent coat of paint.**

**1.0. Materials and Workmanship :**

1.1 The relevant specification of item No. 19.71 shall be followed except that painting work shall be for subsequent coat with paint.

**2.0 Mode of measurements and payment :**

2.1 The relevant specification of item No. 19.71 shall be followed except that the extra rate shall be paid for every subsequent coat applied over and above the item No. 19.71 and 19.73.

2.2. **The rate shall be for a unit of One sq.metre.**

**19.77 Painting two coats (excluding priming coat) on new wood and wood based surfaces with ready mixed paint brushing, oil gloss, semi—gloss, to give an even shade including cleaning of all dust, dirt and other foreign matter sand papering and stopping.**

**1.0. Materials :**

The ready mixed paint shall conform to M-44. The ready mixed brushing gloss, semi-gloss shall conform to I.S, 129-1962 and I.S. 117-1964

**2.0. Workmanship :**

2.1 The relevant specification of item No. 19.71 shall be followed for general and applications of paint except that ready mixed paint brushing, oil gloss and semi-gloss shall be used of approved colour and shade instead of enamel paint.

**3.0. Mode of measurements and payment :**

3.1. The relevant specifications of item J912 shall be followed for measurements and payment The rate excludes cost of priming coat.

3.2 **The rate shall be for a unit of One sq.metre.**

**19.84 Varnishing two coats (excluding priming coat) on new wood and wood based surfaces undercoating with flatting varnish and finishing coat with varnish to give an even surface cleared of all dirt, dust and sand papering SO as to produce a smooth dry surface.**

**1.0. Materials and Workmanship :**

The varnish shall conform to I.S. 338-1962.

**2.0. Mode of measurements and payment :**



2.1.1 The surface to be varnished shall be prepared to produce a smooth, dry neat surface the previous coat of paint or stain, if any shall be allowed to dry and rubbed down slightly with oil and allowed to dry.

2.1.2 The operation of varnishing calls for careful attention to cleanliness. All dust and dirt shall be removed from the surface to be varnished and also from the neighbourhood. If surfaces are dampened to avoid raising of dust, they shall be allowed to dry thoroughly before varnishing is commenced. Damp atmosphere and draughts shall be avoided. For exterior work, a normal dry day should be chosen. Exposure to extreme of heat or cold, or to a damp atmosphere will spoil the work.

2.1.3 In handling and applying and applying varnish care should be taken to avoid forming froth or air bubbles. Brushes and containers shall be kept scrupulously clean.

## **2.2. Application :**

2.2.1 The varnish shall be applied liberally with a brush and spread evenly over a portion of the surface with a short light strokes to avoid frothing. It shall be allowed to flow out while the next section is being laid in. Excess varnish then be scraped out of the brush and the first section be crossed, recrossed and then laid off lightly. Too much or too little varnish left on the surface will mar the appearance or the finish. The varnish, once it has begun to set, shall not be retouched. If a mistake is made, the varnish shall be removed and the work started afresh.

2.2.2 In case of two coats of varnish work, the first shall be hard drying under coating or flatting varnish this shall be allowed to dry hard and then be flattened down before applying the finishing the finishing coat. If two coats are applied, sufficient time shall be allowed between two coats.

2.2.3 When flat varnish is used for finishing a preparatory coat of hard drying under coating or flatting varnish shall be first applied and shall be allowed to harden thoroughly. It shall then be lightly rubbed down before the flat varnish is applied. Section of the work such as panels, shall be cut in clearly, so as to avoid any overlapping during applications, as this is likely to impart some measure, of gloss to partially dried area, worked up in lapping. On larger area of the flat varnish shall be applied rapidly and the edges of each patch applied shall not be allowed to set but shall be followed up whilst in free working conditions.

## **3.0. Mode of measurements and payment :**

3.1 The relevant specifications of item 19.71 shall be followed.

3.2 **The rate shall be for a unit of One sq. metre.**

**19.86 Extra over item 19.84 for every subsequent coat of varnish.**

## **1.0. Materials and Workmanship :**

1.1 The relevant specifications of item 19.84 shall be followed except that the work shall be for subsequent coat of varnishing.

## **2.0. Mode of measurements and payment :**

2.1. The relevant specifications of item 19.84 shall be followed except that the extra rate shall be paid for every subsequent coat, of varnishing, done over and above the rate of item No, 19.84.

2.2. **The rate shall be for a unit of One sq.metre.**

**19.87 Polishing with french polish on new wood and wood based surface to give a smooth even surface including cleaning time surface of all dirt, dust and sand papered 'smooth and including a coat of wood finish.**

**1.0, Materials :**



1.1 The French polish of required tint and shade shall be prepared with the below mentioned ingredients and other necessary Materials : (i) Denatured spirit of approved quality. (ii) Chandras (iii) Shellac (iv) Pigment. The french polish So prepared shall conform to I.S. 348-1968.

**2.0. Workmanship :**

**2.1. Preparation of Surface :**

2.1.1. All unevenness shall be rubbed down to smoothness with sand paper and the surface shall be well dusted. The pores in the wood shall be filled up with a filler made of a paste or whiting in water or methylated spirit (with a suitable pigment like burnt sienna or number if required) : Otherwise the French polish will get absorbed and a good gloss will be difficult to obtain.

**2.2. Application**

2.2.1 A pad of wooden cloth covered by a fine cloth shall be used to apply the polish. The pad shall be moistened with polish and rubbed hard on the surface in a series of overlapping circles applying the polish sparingly but uniformly over the entire area to give an even surface. A trace of lin seed oil on the face of the pad may be added which shall facilitate this operation. The surface shall be allowed to dry and the remaining coats applied in the same way. To finish off, the pad shall be covered with a fresh piece of clean fine cloth, slightly dampened with methylated spirit and rubbed lightly and quickly, with circular motions, The finished surface shall present a uniform texture and high gloss.

**3.0. Mode of measurements and payment :**

3.1. The relevant specifications of item 19.12 shall be followed for Mode of measurements and payment :

3.2. The rate includes cost of wood filler etc. complete.

3.3. **The rate shall be for a unit of One sq.metre.**

**19.88 Polishing with french polish on previously polished wood and wood based surface to give an even surface including cleaning the surface of all dirt, dust and sand papered smooth including a coat of Wood filler.**

**1.0. Materials and Workmanship :**

1.1 The relevant specifications, of item 19.87 shall be followed except that the french polish shall be applied on previously polished wood and wood based surface.

**2.0. Mode of measurements and payment :**

2.1. The relevant specifications of item 19.87 shall be followed.

2.2. **The rate shall be for a unit of One sq. metre.**

**19.91 Applying wax polish on new wood work and wood based surfaces with been was polish in proportion 2:1:5:1:0.5 (2 Bees Wax ; 1.5 linseed oil I Turpentine oil ; 0.5 varnish by weight) by give, all even surface including cleaning the surface of all dirt, dust and sand papered smooth.**

**1.0. Materials :**

Bee's Wax shall conform to I.S. 1504-1968. Linseed oil shall conform to I.S. : 75-1967. Turpentine shall conform to I.S. 83-1950. Varnish shall conform in I.S.: 337-1952.



**2.0. Workmanship :**

2.1. Preparation of bees wax :

2.1.1 In case of bee's wax it shall be prepared locally with following specification.

2.1.2 Pure bees wax free from paraffin or stearine adulterants shall be used. The polish shall be prepared from mixture of bees wax, linseed oil, turpentine, and varnish in proportion 2:1 5:1: 0.5 by weight. The bees wax and boiled linseed oil shall be heated over a slow fire. When the wax is completely dissolved the mixture shall be cooled till it is just warm and turpentine and varnish added to it in the required proportions and entire mixture shall be well stirred.

2.2. **Preparation of surfaces :**

2.2.1 The surface to be waxed shall be prepared to produce a smooth, dry, matt surface. Previous coat of paint or stain if any shall be allowed to dry and be rubbed down lightly, wiped off and allowed to dry. All dust and dirt, shall be removed from the surface to be waxed, and also from the neighbourhood. Damp atmosphere and draught shall be avoided. For waxing, normal dry day shall be chosen.

2.3. **Application :**

2.3.1. The polish shall be applied evenly with clean soft pad of cotton cloth in such way that the surface is completely and fully covered. The surface shall then be rubbed continuously for half an hour. After well rubbing in one coat of wax polish, the work shall be covered with dust proof sheet. (Cloth for preventing dust falling on the work). Subsequent coat shall be applied after the surface is quite dry and shall be rubbed off with soft flannel until the surface has assumed a uniform gloss and is dry showing no sign of stickiness.

2.3.2. The final polish depends largely on the amount of rubbing which shall be continuous and with uniform pressure with frequent changes in the direction.

**3.0. Mode of measurements and payment :**

3.1. The relevant specifications of item No, 19.12 shall be followed.

3.2. **The rate shall be for a unit of One sq.metre.**

**19.92 Applying wax polish on previous wax polished wood and wood based surfaces with bees wax polish in proportion of 2:1:5:1:0.5 (2 Bees Wax : 1.5 linseed oil : 1 Turpentine 0.5 Varnish by weight to give an even surface including cleaning the surface of all dirt, dust and sand papered smooth.**

**1.0. Materials and Workmanship :**

1.1. The relevant specifications of item No. 19.9.1 shall be followed except that the wax polishing shall be carried out on previously wax polished wood and wood based surfaces with bees wax polish.

**2.0. Mode of measurements and payment :**

2.1. The relevant specifications of item No. 19.91 shall be followed.

2.2. **The rate shall, be for a unit of One sq.metre.**

**19.98. Coal tarring two coats on new wood and wood based surfaces using 0.15 and 0.12 liters of coat tar per sq.m. in the first and second coat respectively to give an even shade including**



**cleaning of all dirt, dust and other foreign matter :**

**1.0 Materials :**

The coal tar shall conform to I.S. - 290-1961.

**2.0. Workmanship :**

2.1 200 cms. of unslaked lime shall be added to every liter of coal tar and heated till it begins to bolt, It shall then be taken off the fire and kerosene oil added to it slowly at the rate of 1 part kerosene oil and 6 parts or more parts of coal tar by volume and stirred thoroughly. The addition of lime is for preventing the tar from running.

**2.2. Preparation of surface :**

2.2.1 The surface to be painted shall be allowed to dry sufficiently. Any exciting fungus or mould growth shall be completely removed. All major cracks or defects in the plaster shall be cut out and made good before primer is applied holes and undulations shall be filled up with plaster of paris and rubbed smooth.,

**2.3. Application of paint :**

2.3.1. The coal tar shall be applied as per relevant specifications of applying mixed paint item No. 19.7 except coal tarring is used instead of enamel paint.

**3.0. Mode of measurements and payment :**

3.1 The relevant specifications of item No. 19.12 shall be followed.

3.2 **The rate shall be for a unit of One sq.metre.**

**19.119. (I) Writing letter of figures on any surface with black Japan paint (stops, commas, hyphens and the like not to be measured and paid for separately) : Block (letters/figures).**

**1.0. Materials :**

1.1. Ready mixed the black Japan paint shall conform to I.S. 341-1952.

**2.0. Workmanship :**

2.1. The letters and figures shall be to the heights and widths as per approved drawings or as directed. These shall be stenciled or drawn in pencil and got approved before painting. They shall be of uniform size and finished neatly. The edges shall be straight or in pleasant smooth curves.

**3.0. Mode of measurements and payment :**

3.1 Letters, figures and similar items etc. stops, commas, hyphens, and the like shall be deemed to be included in the item.

3.2. The rate per cm., height of letter shall hold good irrespective of width of the letters or 'figures or the thickness of the lettering.

3.3. **The rate shall be for a unit of per letter per cm. height.**

**19.119.(II). Writing letter (if figures on any surface with black Japan paint (Stops, commas, hyphens and the like not to be measured and paid for separately) : Indian (Letters/Figures).**

**1.0. Materials and Workmanship :**





The relevant specifications of item No. 19.119(1) shall be followed except the writing of letter shall be Indian letters/figures.

**2.0. Mode of measurements and payment :**

2.1 The relevant specification of item No. 19.119(1) shall be followed.

**19.126.(I) (1) Painting lines, dashes, arrows, letter etc. on roads, air fields and like in two coats with road marking paint, brushing, including cleaning the surface of all dirt, dust and other foreign matter : Over 10 cms. in width.**

**1.0 Materials :**

1.1. The road marking paint shall conform to I.S, 164-1951.

**2.0. Workmanship :**

2.1 The relevant specification of item No. 19.119(I) shall be follows except that the painting lines, dashes, arrows and letters on roads, air fields and like shall be carried Out with road marking paint in two coats over 10 cms. in width.

**3.0. Mode of measurements and payment :**

3.1 The relevant specification of item No. 19,119 (I) shall be followed.

3.2 **The rate shall be for unit of One sq. metre,**

**19.126.(II). Painting lines, dashes, arrows, letters etc. on roads, fields and like in two coats with road marking paint brushing including cleaning the surface of all dirt, dust and other foreign matter : Up to 10 cms. in width.**

**1.0 Materials and Workmanship :**

1.1 The relevant specification of item No. 1.126(I) shall be followed except that painting work shall be Up to 10 cms in width,

**2.0. Mode of measurements and payment :**

2.1 The relevant specification of item No. 19.119(1) shall be followed,

2.2. **The rate shall be for a unit of one running metre,**

**19.127.(A). Painting lines, dashes, arrows, letters etc. on roads, airfields, and like in one coat with road marking paint brushing including cleaning the surface of all dirt, dust and other foreign matter : Over 10 cms. in width.**

**1.0 Materials and Workmanship :**

1.1 The relevant specification of item No. 19.126(I) shall be followed except that the painting shall be done in one coat over 10 cms. in width,

**2.0. Mode of measurements and payment :**

2.1. The relevant specification of item No, 19.126(I) shall he followed.

2.2. **The rare shall be for a unit of One sq. metre.**



**19.127.(B). Painting lines, dashes, arrows, letters etc. on roads, airfields and like in one coats with road marking paint brushing including cleaning the surface of all dirt, dust and other foreign matter Up to 10 cms. in width.**

**1.0. Materials :**

1.1. The relevant specifications of item No. 19.126(1) shall be followed except that the painting shall be done in one coat upon 10 cms in width.

**2.0. Mode of measurements and payment :**

2.1. The relevant specifications of item No. 19.126(I) shall be followed.

2.2. **The rate shall be for a unit of the running metre.**

## SECTION – 20

### Demolition & Dismantling

**20.1.(I). Demolition and disposal of unserviceable Materials : with all leads and lifts : Lime concrete :**

**1.0. Workmanship :**

1.1 The demolition shall consist of demolition of one or more parts of the building as specified or shown in the drawings. Demolition implies taking up or down or breaking up. This shall consist of demolishing whole or part of work including all relevant items as specified or shown in the drawings.

1.2. The demolition shall always be planned before hand and shall be done in reverse order of the one in which the structure was constructed. This scheme shall be got approved from the Engineer-in-charge before starting the work. This however will not absolve the contractor from the responsibility of proper and safe demolition.

1.3 Necessary propping, shoring and under pinning shall be provided for the safety of the adjoining work or property. Which is to be left intact, before dismantling and demolishing is taken up and the work shall be carried out in such a way that no damage is caused to the adjoining property.

1.4. Wherever required, temporary enclosures or partitions shall also be provided. Necessary precautions, shall be taken to keep the dust nuisance down as and where necessary.

1.5 Dismantling shall be commenced in a systematic manner. All Materials : which are likely to be damaged by dropping from a height or demolishing roof, masonry etc. shall be carefully dismantled first. The dismantled articles shall be properly stacked as directed.

1.6. All Materials : obtained from demolition shall be the property of Government unless otherwise specified and shall be kept in safe custody until handed over to the Engineer-in-charge.

1.7 Any serviceable Materials : obtained during dismantling or demolition shall be separated out and stacked properly as directed with all lead and lift. All unserviceable Materials :, rubbish etc. shall be stacked as directed by the Engineer-in-charge.

1.8 On completion of work, the site shall be cleared of all debris rubbish and cleaned as directed

**2.0. Mode of measurements and payment :**

2.1 Measurements of all work shall be taken before demolition or dismantling and no allowance for increase in bulk shall be allowed. The demolition of lime concrete shall be measured under this item. Specification for deduction for voids, openings etc. shall be on same basis as that employed for construction of work.



- 2.2 All work shall be measured on decimal system as fixed in its place subject to the following limits, unless otherwise stated hereinafter : (a) Dimensions shall be measured to the nearest 0.01 mt. (b) Areas shall be worked out to the nearest 0.01 sq.mt. (c) Cubical contents shall be worked out to the nearest 0.01 Cu.m.
- 2.3 The rate shall include cost of all labour involved and tools used in demolishing and dismantling including scaffolding. The rate shall also include the charges for separating out and stacking the serviceable Materials : properly and disposing the unserviceable Materials : with all lead and lift. The rate also includes for temporary shoring for the safety of the portion not required to be pulled down or of adjoining property and providing temporary enclosures where considered necessary.
- 2.4. **The rate shall be for a unit of one cubic metre.**
- 20.1.(II). Demolition and disposal of unserviceable Materials : with all leads and lifts : Unreinforced cement Concrete.**
- 1.0. Workmanship :**
- The relevant specifications of item 20.1(i) shall be followed except that the unreinforced cement concrete work is to be demolished instead of lime concrete.
- 2.0. Mode Of measurements and payment :**
- 2.1. The relevant specification of item 20.1(i) shall be followed
- 2.2 **The rate shall be for a unit, of one cubic metre.**
- 20.3. Demolition including stacking of serviceable Materials : disposal of unserviceable materials with all leads and lifts R.C.C. Work.**
- 1.0. Workmanship :**
- 1.1. The relevant specifications of item 20.1(i) shall be followed except that demolition of R.C.C. work is to be done.
- 2.0. Mode of measurements and payment :**
- 2.1 The relevant specifications of item 20.1(i) shall be followed except that the demolition of reinforced concrete structure is to be done. The unserviceable Materials : shall be disposed of at all leads and lifts. The rate excludes scraping straightening of reinforcement but includes cutting of reinforcement,
- 2.2. **The rate shall be for a unit of one cubic metre.**
- 20.11.(II). Demolition of brick work and stone masonry including stacking of serviceable Materials : and disposal of unserviceable Materials : with all leads and lifts : in lime mortar.**
- 1.0. Workmanship :**
- 1.1. The relevant specifications of item No, 20.1.(i) shall be followed except that demolition of brick or stone masonry in lime mortar is to be done.
- 2.0. Mode of measurements and payment :**
- 2.1. The relevant specification of item No. 20.1(i) shall be followed except that the wall and independent piers or columns of brick or stone masonry shall be measured in cubic metres. All copings, curbels, cornices and other projections shall be included with the wall measurements.



- 2.2. In measuring thickness of plastered walls, the thickness of plaster shall be included. The unserviceable Materials : shall be disposed off with all lead and lift. Ashlar face stones dressed stone etc, if required to be taken down intact shall be dismantled and measured separately in cubic metres,
- 2.3. The rate is exclusive of cleaning of bricks or stones. Honey comb works or hollow block walling shall be measured as solid.
- 2.4. **The rate shall be for a unit of one cubic metre.**
- 20.11.(III). Demolition of brick work amid stone masonry including stacking of serviceable Materials : and disposal of unserviceable Materials : with all lead and lifts : in cement mortar :**
- 1.0. Workmanship :**
- 1.1. The relevant specifications of item No. 20.11(ii) shall be followed, The unserviceable Materials : shall be stacked as directed by Engineer-in-charge with all leads and lifts.
- 20.22 Demolition in terrace including stacking of serviceable material and disposal of unserviceable Materials : with all lead and life: Brick tiles covering.**
- 1.0. Materials and Workmanship :**
- 1.1 The relevant specifications of item No. 20.1(i) shall be followed except that the demolition of terrace brick tiles is to be done.
- 2.0. Mode of measurements and payment :**
- 2.1 The relevant specifications of item No. 20.1(1) shall be followed except that the brick tiles covering of terrace shall be measured in sq.mt. The unserviceable Materials : shall be stacked as directed all leads and lifts.
- 2.2. **The rate shall be for a unit of One sq.metre.**
- 20.23 Dismantling tiled or stone floors laid in mortar including stacking of serviceable Materials : and disposal of unserviceable Materials : with all lead and lifts.**
- 1.0. Workmanship :**
- 1.1. The specifications of item No. 20.1(i) shall be followed except the dismantling of tiled or stone floors laid on mortar shall be done. Dismantling implies carefully taking up or down or removing without damage. The articles shall be passed by hand where necessary and lowered and where these are fixed by nail, screws, bolts, etc. these shall be taken out with proper tools,.
- 2.0. Mode of measurements and payment :**
- 2.1. The supporting Materials : such as joints, beams if any etc. shall. be measured separately. The relevant specifications of item No. 20. (ii) shall be followed. The rate shall include stacking the unserviceable Materials : as directed with all lead and lift.
- 2.2. **The rate shall be for a unit of One sq.metre.**
- 20.25 Dismantling of wooden floors, including stacking of serviceable Materials : and disposal of unserviceable Materials : with all lead and lifts.**



**1.0. Materials :**

1.1. The relevant specifications of item No. 20.1(i) shall be followed except that wooden floors shall be dismantled.

**2.0. Mode of measurements and payment :**

2.1 The relevant specifications of item No. 20,1.(i) shall be followed. The supporting members such as joints, beams etc. shall be measured separately. The rate shall include disposal of unserviceable Materials : as directed for and with all lead, and lift.

2.2, **The rate shall be for a unit of One sq.metre.**

**20.27.(I). Dismantling of sheet roofing including ridges, valleys gutters etc. stacking of serviceable Materials : and disposal of unserviceable Materials : with all leads with lifts : G. I. Sheet roofing.**

**1.0. Materials :**

1.1 The relevant specification of item No. 20.1 (i) shall be followed except that G.I. sheet roofing shall be dismantled instead of concrete work,

**2.0 Mode of measurements and payment :**

2.1 The area of G.l. sheet roofing shall be measured in sq.metre. Ridges, hips and valleys shall be girthed and included with roof area. Corrugated and semi-corrugated surfaces shall be measured flat and not girthed.

2.2. Supporting members as rafters, purlins, beams, joints, trusses etc. shall be measured separately,

2.3. The rate shall include disposal of unserviceable Materials : with all leads and. lifts and stacking the serviceable Materials : as directed.

2.4. **The rate shall be for a unit of one sq.metre.**

**20.27.(III). Dismantling of sheet roofing including ridges, hips, valleys, gutters, etc. stacking of serviceable Materials : and disposal of unserviceable Materials : with all leads and lifts A.C. Sheet roofing.**

**1.0. Workmanship :**

1.1. The relevant specifications of item No.20.27(i) shall be followed except that dismantling work of A.C, Sheet roofing is to be down.

**2.0. Mode of measurements and payment :**

2.1 The relevant specifications of item No. 20.276 (j) shall be followed except that the A.C. Sheets roofing shall be measured in this item.

2.2 **The rate shall be for a unit of one sq.metre,**

**20.28 Dismantling Mangalore or country tile roofing with battns, boarding etc. including stacking of serviceable Materials : and disposal of unserviceable Materials : with all lead and lifts.**

**1.0. Workmanship :**

1.1. The relevant specifications of item No. 20.1(i) shall be followed except that the country tile roof or Mangalore roof shall be dismantled.



**2.0. Mode of measurements amid payment :**

2.1. The relevant specifications of item No. 20.1 (i) shall be followed.

2.2 The supporting members shall be measured under separate item.

2.3. The rate includes labour required of disposal of unserviceable item with all leads and lifts.

2.4 **The rate shall be for a unit of one sq.metre.**

**20.30 Dismantling cement asbestos/harde board in ceiling or partition walls, wooden trellis work including frames stacking of the serviceable Materials : and disposal of unserviceable Materials : with all leads and lifts.**

**1.0 Materials :**

1.1. The relevant specifications of item No. 20.1. (i) shall be followed except that the cement asbestos hard board in ceiling or partition walls, wood trellis, work etc. shall be dismantled.

**2.0. Mode of measurements and payment :**

2.1. The relevant specifications of item No. 20.1. (i) shall be followed. The serviceable Materials : shall be stacked as and where directed and the unserviceable Materials : shall be disposed off with all leads and lifts.

2.2 **The rate shall be for a unit of One sq.metre.**

**20.35 Dismantling wood work, wrought framed and fixed in frames, trussed including stacking the Materials : with all lead and lift.**

**1.0. Workmanship :**

1.1. The relevant specification of item No. 20.1 (i) shall be followed except that the wood work, wrought framed and fixed in frames, trusses etc. shall be dismantled.

**2.0 Mode of measurements and payment :**

2.1 The relevant specifications of item No. 20.1(i) shall be followed.

2.2. The Materials : shall be stacked as and where directed with all leads and lifts.

2.3. **The rate shall be for a unit of one cubic metre.**

**20.39 Dismantling expanded metal or IRC fabric with necessary battens and beadings including frame work and stacking the serviceable Materials : with all lead and lift.**

**1.0. Workmanship :**

The relevant specifications of item No. 20.1(i) shall be followed except that the dismantling of expanded metal or IRC fabric shall be done.

**2.0 Mode of measurements and payment :**



2.1 The relevant specifications of in Item No. 20.1(i) shall be followed.

2.2 **The rate shall be for a unit of One sq.metre.**

**20.43. Dismantling steel work including dismembering and stacking the Materials : wit/i all leads and lifts.**

**1.0 Materials and Workmanship :**

1.1 The relevant specifications of item No. 20.1(i) shall be followed except that the dismantling of steel work shall be carried out.

**2.0 Mode or measurements & payment :**

2.1 The relevant specifications of item No. 2.1(i) shall be followed.

2.2. The weight of the member shall be computed from standard tables unless the actual weight can be readily determined.

2.3. Riveted works where rivets are required to be cut, the same shall be carried out under this item and nothing extra shall be paid.

2.4. In framed steel gate, the weight of any covering material or filling such as iron sheets and expanded metal shall be added to the weight of the main articles if such covering is not ordered to be taken out separately.

2.5. The rate includes stacking the Materials : as and where directed with all leads and lifts.

2.6. **The rate shall be for a unit one Kg.**

**20.49.(I). Dismantling doors, windows, ventilators etc. (wood or steel) shutters including chowkhats, Architraves, hold fists and other attachments etc. complete and stacking them with all leads & lifts. Not exceeding 3 sq. metres in area.**

**1.0. Workmanship :**

1.1 The relevant specifications of item No. 20.1(1) shall be followed except that the door, windows, ventilators etc. (wood or steel shutters including chowkhats, architraves, hold fasts and other attachments etc. are to be dismantled.

**2.0. Mode of measurements and payment :**

2.1 The relevant specifications of item No. 20.1(i) shall be followed.

2.2 The doors, windows, ventilators etc. not exceeding 3 sq.mt. in area (each) including shutters and chowkhats, Architraves, hold fasts and other attachment to frames etc. will be dismantled and measured under this item.

2.3. The rate includes stacking the serviceable Materials : as and where directed with all leads and lifts.

2.4 **The rate shall be for a unit of One number.**

**20.49.(II). Dismantling' doors, windows ventilators etc. (wood or steel) shutters including chowkhats, Architraves. Hold fasts and other attachments etc. complete and stacking them within all leads & lifts. Exceeding 3 sq.metres in area.**



**1.0. Workmanship :**

1.1 The relevant specifications of item No. 20.49(i) shall be followed except that the door, windows, ventilators exceeding 3 sq. metres are to be dismantled under this item.

**2.0. Mode of measurements and payment :**

2.1. The relevant specifications of item No. 20.49 (i) shall be followed.

2.2. **The rate shall be for a unit of One number,**

**20.51 Dismantling barbed wire fencing including making rolls and also including dismantling fencing posts including all earth work, concrete in the base and making good the disturbed ground, stacking useful Materials : as directed and disposing all the unserviceable Materials : with all leads and lifts.**

**1.0. Workmanship :**

1.1 The relevant specifications of item No. 20.1(i) shall be followed except that the dismantling of barbed wire fencing shall be carried out.

**2.0. Mode of measurements and payment :**

2.1 The relevant specifications of item No. 20.1(i) shall be followed.

2.2 The rate includes making rolls of dismantled wires and including dismantling fencing posts. concrete work, in base and making good the disturbed ground etc. complete.

2.3. The serviceable Materials : shall be stacked as and where directed and end unserviceable Materials : shall disposed with all leads and lifts.

2.4. **The rate shall be for a unit of one running metre,**

**20.56 Dismantling (C. I. Pipes, G. S. W. Pipes and A. C. rain water pipes with fittings and clamps, including stacking the Materials : with all lead and lift. (for any dia. of pipe).**

**1.0 Workmanship :**

1.1 The relevant specifications of item No. 20.23 shall be followed except that the dismantling work of pipes lines of C.I., G.S.W, & A.C. Pipes with fitting shall be carried out.

**2.0 Mode of measurements and payment :**

2.1. The relevant specifications of item No. 20.1(i) shall be followed.

2.2 Water pipe lines, including rain water pipes. with clamps and specials, sewer pipe lines, (Salt glazed ware or concrete) etc. shall be measured in running metre inclusive of joints (The measurements shall be taken along the centre lint of pipe and fittings) .

2.3. **The rate shall be for a unit of One running metre.**

**20.00.1 Dismantling sanitary fittings like wash basin, WC. Pan, Indian & European Type flushing tank, etc. including stacking the Materials : with all lead lift. ,**

**1.0. Workmanship :**





1.1 The relevant specifications of item No. 23.23 shall be followed except that the dismantling work of sanitary fittings such as wash basin, W.C. Pan (all type of Pans), flushing tanks etc. shall be carried out.

**2.0. Mode of measurements and payment :**

2.1. The relevant specifications of item No.20.1(i) shall be followed

2.2. **The rate shall be for a unit of one number,**

**20.00.2 Scraping oil paint from steel and other metal surfaces and making the surface even (with hand scraping). .**

**1.0. Workmanship :**

1.1 The odd paint from steel and other metal surface shall be scraped thoroughly with handscrapper followed by wire brushing (first with coarse and then with fine brushes) and finally sand papering with coarse and. paper (No.3) steel wood (No.2) or emery paper (No.3) or with emery clothes. This shall then be wiped finally with mineral turpentine to remove grease and perspiration of hand marks etc. and allowed to dry. The surface shall be made even and smooth.

**1.0 Mode of measurements and payment :**

2.1. The work shall be measured in actual area of work done.

2.2. **The rate shall be for a unit of one sq.metre.**

**SECTION – 21**

**Repairs to Buildings**

**21.8. Providing and fixing M.S. fan clamps of shape and size as specified in existing R.C.C. slab including cutting chase and making good.**

**1.0. Materials :**

1.1. M.S. Bar shall conform to M-18.

**2.0. Workmanship :**

2.1. The shape and size of fan clamp shall be as directed.

2.2 The fixing M.S. fan clamp in existing R.C.C. slab a chase of size 150 mm x 75 mm shall be cut from the ceiling so as to expose the reinforcement and up to 25 mm. clear round the reinforcement bar. This shall be done without any damage to adjoining portion of ceiling. The two arms of the ends of the clamp shall be passed through the space over reinforcement bar from the bottom of the slab. Then the two arms shall be bent down about 15 mm. by means of crow bar. The clamp shall be held in position and the chase in the ceiling filled with cement concrete 1:2:4 (1 cement : 2 coarse sand : 4 graded stone aggregate 20 mm. nominal size). The ceiling shall be then finished to match the existing surface and properly cured.

**3.0. Mode of measurements and payment :**

3.1. The rate includes cost of all Materials : and labour required for completion of this item as described above.

3.2. **The rate shall be for a unit of one number.**



**21.23. Cutting out cracks, of roof terrace to V. Section, Clearing out, wetting, grouting with cement and sand slurry 1:3 (1 cement : 3 sand)**

**1.0. Materials :**

- 1.1 (1) Water shall conform to M-1. (2) Cement shall conform to M-3.  
(3) Sand shall conform to M-6.

**2.0. Workmanship :**

- 2.1. The cracks shall be cleaned out and trimmed to V shaped cuts atleast 6 mm. wide on top. The cracks shall be cleaned off and then cracks and shall be thoroughly flooded with water, water allowed to a soak in cracks, and the grouted with cement and sand slurry in proportion 1:3 The required cracks shall be cured atleast 7 days.

**3.0. Mode of measurements and payment :**

- 3.1. The rate shall includes cost of all Materials : and labour required for satisfactory completion of item as described above.  
3.2. **The rate shall be for a unit of One running metre.**

**21.24. Cutting out cracks of roof terrace to V-Section cleaning out, and filling solidly with hot mixtures of bitumen and clean dry sand (1:1 weight).**

**1.0. Materials :**

- 1.1 (1) Bitumen shall be 85/25 penetration  
(2) Sand shall conform to M-6.

**2.0. Workmanship :**

- 2.1. The relevant specifications of item No. 21.23 shall be followed for opening cracks and cleaning.  
2.2. The cracks shall be absolutely dried and cleaned and filled solidly with a hot mixtures of 85/25 penetration and sand in ratio of 1:1 by weight. The fillar shall be well filled in to cracks with the edges of a trowel and left flush with surface of roof. Repaired cracks shall cause no ridges across the direction of the slope of roof.

**3.0. Mode of measurements and payment :**

- 3.1. The relevant specifications of item No. 21.23 shall be followed.  
3.2. **The rate shall be for a unit of One running metre.**



## SECTION – 22

### Misc. Building items

**22.2. Providing and fixing 1.20 metre high fencing with 2 metre long M.S. angle posts 40 mm. x 40 mm. x 6 mm. and oil painting 3 coats fixed at 2.5 M C/C with five horizontal lines, and two diagonals of galvanized and fixed to posts with G.I. staples including fixing the posts in ground with 0.5 M x 0.5 M x 0.5 M block in C.C. 1:5:10 (1 cement : 5 sand : 10 graded brick aggregate 40 mm. nominal size) etc. complete.**

**1.0. Materials :**

1.1 (1) Water shall conform to M-1. (2) Cement shall conform to M-3. (3) Sand shall conform to M-6. (4) Brick bats aggregate shall conform to M-14. (5) Oil paint shall conform to M-44. (6) Barbed wire shall conform to M-78.

**2.0. Workmanship :**

2.1. The pits of the size 0.5 m x 0.5 m x 0.5 m shall first be excavated, true to line and level to receive the post at 2.5 m C/C. the relevant specifications of item 4.00. I shall be followed for excavation work.

2.2. The pits shall be filled with a layer of 0.15 m thick with lean concrete 1:5:10 (1 cement : 5 sand : 10 graded brick bat aggregated 40 mm. nominal size). The M.S. angles 40 mm x 40 mm x 6 mm shall be filed in with clean concrete 1:5:10 and rammed properly so as to form total 0.5 m x 0.5 m x 0.5 m concrete block. The concrete shall be cured for 7 days to allow it set.

2.3. The barbed wire shall be stretched and fixed in 5 horizontal rows and tow diagonals. The bottom row shall be 140 mm. above goround and the rest at 125 mm centre to centre. The diagonal shall be stretched between adjacent post from top wire of one post to the bottom wire of 2<sup>nd</sup> post. The wires shall be fixed to posts by means of staples. The M.S. Angle posts shall be painted with 3 coats of oil paint of approved tint and shade.

**3.0. Mode of measurements and payment :**

3.1. The work shall be measured for the finished work from centre to centre of the posts.

3.2. The rate shall include the cost of all labour and Materials : involved in the operations described above.

3.3. **The rate shall be for a unit of One running metre.**

**22.00.1 Constn. Of B. B. masonry paniara 23 cm x 75 mm wall including fixing precast R.C.C. marble Mosaic (terrazo) slab of 75 mm. thickness on top and smooth finishing to walls in cement plaster in C.M. 1:3 curing etc. complete including drainage out, waste arrangements.**

**1.0. Materials :**

1.1 (1) Water shall conform to M-1. (2) Cement shall conform to M-3. (3) Sand shall conform to M-6. (4) Burnt bricks shall conform to M-15. (5) Precast marble mosaic terrazo paniara of 75 mm thickness shall be of best quality. The width of paniara shall be directed.

**2.0. Workmanship :**

2.1. The brick masonry shall be constucted for paniara for the size as directed in C.M. 1:6. The thickness of wall shall be 23 cms. thick and heigh shall be 75 cms. The relevant specifications of B.B. masonry at item 6.13. (b) shall be followed for B.B. masonry work.

2.2. The B.B. masonry work shall be covered with precast marble terrazo paniara at top, of width and length as specified or as directed. The terrazo mosaic paniara shall be 75 mm. thickness.

2.3. The whole masonry work shall be finished smooth with C.M. 1:3 on both sides. The relevant specifications of item No. 17.59. (I) shall be followed.



2.4. The drainage outlet and water arrangement shall be made as directed.

**3.0. Mode of measurements and payment :**

3.1. The work shall be measured for the finished work.

3.2. The rate shall include the cost of all labour and Materials : involved in the operations described above.

3.3. **The rate shall be for a unit of One Running metre.**

**22.00.2 Constructing, a chowkadi with C C over 12 cm. thick B B masonry in front and dwarf wall 1 m high and 23 cms. thick cement plaster to masonry in C.M. (1.3) and cement concrete flooring in 1:2:4 with 5 cm. dia A.C. Drain pipe etc. complete.**

**1.0. Materials :**

1.1 Water shall conform to M-1. Cement shall conform to M-3. Sand shall conform to M-6. Burnt bricks shall conform to M-15. Stone aggregate 20 mm. nominal size shall conform to M-12. (a) A.C. Drain pipe of 5 cms. dia. shall conform to M-74.

**2.0. Workmanship :**

2.1. The chowkadi shall be constructed of specified size and as directed. The slab shall be cast on B. B. masonry wall 12 cms. thick and dwarf wall 1 m high and 23 cms. thick shall be constructed in proportion of C.M. 1:6. The relevant specifications of item 6.3. (I) shall be followed for masonry partition work and 5.4.1.

(c) Shall be followed for reinforced concrete work.

2.2. The whole masonry work shall be finished with cement mortar 1:3 and finished smooth. The relevant specifications of item No. 17.59(I) shall be followed for plastering work.

2.3. The A.C. pipe of 5 cms. dia. Shall be fixed as drainage pipe. The bottom shall be finished with C.C. 1:2:4 finished with cement slurry.

**3.0. Mode of measurements and payment :**

3.1. The work shall be measured for finished work.

3.2. The rate includes cost of all Materials :, labour etc. required for carrying out satisfactory completion of work.

3.3. **The rate shall be for a unit of one square metre.**

**22.00.3.(I) Construction cooking platform 60 cm. width and 70 cm. height resting on B. B. Masonry wall 23 cms. thick in C.M. 1:6 with fixing of precast 1:2:4, R.C.C. 0.08 M. thick slab with marble mosaic chips set in G.M. (Terrazo) with plastering on exposed faces to wall in C.M. 1:4 etc. complete.**

**1.0. Materials :**

1.1 Water shall conform to M-1. Cement shall conform to M-3. Sand shall conform to M-6. Burnt bricks shall conform to M-15. Mosaic chips shall conform to M-46. Stone aggregate 20 mm. nominal size shall conform to M-12. (a) M.S. Bars shall conform to M-18.

**2.0. Workmanship :**

2.1. The cooking platform of size as directed shall be constructed in 60 cms. width and 70 cms. height. The brick masonry wall in C.M. 1:6 shall be constructed in 23 cms. thickness up to full depth. The relevant specifications of item 6.13. (B) shall be followed for masonry work.



- 2.2. The R.C.C. slab of 8 cms. thickness and of adequate desing and size shall be precast and the same shall be put up on the B.B. masonry work.
- 2.3. The tap and exposed sides of the R.C.C. slab shall be finished with marble mosaic terrazo 8 mm. thick with require colour pigment. The work of terrazo shall be carried out as per relevant specification of item 14.4. (E).
- 2.4. The whole masonry work shall be finished with cement mortar in C.M. 1:4, the relevant specification of item 17.59 (II) shall be followed.

**3.0. Mode of measurements and payment :**

- 3.1. The work of cooking platform shall be measured for finished work.
- 3.2. The rate include cost of all labour and Materials :, etc. required for satisfactory completion of this item as described above.

**3.3. The rate shall be for a unit of One running metre.**

**22.00.3.(II) Constructing cooking platform of 60 cm with and 70 cms. height resting on B.B. masonry walls 23 cm thick in C.M. 1:1 with fixing black kapada stone surface laid on precast R.C.C. slab 1:2:4 with plastering on exposed faces to wall in C.M. 1:4 etc. complete.**

**1.0. Materials :**

- 1.1 The relevant specification of item No. 22.00.3 (I) shall be followed except that the cooking platform shall be constructed by providing black kapada stone of 25 mm to 30 mm thickness on precast R.C.C. 1:2:4 slab 8 cms. thick. The black stone shall be provided in single piece up to 1.8 M in length and specified width. All the exposed edges of stone shall be machine cut.

**2.0. Mode of measurements and payment :**

- 2.1. The relevant specification of item 22.00.3 (I) shall followed.
- 2.2. The rate includes provind machine cut edges on exposed face of kapada stone.
- 2.3. **The rate shall be for a unit of One running metre.**

**22.00.4 Providing and fixing Rajula stone 75 mm. thick 60 cm x 45 cms. size including fixing in cement mortar as directed.**

**1.0. Materials :**

- 1.1 Water shall conform to M-1. Cement mortar shall conform to M-11. Rajula stone of specified size shall be of best quality and free from any defects. The stone shall not be less than 75 mm in thickness.

**2.0. Workmanship :**

- 2.1. The Rajula stone of size 60 x 45 cms. size shall be fixed as and where directed in cement mortar in 1:3 All the edges of the stone shall be fixed with cement mortar in C.M. 1:3 and sloped at 45 and finished smooth. The work shall be cured for 7 days after fixing.

**3.0. Mode of measurements and payment :**

- 3.1. The work shall be measured for finished work.
- 3.2. The rate includes cost of all labour and Materials : required for satisfactory completion of this item.

**3.3. The rate shall be for a unit of one number.**



**22.00.5 Providing and laying Bilimora type brick facing in C.M. 1:1 laid over bedding of cement mortar 1:3 (13 mm. thickness) including cleaning, watering, scaffolding etc. complete.**

**1.0. Materials :**

Water shall conform to M-1. Cement mortar of specified proportion shall conform to M-11. Bilimora type bricks shall be approved before collecting the same on site.

**2.0. Workmanship :**

2.1. The surface on which the Bilimora type bricks is to be provided shall be cleaned of all dust, dirt, etc. and finished with CM 1:3 in 13 mm. thickness. The relevant specifications of item 17.59 (I) shall be followed except that the thickness of finishing shall be 13 mm. The top surface shall be roughened by wire brushes to give proper grip to the tiles to be fixed.

2.2. The Bilimora type bricks shall be fixed with CM 1:1. The tiles shall be properly wetted before fixing. The horizontal and vertical joints shall be maintained in true line and level by providing 12 mm or 20 mm sq. bars as directed. The tiles shall be tamped by trowel so that there shall not be any hollows left behind the tiles.

2.3. The tiles shall be cut to the required size on ends or at top bottom of beams in best workman like manner.

2.4. The whole work shall be cured for 7 days.

**3.0. Mode of measurements and payment :**

3.1. The work shall be measured as per relevant specification of item No. 17.58 (I)

3.2. The rate includes cost of all Materials ;, wastage etc. occurring due to cutting of tiles and ends as top and bottom of beams etc. including base coat.

3.3. **The rate shall be for a unit of One sq. metre.**

**22.00.6 Providing and fixing teakwood rail of 60 mm. x 20 mm. size and 50 cms. length incl. 3 coats of oil paint to wood work with set of 3 pags.**

**1.0. Materials :**

Teak wood battens of specified size shall conform to M-29. Oil paint shall conform to M-44 Wall pags of aluminium 3 Nos. of approved quality and make shall be provided.

**2.0. Workmanship :**

2.1. The teakwood battens of size 60 mm. x 20 mm. and 50 cms. long shall be planed on all sides. The anodized aluminium wall pags of approved make shall be fixed on wooden baten prepared with screws as directed. The wooden battens shall be painted with 3 coats of ready-mix paint of approved colour and shade.

**3.0. Mode of measurement and payment :**

3.1. The work shall be measured for finished work.

3.2. **The rate shall be for a unit of one number.**

**22.00.7 Treating the bottom and sides (up to a height of 300 mm.) of the excavations made for the masonry foundations and basement with chemical emulsion at the rate of 5 liters per sq. metre of the surface area.**



**1.0. Materials :**

The chemicals used for the soil treatment shall be only one of the following with concentration shown against each in aqueous emulsion.

<u>Chemicals</u>	<u>Concentration</u>
1. Aldrin	0.50% (by weight)
2. Heptachlor	0.50% (by weight)
3. Chlordane	1.00% (by weight)

**2.0. Workmanship :**

- 2.1. The chemicals barrier shall be complete and continuous under whole of the structure to be protected.
- 2.2. The bottom and the sides of foundations up to a height of 30 cms. from the bottom of excavation made for masonry foundation and for basement column pits shall be treated with the chemical emulsion at the rate 5 liters/Sq. metre of the surface area.
- 2.3. The chemical treatment shall be carried out when the surface is quite dry. Chemical treatment shall not be carried out when it is raining or when the soil is wet with rain or sub soil water.
- 2.4. Once formed, treated soil barriers shall be not be disturbed. If by chance treated soil barriers are disturbed, immediate steps shall be taken to restore the continuing and compactness of the barrier system.
- 2.5. The treatment against termite infection shall remain fully effective for a period not less than 10 years from date of issue of the final certificate of completion of work, if at any time during this period, any defects in treatment are revealed or any evidence of infection in any part of the building or structure is noticed, the contractor shall be recitify the concerned defects within 14 days on receipts of notice from Engineer-in charge. On contractor's failure to do so, the Engineer-in charge may get the same rectified through any other agency at contractor's risk and cost, and decision of Engineer-in charge as to the cost payable by the contractor for the same shall be final and binding to the contractor.
- 2.6. A guarantee bond on appropriately stamped paper shall be given by the contractor to the department in the manner and form prescribed below.

**FROM OF GUARANTEE BOND**

"I/We ..... (Contractor) hereby guarantee that work will remain unaffected and will not be in any way damaged by termite or any other germs of similar types, for a period of 10 years after completion of the work of anti-termite as per the terms and conditions of the contract and contractor hereby indemnifies and agrees to save harmless the Government of Gujarat form any loss and or damage that might be caused on account of termite and or other similar type of germs and hereby Guarantees to make god any loss or damages suffered by the Government of Gujarat and further guarantee to re-do the effective work without claiming any extra cost."

- 2.7. This guarantee shall remain in force for the period of 10 year from the completion of the work under the contract and it shall remain binding to the contractor for period of 10 years.
- 2.8. The deposit at the rate of 50% of the cost of this item from the running and final bills shall be recovered and retained for the first one year after completion of the work and 10% shall be retained for the balance of guarantee period and shall be refunded only after the completion of the guarantee period.

**3.0. Mode of measurements and payment :**

- 3.1. The length and breadth shall be measured correct to a cm. as per the dimensions of sanctioned plans. No deduction shall be made nor extra paid for any opening for pipes etc. up to 0.1 sq.mt. The rate shall include the cost of all labour and Materials : required for the operation involved for satisfactory completion of this item. The sides of the trenches 30 cms. each side and bottom shall be measured under this item.
- 3.2. **The rate shall be for a unit of One sq. metre.**



**22.00.8 Treating the backfill immediately in contact with foundation structure with chemical emulsion at the rate 7.5 liters per sq.mt. of vertical surface of the sub structure for each side (in case of R.C.C. basement walls, treating the sides of 50 metre).**

**1.0. Materials :**

1.1 The specification of the item 22.00.7. shall be followed.

**2.0. Workmanship :**

2.1. After masonry foundations and retaining walls of basement come up, the backfill immediate in contact with foundation shall be treated with the chemical emulsion at the rate of 7.5 liters per sq.m. of the vertical surface of the sub structure for each side. The filling of earth is usually carried out in layers and the treatment shall be directed towards the concrete or masonry surfaces of the columns and walls so that the earth in contact with these surfaces is well treated with chemical.

2.2. In case of R.C.C. framed structure with columns and plinth beams, and R.C.C. basements the treatment shall start at the depth of 50 cms. below ground level. From this depth backfill around the columns, beams, and R.C.C. basement walls shall be treated at 7.5 lit/sq.m. of vertical surface. The relevant specifications shall be followed same as item 22.00.7.

**3.0. Mode of measurements and payment :**

3.1. The area of substructure in contact with backfill to be measured. The length and breadth shall be measured correct to a cm. as per dimension of sanctioned plans for the surface in contact with backfill.

3.2. No deduction shall be made nor extra paid for any opening for pipes, etc. up to 0.1 sq.m.

3.3. **The rate shall be for a unit of One sq. metre.**

**22.00.9 Treating the top surface of the plinth filling with chemical emulsion at rate of 5 liters sq. metre before the sand bed or sub grade is laid.**

**1.0. Materials :**

1.1 The relevant specifications of item 22.00.7 shall be followed.

**2.0. Workmanship :**

2.1 The relevant specifications of item 22.00.7 shall be followed except that the top surface of the consolidated earth within the walls, shall be treated with the chemical emulsion at the rate of 5 liters/sq. metre of the surface before the sand bed or sub-grade is laid. If the filled earth has been well rammed and the surface does not allow the emulsion to seep through, holes up to 50 to 75 mm. deep at 150 mm. centers both ways may be made with 12 mm. dia. M.S. rod on the surface to facilitate absorption of the emulsion.

**3.0. Mode of measurements and payment :**

3.1. The length and breadth shall be measured clean for the area actually treated.

3.2. No deduction shall be made nor extra paid for any opening for pipes, etc. up to 0.1 sq.m.

3.3. **The rate shall be for a unit of One sq. metre.**

**22.00.10 Treating the junctions of walls and floor area with chemical emulsion at the rate of 7.5 liter/sq. mt. making holes at junction of walls, and columns, with the floor before laying sub grade to a depth of 15 cms. by making holes.**





**1.0. Materials :**

1.1 The relevant specifications of item 22.00.7 shall be followed.

**2.0. Workmanship :**

2.1. The relevant specifications of item 22.00.7 shall be followed except that the junction of walls columns with the floor shall be treated with the chemical emulsion at the rate 7.5 liters/sq. metre. Special care shall be taken to establish continuity of the vertical chemical barrier on inner wall surfaces from the ground level up to the level of filled earth surface. To achieve this, a small channel 3 x 3 cm. shall be made at the channels up to the ground level 15 cms. apart and the rod moved backward and forward to breakup the earth and chemical emulsion poured along the channel at the rate of 7.5 liters per sq. m. of the vertical walls or column surface of sub-structures so as to soak the soil right to the bottom. The soil should be tamped back into place after this operation.

**3.0. Mode of measurements and payment :**

3.1. The relevant specifications of the item 22.00.7 shall be followed.

3.2. The vertical area of sub-structure in contact with filled up earth above ground level to top of filled up earth shall be measured for payment.

3.3. **The rate shall be for a unit of One sq. metre.**

**22.00.11 Treating the earth along the external perimeter of the building by making holes 15 cms. apart up to a depth of 30 cms. with chemical emulsion at the rate of 7.5 liters per sq.metre along the wall.**

**1.0. Materials :**

1.1 The relevant specification of item 22.00.7 shall be followed.

**2.0. Workmanship :**

2.1. The relevant specifications of item 22.00.7 shall be followed except that the external perimeter of the building shall be treated with chemical emulsions. After building is complete, the earth along the external perimeter of the building should be rodded at intervals of 15 cms. and to a depth of 30 cms. The rods shall be moved backward and forward parallel to the wall to breakup the earth and chemical emulsion poured along the wall at the rate of 7.5 liters per sq. metre of vertical surfaces. After the treatment he earth shall be tamped back into place, the earth out side of the building should be graded on completion of building, this treatment shall be carried out on the completion of such grading. In event of filling being more than 30 cms. the external perimeter and treatment shall be extended to the full depth of filling up to ground level so as to ensure continuity of the chemical barrier.

**3.0. Mode of measurements and payment :**

3.1. The relevant specifications of item No. 22.00.7 shall be followed.

3.2. The vertical surface area of sub-structure 30 cms. in depth from finished ground level in external periphery only shall be measured and paid under this item. The depth of wall treated under back filled shall not be included in this item.

3.3. **The rate shall be for a unit of One sq. metre.**

**22.00.12 Providing treatment along, outside of foundation using chemical emulsion at 7.5 liters per sq. m. of vertical surface (for each side) of sub-structure.**

**1.0. Materials :**



- 1.1 The chemical used for the soil treatment shall be any one of the following with concentration shown against each in aqueous emulsion :

<u>Chemicals</u>	<u>Concentration</u>
1. Aldrin	0.50% (by weight)
2. Heptachlor	0.50% (by weight)
3. Chlordane	1.00% (by weight)

**2.0. Workmanship :**

- 2.1. The surface of consolidated earth around the existing building shall be treated with chemical emulsion at the rate 7.5 liters/sq.m. of vertical surface of sub-structure. The minimum height to substructure shall be considered 60 cms. for treatment. If the earth along the perimeter does not allow emulsion to seep through, holes up to 300 mm. deep at 150 mm. centers both ways be made by 12 mm. dia. Mild steel rod on the surface to facilitate saturation of the soil with chemical emulsion.
- 2.2. The chemical barrier shall be complete and continuous under whole on the structure to be protected.
- 2.3. The chemical treatment shall be carried out when the surface is quite dry. Chemical treatment shall not be carried out when it is raining or when the soil is wet with rain or sub soil water.

**3.0. Mode of measurements and payment :**

- 3.1. The length shall be measured along the periphery of sub-structure. The depth shall be taken 0.60 m.
- 3.2. No deduction shall be made nor extra paid for any opening for pipes etc. up to 0.1. sq.m.
- 3.3. The rate includes cost of all labour and material required for the operations involved for satisfactory completion of this item.
- 3.4. **The rate shall be for a unit of One sq. metre.**

**22.00.13 Providing treatment along external wall perimeter below concrete or masonry apron using chemical at 5 lit./ per liner including drilling and plugging etc.**

**1.0. Materials :**

- 1.1 The relevant specification of item No. 22.00.12 shall be followed.
- 1.2 The relevant specification of item No. 22.00.12 shall be followed except that the treatment shall be carried out along external wall perimeter below concrete or masonry apron, using chemical at rate of 5 lit/running metre.

**2.0 Mode of measurements and payment :**

- 2.1 The relevant specifications of item No. 22.00.12 shall be followed.
- 2.2 The rate includes drilling and plugging holes in apron etc. complete.
- 2.3 **The rate shall be for a unit of One running metre.**

**22.00.14 Treatment of soil below existing floor using chemical at 1 liter per hole at 300 mm. apart including drilling plugging holes etc.**

**1.0. Materials :**

- 1.1 The relevant specifications of item No. 22.00.12 shall be followed.

**2.0. Workmanship :**



2.1. The relevant specification of item No. 22.00.9 shall be followed except the termite control treatment shall be carried out in soil below existing floors.

2.2. The holes of 12 mm. dia. Rod shall be drilled in floor up to 150 mm. depth at 300 mm. part both ways the chemical shall be then injected with pressure at the rate of 1 liters/hole of the surface area.

**3.0. Mode of measurements and payment :**

3.1. The relevant specifications of item 22.00.9 shall be followed.

3.2. The rate shall include cost of drilling holes and plugging.

3.3. **The rate shall be for a unit of One sq. metre.**

**22.00.15 Treatment of voids in masonry using chemical at 1 Lit/hole at 300 mm. apart including drilling holes and plugging.**

**1.0. Materials :**

The relevant specifications of item 22.00.12 shall be followed.

**2.0. Workmanship :**

2.1. The walls affected by termite shall be cleaned of all forms binding inside and the holes of voids in masonry wall surface shall be treated by chemical emulsion at rate 1 Lit. hole The holes in cracks in surface of wall shall be drilled at 300 mm. apart.

**3.0. Mode of measurements and payment :**

3.1. **The rate shall be for a unit of One number of voids treated.**

**22.00.16 Treatment to wood work by chemical emulsion in oil or kerosene based including 6 mm. dia downward slanted holes 150 mm. C/C and plugging the same with cement mortar.**

**1.0. Materials :**

1.1 The relevant specifications of item No. 22.00.7 shall be followed.

**2.0. Workmanship :**

2.1. The wood work effected by Ants shall be cleaned of all lives form hinding inside. The whole wood surface shall be then treated with oil or kerosene based chemical emulsion. The holes of 6 mm. dia. Shall be drilled slanted downwards at 150 mm. centers to centers and chemical emulsion shall be poured into holes by means of funnels specifically prepared for the same and allowed to seep. After funnels become empty another does of chemical shall be poured in them this process shall be done repeatedly till the whole wood work is fully saturated with chemical.

2.2. The holes drilled in wood work shall be filled in with putty and other similar Materials : as directed and the whole wooden surface shall be made good as before.

**3.0. Mode of measurements and payment :**

3.1. The work shall be measured for the finished work in sq. metre including frame.

3.2. The out to out of frame shall be measured as width and from top of flooring to top of frame shall be as height. This area includes for treating frame and shutters both.

3.3. The rate includes cost of all labours and Materials : required for satisfactory completion of this item.



- 3.4. The rate includes drilling holes plugging the same after treatment completed and making good as before.
- 3.5. **The rate shall be for a unit One sq. metre.**

## SECTION – 23

### Water Supply, Plumbing and Sanitary Fittings

- 23.2. Providing and fixing to wall, ceiling and floor galvanised mild steel tube (Medium grade) of the following nominal bore, tube fittings and clamps including making good the wall ceiling and floor (A) 15 mm. dia. (B) 20 mm. dia. (C) 25 mm. (D) 32 mm. (E) 40 mm. (F) 50 mm.**

**1.0. Materials :**

- 1.1. Galvanised mild steel tubes of specified dia, nominal bore shall conform to I.S. 1239-1968.
- 1.2. The galvanised fittings, clamps, etc. required for specified dia. bore pipes shall be of best quality and make as approved by the Engineer-in-charge.

**2.0. Workmanship :**

**2.1. Cutting, Laying & Jointing**

- 2.1.1. When the tubes are to be cut or rethreaded, the ends shall be carefully filed out so that no obstruction to bor in offered. The ends of the tubes shall then be threaded conforming to the requirements of I.S. 554-1955 with pipe dies and taps carefully in such a manner as will not result in slackness of joints when the two pieces are screwed together.

- 2.1.2. The taps and dies shall be used only for straightening screw threads which have becoming bent or damaged and shall not be used for turning of the threads so as to make them slack as the latter procedure may not result in the water tight joint. The screw threads for tube and fitting shall be protected from edge until they are fitted.

- 2.1.3. In jointing the tubes, the inside of the socket and the screwed end of the tubes shall be oiled and smeared with white or red lead and wrapping around with a few turns of fine spun yarn round the screwed end of the tube. The end shall then be tightly screwed in the socket, tees, etc. with a pipe wrench. Care shall be taken that all pipes and fittings are properly jointed so as to make the joints completely water tight and pipes are kept at all times free from dust, and dirt during fixing. Burr from the joints shall be removed after screwing. After laying the open ends of the pipes shall be temporarily plugged to prevent access of water, soil or any other foreign matter.

- 2.1.4. Any threads exposed after jointing shall be painted of in the case of underground piping thickly coated with approved anti-corrosive paint to prevent corrosion.

**2.2. Fixing of the fittings to wall ceiling & floors :**

- 2.2.1 In case of fixing of tubes and fittings to the walls or ceilings, these shall run on the surface of the wall or ceiling (not in chase) unless otherwise specified. The fixing shall be done by means of standard pattern, holder clamps keeping the pipes about 15 mm. clear of the wall. When it is found necessary to conceal the pipes and when specified so, chasing may be adopted or pipe fixed in ducts or recesses etc. provided that there is sufficient space to work on the pipe with usual tools. The pipe shall not ordinarily be buried in walls or soidid floors: where unavoidable, pipes may be buried for short distances provided that adequate protection is given against damage and where so required joints are not burried. Where required M.S. tube sleeve shall be fixed at a place a pipe is passing through a wall or floor for expansion and contraction and other movements. In case the pipe is embedded in walls or floors, it should be painted with anti-corrosive bitumastic paint of approved quality. The pipe should not come in contact with lime mortar or lime concrete as the pipe is affected by lime. Under the floors, the pipe shall be laid in layer of sand filling.



- 2.2.2. All pipes and fittings shall be fixed truly vertical and horizontal unless unavoidable. The pipes shall be fixed to walls with standard pattern clamps of required size and shape, one end of which shall be properly plugged or cemented into walls with cement mortar 1:3 (1 cement : 3 coarse sand) and the other tightened round the pipes to hold it securely, these clamps shall be spaced at regular intervals in straight lengths at 2 M C/C interval in horizontal run and 2.5 m. interval in vertical run. For pipe of 15 mm. dia. up to 25 mm. dia brick work or concrete. However for bigger diameter pipes the holes shall be carefully made of the smallest requires size. After fixing the pipe, the holes shall be made good with cement mortar 1:3 (1 cement : 3 coarse sand) and properly finished to match the adjacent surface.
- 2.3. Testing of joints :
- 2.3.1. After laying and jointing, the pipes and fittings shall be inspected under working conditions of pressure and flow. Any joint found leaking shall be redone, and all leaking pipes removed and replaced without extra cost.
- 2.3.2. The pipes and fittings after they are laid shall be tested to hydraulic pressure of 6 Kg/sq. cm. The pipe shall be slowly and carefully charged with water allowing all air to escape and avoiding all shock and water hammer. The draw off takes and stop cock shall then be closed and specified hydraulic pressure shall be applied gradually. The pressure gauge must be accurate. The pipes and fittings shall be tested in sections as the work of laying proceeds, keeping the joints exposed for inspection during the testing.
- 3.0. Mode of measurements and payment :**
- 3.1. The description of each item shall; unless otherwise stated, be held to include where necessary, conveyance, and delivery, handling, unloading, storing, fabrication, hoisting, all labour for finishing to required shape and size, setting, fitting in position, straight, cutting and waste, return or packings etc.
- 3.2. The length shall be measured on running metre basis of finished work. The length shall be taken along the centre line of the pipe and fittings. The pipes fixed to walls, ceiling, floors etc. shall be measured and paid under this item.
- 3.3. All the work shall be measured in decimal system as fixed in its place, subject to tolerance given below unless otherwise stated.
- (i) Dimension shall be measured to the nearest 0.01 metre.  
(ii) Area shall be worked out to the nearest 0.01 metre.
- 3.4. All measurements of cutting shall unless otherwise stated by held to include the consequent waste.
- 3.5. In case of fitting of unequal bore, the largest bore shall be measured for the test.
- 3.6. Testing of pipe lines, fittings, and joints include for providing all plant and appliances necessary for obtaining access to the work to be tested and carrying out the tests.
- 3.7. The rate includes galvanised steel tubing with screwed socket joints, together with all fittings (such as bends, sockets, springs, elbows, tees, crosses, short pieces, clamps and plugs unions etc. and fixing complete with clamping wall hooks, wooden plugs etc. and also cuttings, screwing and waste and for making forged (or hand made) bends on piping as required. Connector shall be inserted, where required or directed. The rate also includes cuttings through walls, floors, etc. and their making good and painting expose threads with anti corrosive paint as above and testing. Where tubes are to be fixed to wall, ceiling and flowing the rate shall not include painting of pipes providing sleeves and sand filling under floor for which separate payment shall be made.
- 3.8. **The rate shall be for a unit of One running metre.**



**23.4 Providing and laying in trenches galvanised mild steel tubes (Medium grade) of the following nominal bore and tube fittings earth work in trenches to be measured and paid for separately: (A) 15 mm dia (B) 20 mm (C) 25 mm (E) 60 mm (F) 80 mm.**

**1.0. Materials :**

1.1. Galvanised mild steel tube of specified dia. nominal bore and fittings shall conform I.S. 1239-1968.

**2.0. Workmanship :**

2.1. The relevant specifications of item 23.2 (A) shall be followed for cutting, laying and jointing testing of joints except that the fixing of tube shall be done in trenches.

2.2. The width and depth of the trenches shall be 30 cms and depth of trenches 60 cms.

2.3. At joints, the trench width shall be widened where necessary. The work of excavation and refilling shall be done true to line and gradient in accordance with general specifications of earth work in trenches.

2.4. The pipes shall be painted with two coats of anti corrosive bitumastic paint of approved quality. The pipe shall be laid on a layer of 75 mm sand filled up to 150 mm. above the pipe if so specified. The remaining portion of trench shall be then filled with excavated earth. The surplus earth shall be disposed of as directed.

2.5. When the excavation is done in rock the bottom shall be cut deep enough to permit the pipe to be laid and cushion of sand 75 mm. In case of bigger diameter of tube where the pressure is very high, thrust block of cement concrete 1:2:4 (Cement : 2 coarse sand : 4 grade stone aggregate of 20 mm, nominal size) shall be constructed on all bends to transmit the hydraulic thrust without in pairing the ground and spreading it over a sufficient area if so specified.

**3.0. Mode of measurements and payment :**

3.1. The relevant specifications of Item No.23.2 (A) shall be followed. The authorized quantities shall be measured.

3.2. For purpose of calculating cubic content cross section shall normally be taken at suitable intervals i.e. at manhole or wall chamber intervals except in abnormal cases like sudden change in strata or undulating ground etc. when they may be taken at closer intervals as approved by the Engineer in charge whose decision shall be final conclusive and binding.

**3.3. Authorised Width :**

(a) Up to one metre depth, the width of the trenches for the purpose of measurements of excavation shall be arrived at by adding 40 cms. to the external diameter of the tube (not the socket). Where a pipe is laid on concrete bed/cushioning layer, the authorized width shall be the external diameter of tube plus 40 cms. or the width of the concrete bed cushioning layer whichever is more.

(b) For depths exceeding one meter an allowance of 5 cms per metre of depth for each side of the trenches shall be added to the authorized width (i.e. external diameter of pipe of plus 40 cms) This allowance shall apply to the entire depth of the trench. The authorized width in such cases shall therefore be, equal to the depth of trench, plus external diameter or tube plus 40 cms.

(c) Where more than one tube is laid, the diameter shall be reckoned as the horizontal distance for outside to outside of the outermost pipes.



- (d) Where sheeting etc. has been provided the authorized width of the trenches of bottom shall be increased to accommodate for sheeting etc. so that the clear width available between faces of sheeting is as per provisions of (a), (b) & (c) above.
- (e) If the sides of the trench are not vertical the toes of the side slopes shall end at the top of the pipe and vertical sided trench of authorized width as per (a), (b), (c) and (d) above shall be excavated from these down to the bed of trenches.

3.4. Where the tubes are laid in trenches, the work of excavation and refilling all round tubes for which separate payment shall be made, the length shall be measured on running metre basis.

3.5. **The rate shall be for a unit of one running metre.**

**23.6. Making connection of galvanised M/S. distribution branch with galvanised mild steel main 50 mm to 80 mm nominal bore by providing and fixing tee including, cutting and threading the pipes etc. complete.**

**1.0. Materials :**

1.1 the fittings required of specified dia of pipe shall conform to I.S. 1237-1986

**2.0. Workmanship :**

2.1. A pit of suitable dimensions shall be dug at the pint where the connection is to be made with the main and earth removed up to 150 mm below the main. The flow of water main shall also be disconnected by closing the sluice or wheel valves on the mains. The main shall first be cut. Water if any, collected in the pit shall be bailed out and ends of the pipe threaded.

2.2. The connections of distribution pipe shall be made by fixing malleable galvanised mild steel tee of the required size and fittings such as jam nut, socket, connecting piece etc.

2.3. The testing of the joints shall be done as per relevant specifications of item No. 23.2(A)

**3.0. Mode of measurements and payment :**

3.1. The rate includes cost of all labour, Materials :, tools and plant required for satisfactory completion of this item.

3.2. **The rate shall be for a unit of one number**

**23.8. Providing and fixing to wall ceiling and floor 6 kgs/sq.cm. working pressure polythene pipes of the following outside diameter, low density complete with special flange compression type fittings wall clips etc. including making good the wall / ceiling and floor (A) 20 mm dia (B) 24 mm dia (c) 32 mm dia (d) 40 mm dia (E) 50 mm dia.**

**1.0. Materials :**

1.1. The low density polythene pipe of specified diameter with 6 kg/sq.cm. working pressure shall conform to I.S. 3076=1968. The specials and fittings required shall be to best quality.

**2.0. Workmanship :**

2.1. The PVC pipes of specified diameter shall be fixed as directed. Due to thermal expansion of rigid P.V.D. pipes, due allowance shall be made particularly in over ground pipe lines for any change in length of pipe line which may occur during installation or when pipe line is in service.



- 2.2. Above ground installation of rigid P.V.C. pipe should be undertaken after preparations are observed for their protection against direct sun rays and mechanical damage.
- 2.3. The rigid P.V.C. pipe lines should not be kept exposed above ground when it passes through public places railway lines, road side and footpaths.
- 2.4. P.V.C. pipes shall be supported at the following intervals:  
20 mm dia 60 mm  
25 mm dia 750 mm  
32 mm dia 900 mm
- 2.5. Closer support spacing shall be provided if recommended by the manufacture.
- 2.6. The guide lines indicated by the manufacturer regarding handling, transportation, storing, laying and jointing of pipes shall be kept in view during execution.
- 2.7. P.V.C. pipes shall be fixed on wall with wooden plugs and suitable plastic clamps.
- 2.8. **Jointing the pipes :**
- 2.8.1. The pipes and sockets shall be accurately cut. The ends of the pipes and fittings should be absolutely free from dirt and dust. The outside surface of the pipes and the inside of the fittings shall then be roughened with emery paper and then solvent cement joint. Since solvent cement is aggressive to P.V.C. care must be wiped off after jointing. Empty solvent cement tins, brushes, rags, or paper unregnated with cement should not be buried in the trenches. They should be gathered not left scattered about as then can prove to be a hazard to animals, which may chew them.
- 2.8.2. If any manufacturer recommends its own methods of joining the same shall be adopted after necessary approval from the Engineer in charge.
- 2.9. **Laying pipes in Trenches :**
- 2.9.1. The pipes shall be laid over uniform relatively soft fine grained soil found to be free of presence of hard objects such as large flints projections, large tree roots etc. The width of the trenches shall be minimum width required for working.
- 2.9.2. The pipes laid underground shall not be less then one meter from the ground level. The pipe shall be positioned in the trenches so as to avoid and induced stresses due to deflection. Any deviation required shall be obtained by using proper type of rubber ring joints.
- 3.0. **Mode of measurements and payment :**
- 3.1. The relevant specifications of item 23.2 (A) shall be followed except that the P.V.C. pipes of specified dia shall be paid under this item.
- 3.2. **The unit rate shall be for a unit of one running meter.**
- 23.111. **Providing and fixing water closet squatting pan (Indian type w.c. pan) size 580 mm (Earth work, bed concrete, foot rests and trap to be measured and paid for separately). Vitreous china. Long pattern white colour.**
- (A).(I)
- 1.0. **Materials :**
- 1.1. Water closet squatting pan (Indian type w.c. pan) shall conform to M-62 cement mortar shall conform to M-11
- 2.0. **Workmanship :**
- 2.1. The pan shall be sunk into the floor and embedded in a cushion of average 15 cm. cement concrete 1:5:10 (1 cement : 5 fine sand : 10 graded stone aggregate or brick aggregate 40 mm nominal size)





or as specified. This concrete shall be left 115 mm below the top level of the pan so as to allow for flooring and its bed concrete. The floor should be suitably sloped so that the waste water is drained into the pan. The pan shall be provided with 100 mm 'P' or 'S' trap as specified in the item No. 23.113 with approximately 50 mm seal. The joints between the pan and the trap shall be made leak proof with cement mortar 1:1: (1 cement : 1 fine sand)

**3.0. Mode of measurements and payment :**

3.1. The rate shall include the cost of all Materials : and labour involved in the operations described under Workmanship :

3.2. **The rate shall be for a unit of one number.**

3.3. The 'P' or 'S' trap shall be paid separately.

**23.70. Providing and fixing cast iron spigot and sockets soil, waste, water and ventilating pipes of the following normal size (B) 75 mm dia (C) 100 mm dia.**

**1.0. Materials :**

1.1. The specified dia C.I. Spigot and socket soil or waste pipe shall conform M-68

**2.0. Workmanship :**

2.1. The fixing of C.I. spigot and socket soil, waste and ventilating pipe shall be carried out as per relevant specifications of item 15.93 (B) except the C.I. spigot and socket shall be fixed. The joints shall be filled with cement mortar 1:2 (1 cement : 2 sand) and spun yarn. The pipes without ears shall be fixed to wall with M.S. clamps. The pipes with ears shall be fixed to wall with M.S. clamps. The pipes with ears shall be secured with 40 mm. before steel or iron barrel distance pieces or bobils and strout galvanised iron nails 10 cms long into hand wool plugs fixed in walls. Access doors to fittings shall be provided with 3 mm rubber insertion packings and secured without screws to make air and water tight.

2.2. All soil pipes shall be carried up above the roof and shall have a wire balloon guard or a cowl.

2.3. The ventilating pipe or shaft shall be carried out to height of atleast one metre above the outer covering of the roof of the building or in the case of windows in a gable wall or adormer windows, it shall be carried up to a ridge of the roof or atleast two metres above the parapet or two metres measured vertically from the top of any windows or opening which may exist up to a horizontal distance of five metres from the vent pipe into such building and in no case shall be carried out to a height less than three metres.

2.4. Where ventilating pipes are carried in pipe shafts the shaft shall be of a minimum size of one metre. If the shafts are also used to give light and air to rooms, the ventilating pipes must be carried out to a horizontal distance at roof level not less than five metre from the site of the shaft.

2.5. The sand cast iron pipes above parapet shall be fixed with M.S. clamps and stays. The clamps shall be made form 1.5 mm. thick M.S. flat or 3 mm. width band to the required shape and size to fit tightly on the sockets when tightened with screw bolts. It shall be formed of two semi circular pieces with flanged ends on both sides, with holes to fit in the screw bolts and nuts 40 mm. dia. M.S. Bars. One end of the stay shall be bent to form a hook to be fixed with clamps by means of bolts and the other end shall be bent for embedding in wall in cement concrete block of size 200 mm. × 100 mm. × 100 mm. in 1:2:4 mix. The concrete shall be finished to match the surrounding surfaces.

2.6. The connection between the main pipe and branch pipes shall be made by using branches and bends with access door for cleaning.

2.7. The waste from lavatories, kitchens, besins, sinks, baths and other floor traps shall be separately



connected to respective stacks of upper floor. The waste stack of lavatories shall be connected directly to main hole while the waste stack of other shall be separately discharged over gully trap.

**3.0. Mode of measurements and payment :**

3.1. The length of pipe shall be measured including all fitting along its length in running metres correct to a centimeter. No allowance shall be made for the portion of pipe length entered in the sockets of the adjacent pipe or fittings.

3.2. The rate includes all labour, and Materials, tools and plant etc. required for satisfactory completion of this item.

3.3. **The rate shall be for a unit of One running metre.**

**23.87. Providing and fixing cast iron (spun) Nahni trap of the following nominal diameter of self cleaning design with C.I. Screwed down or hinged grating including cost of cutting and making good the wall and floor : 100 mm. Inlet and 50 mm. outlet.**

**1.0. Materials :**

1.1. The cast iron (spun) Nahni trap shall conform to M-69. The C.I. hinged or screwed down cover shall be of the quality.

**2.0. Workmanship :**

2.1. The Nahni trap with 100 mm. dia inlet and 50 mm. dia. outlet shall be fixed as per drawing or as directed.

2.2. The Nahni trap shall be jointed with C.I. Pipe, 75 mm. dia. with lead joints. The lead joints shall be done in conformation with I.S. 782-1976.

**3.0. Mode of measurement and payment :**

3.1. The rate includes cost of all labour, Materials, tools and plants etc. required for satisfactory completion of this item including lead jointing and testing.

3.2. **The rate shall be for a unit of the number.**

**23.112. (A).(I). Providing and fixing wash down water closet (European type W.C. Pan) with integral 'P' or 'S' trap including jointing the trap with soil pipe C.M. 1:1 (1 cement : 1 fine sand) (seat and cover to be measured and paid for separately) : Vitreous china pattern : In white colour.**

**1.0. Materials :**

1.1. Wash down water closet (European type W.C. Pan) shall conform to M-60. Cement mortar shall conform to M-11.

**2.0. Workmanship :**

2.1. The closet shall be fixed to the floor by means of 75 mm. long 6.5 mm. diameter counter sunk bolts and nuts embedded in the floor concrete using rubber or fiber washers so as not to allow any lateral displacement. The joint between the trap of W.C. and soil pipe shall be made with C.M. 1:1 (cement : 1 fine sand).

**3.0. Mode of measurement and payment :**

3.1. The rate includes cost of all Materials and labour involved in all the operations described under Workmanship :



3.2. The rate includes cost of all labour for fixing pans and seat and cover, inlet, connections etc. complete including testing the same. The payment of seat and cover shall be made separately.

3.3. **The rate shall be for a unit of One number.**

**23.113.A. Providing and fixing 100 mm. size 'P' or 'S' trap for water closet squatting pan including jointing the trap with the pan and soil pipe in cement mortar 1:1 (1 cement : 1 fine sand) Vitreous Chine.**

**1.0. Materials :**

1.1 The 100 mm. size 'P' or 'S' trap for water closet shall conform to M-62. Cement mortar shall conform to M-11.

**2.0. Workmanship :**

2.1 The 'P' or 'S' trap shall be fixed with pan cast iron pipe with C.M. 1:1. The pan shall be provided with a 100 mm. 'P' or 'S' trap as specified in the item with an approximately 50 mm. seal. The joint between the pan and the trap shall be made leak-proof with cement mortar 1:1 (1 cement : 1 fine sand)

**3.0. Mode of measurements and payment :**

3.1. The rate shall include the cost of all Materials : and labour involved in the operations described under Workmanship : including testing.

3.2. **The rate shall be for a unit of One number.**

**23.114. Providing and fixing in C.M. 1:3 (1 cement : 3 coarse sand) a pair of white vitreous china 250 mm.×130mm.×30mm. foot rest for long pattern squatting pan water closet.**

**1.0. Materials :**

1.1 The pair of white vitreous china foot-rests shall conform to M-62. Cement mortar shall conform to M-11.

**2.0. Workmanship :**

2.1 After laying the floor, the floor shall be suitable sloped so that the waste water is drained into the pan. A pair of foot-rests of size 250 mm x 130 mm x 30 mm of white vitreous china shall be set in cement mortar 1:3 (1 cement : 3 coarse sand). The foot-rests shall be fixed at a distance of 175 mm. from the inner edge of the back side of the pan and shall be fixed at convenient angle.

**3.0. Mode of measurements and payment :**

3.1. The rate shall include the cost of all Materials : and labours involved in all the operations described under Workmanship :

3.2. **The rate shall be for a unit of One pair.**

**22.115.A. Providing and fixing 12.5 liters low level flushing cistern with a pair of C.I. or mild steel brackets complete with fittings such as lead valveless siphon, 15 mm. nominal size brass ball valve with polythene float, C.P. brass ball handle, unions and couplings for connections with inlet, outlet and overflow pipes, 40 mm. dia. Porcelain enamelled flush bend including cutting holes in walls and making good the same and connecting the flush bend with cistern**



**and closet (overflow pipe to be measured and paid for separately) : Vitreous China. In white colour.**

**1.0. Materials :**

1.1. The low level vitreous china (Enamel) flushing tank shall conform to M-65 except that the flushing cistern shall be 12.5 liters low level type as mentioned in the item.

**2.0. Workmanship :**

2.1. The low level cistern shall be firmly fixed on two C.I. or mild steel brackets which shall be firmly embedded in the wall in C.M. 1:4 (1 cement : 4 fine sand)

2.2. The height of the bottom of the cistern from the top of the pan shall be 30 cms or low level flushing cistern shall be connected to the closet by means of 40 mm. dia. white porcelain enameled flush bend using Indian rubber adaptus joint. The flush pipe shall be securely connected to the cistern outlet by means of coupling nut made of any non-corrosive Materials ;, non-ferrous metal or galvanised steel. The flush pipe from the cistern shall be connected to the closet by means of cement or red-lead.

**3.0. Mode of measurements and payment :**

3.1. The rate shall include the cost of all Materials ;, fitting and labour involved in all the operations described under Workmanship : including testing.

3.2. **The rate shall be for a unit of One number.**

**23.116. Providing and fixing 12.5 liters high level C.I. flushing cistern with a pair C.I. or mild steel brackets, complete with fittings such as symphonic arrangement, 15 mm. nominal size brass ball connections with polythene flat, lever, G.I. China (60 cms.) and pull unions and couplings for connections with inlet, outlet and overflow pipes etc. including cutting holes in walls and making good the same (overflow pipe to be measured and paid for separately).**

**1.0. Materials :**

1.1. The high level C.I. flushing cistern shall conform of M-66, except that the flushing cistern shall be of 12.5 liters high level C.I. flushing cistern as mentioned in the item.

**2.0. Workmanship :**

2.1. The cistern shall be fixed on two C.I. or mild steel brackets which shall be firmly embedded in the wall in cement mortar 1:4 (1 cement : 4 fine sand)

2.2. The height of the bottom of the cistern from the top of the pan shall be two metres.

2.3. The W.C. Pan wall be connected to the cistern by galvanised steel flush pipes of 32 mm. nominal internal diameter. The flush pipe from the cistern shall be connected to the closed by means of cement or red-lead. The flush pipe shall be securely connected to the cistern outlet by means of coupling nut made of any non-corrosive material non-ferrous metal or galvanised steel.

2.4. The chain and the pull union shall be fixed to the protruding lever arm of the flushing cistern.

2.5. The whole installation shall be tested for leak-proof joints and satisfactory functioning.

**3.0. Made of measurements & payment :**

3.1. The rate shall include the cost of all material, fittings and labour involved in all the operations described under Workmanship : including testing.

3.2. **The rate shall be for a unit of One number.**



**23.117. Providing and fixing in position with clamps etc. 32 mm. nominal internal dia. galvanised steel tube flush pipe for level flushing cistern including connecting the flush pipe with cistern and closet and making good the walls and floors.**

**1.0. Materials :**

1.1. The 32 mm. nominal internal dia. galvanised steel tube flush pipe shall conform to M-56.

**2.0. Workmanship :**

2.1. The W.C. pan shall be connected to the cistern by galvanised steel flush pipe of 32 mm. nominal internal diameter. The flush pipe shall be fixed to wall by using clamps.

2.2. The flush pipe from the cistern shall be connected to the closed by means of cement or red-lead.

2.3. The flush pipe shall be securely connected to the cistern outlet by means of coupling nut made of any non-corrosive Materials :, non-ferrous metal or galvanised steel.

**3.0. Mode of measurements and payment :**

3.1. The rate shall include the cost of all Materials :, fitting and labour involved in all the operations described under Workmanship : including testing.

3.2. **The rate shall be for a unit of One running metre.**

**23.120. Providing and fixing G.I. inlet connection for flush pipe with W.C. Pan.**

**1.0. Materials :**

1.1. The G.I. inlet connection for flush pipe shall conform to M-56.

**2.0. Workmanship :**

2.1. The flush pipe from the cistern shall be connected to the closet by means of cement of red-lead.

**3.0. Mode of measurements and payment :**

3.1. The rate shall include the cost of all Materials :, fittings and labour involved in all the operations described under Workmanship : including testing.

3.2. **The rate shall be for a unit or One number.**

**23.127. Providing and fixing wash basin with single hole for pillar top white C.I. or M.S. brackets painted white including cutting holes, and making good the same but excluding fitting, vitreous china flat back wash basin 550 mm. x 400 mm. in white colour.**

**1.0. Materials :**

1.1. The white glazed earthenware wash basin shall be 550 mm. x 400 mm. of 1<sup>st</sup> quality and make as approved by the Engineer-in-charge. The wash basin shall conform to M-59.

**2.0. Workmanship :**

2.1. The wash basin shall be fixed on the wall as and where directed. The wash basin shall be supported on a pair of M.S. or C.I. brackets fixed in C.M. 1:3 (1 cement : 3 sand). The bracket shall conform to I.S. : 775-1962. The wall plaster on the rear shall be cut to rest top edge of the wash basin. After fixing the basin, plaster shall be made good and surface finished to match with the existing one.



- 2.2. The bracket shall be painted white with ready-mixed paint.
- 2.3. The C.I. brass trap and union shall be connected to 32 mm. dia. waste pipe which shall be suitable bent towards the wall and which shall discharge into an open drain leading to a gully trap or directed into the gully trap on the ground floor and shall be connected to a waste pipe through a floor trap on the upper floors. C.P. brass trap and union may not be provided where the surface drain or a floor trap is placed directly under the basin and the waste is discharged into vertically.
- 2.4. The height of the front edge of the wash basin from the floor level shall be 80 cms.
- 2.5. The necessary inlet, outlet connections and fittings such as pillar cocks, C.P. brass waste trap waste pipe, stop cock, chain wish rubber plug etc. shall be fixed.
- 2.6. The payment of fittings shall be made separately under separate items.
- 3.0. Mode of measurements and payment :**
- 3.1. **The rate shall be for a unit of One number.**

**23.130.C. Providing and fixing kitchen sink with C.I. or M.S. brackets painted white including cutting holes in walls and making good the same but excluding fittings. Vitreous china sink 600 mm. x 450 mm. x 150 mm. size.**

**1.0. Materials :**

- 1.1. White glazed vitreous china sink 600 mm. x 450 mm. x 150 mm. size shall conform to M-63.

**2.0. Workmanship :**

- 2.1. The Kitchen sink shall be supported on a pair of M.S. or C.I. brackets fixed in cement mortar 1:3 (1 cement : 3 coarse sand). The M.S. or C.I. brackets shall conform to I.S. 775-1962. The wall plaster on the rear shall be cut to rest over the top edge of the sink. After fixing the sink, plaster shall be made good and the surface finished to match with the existing one.
- 2.2. The C.P. brass trap and union shall be connected to 40 mm. dia. nominal bore galvanised mild steel waste pipe which shall be suitable bent towards the wall and which shall discharge into an open drain leading to a gully-trap or direct into the gully-trap on the ground floor and shall be connected to a waste pipe or a floor trap is placed directly under the sink and the waste is discharged to it vertically.
- 2.3. The height of front edge of the wash basin from the floor, level shall be 80 cms.

**3.0. Mode of measurements and payment :**

- 3.1. The rate includes cost of all labour, Materials :, tools and plant and other equipment required for satisfactory completion of this item as described in Workmanship :
- 3.2. **The rate shall be for a unit of One number.**

**23.135.A. Providing and fixing 32 mm. dia. C.P. brass waste for wash basin or sink.**

**1.0. Materials :**

- 1.1. The C.P. brass trap and unions shall be of 32 mm. dia. and of best quality and make as approved by the Engineer-in-charge.

**2.0. Workmanship :**



2.1. C.P. brass waste trap and union shall be connected to 32 mm. dia. waste pipe which shall be suitable bent towards the wall and which shall discharge into drain through a floor trap. The C.P. brass waste trap shall be provided for wash basin or sink as the case may be.

**3.0. Mode of measurements and payment :**

3.1. The rate includes all labours and providing C.P. brass waste trap and union including waste couplings of 32 mm. dia. The rate excludes the cost of waste pipe of 32 mm. dia.

3.2. **The rate shall be for a unit of One number.**

**23.135.B. Providing and fixing 40 mm. dia. C.P. Brass waste for wash basin or sink.**

**1.0. Materials & Workmanship :**

1.1. The relevant specifications of item 23.135 (A) shall be followed except that the diameter of C.P. brass waste is 40 mm. dia.

**2.0. Mode of measurement & payment :**

2.1. **The rate shall be for a unit of One number.**

**23.136.A. Providing and fixing 32 mm. dia. M.I. fisher union for wash basin or sink.**

**1.0. Materials :**

1.1. The 32 mm. dia. M.I. fisher union shall be of best quality and make as approved by the Engineer-in-charge.

**2.0. Workmanship :**

2.1. The 32 mm. dia. M.I. fisher union shall be fixed to wash basin or sink in best workman like manner.

**3.0. Mode of measurements and payment :**

3.1. The rate includes all labours and Materials :, tools and plants etc. required for satisfactory completion of the item.

3.2. **The rate shall be for a unit of One number.**

**23.136.B. Providing and fixing 40 mm. dia. M.I. fisher union for wash basin or sink.**

**1.0. Materials & Workmanship :**

1.1. The relevant specifications of item No. 23.136 (A) shall be followed except that the diameter of M.I. Fisher union shall be 40 mm. dia.

**2.0. Mode of measurements of payment :**

2.1. **The rate shall be for a unit of One number.**

**23.139. Providing and fixing 100 mm. dia. sand cast iron grating for gulley, floor or Nahni trap.**

**1.0. Materials :**

1.1. The 100 mm. dia. sand cast iron gratings for gulley, floor or Nahni trap shall be of best quality and make as approved.



**2.0. Workmanship :**

2.1. The cast iron grating shall be providing to gully trap floor or Nahri trap as the case may be in best workman like manner.

**3.0. Mode of measurements and payment :**

3.1. The rate includes cost of all labour, Materials :, tools and plants etc. required for satisfactory completion of this item.

3.2. **The rate shall be for a unit of One running metre.**

**23.141.A. Providing and fixing 100 mm. dia. C.P. brass shower rose with 15 mm. or 20 mm. inlet.**

**1.0. Materials :**

1.1. 100 mm. dia. C.P. brass shower rose shall conform to I.S. 2556-1972 part-XI and best quality and make as approved by the Engineer-in-charge. The inlet of shower rose shall be 15 mm. dia. or 20 mm. dia. as directed.

**2.0. Workmanship :**

2.1. The C.P. brass shower rose shall be fixed as directed with 15 mm. dia. or 20 mm. dia. G.I. inlet pipe as the case may be.

**3.0. Mode of measurements and payment :**

3.1. The rate includes all labour and Materials :, tools and plant etc. required for satisfactory completion of this item.

3.2. **The rate shall be for a unit of One number.**

**23.143. Providing and fixing 600 mm. x 450 mm. beveled edge mirror of superior glass mounted on 6 mm. thick A.C. Sheet or plywood sheet and fixed to wooden plugs with C.P. brass screws and washers.**

**1.0. Materials :**

1.1. The 600 mm. x 450 mm. size mirror shall be of superior glass with edge rounded or for beveled as specified. It shall be free from flaws specks, or bubbles and its thickness shall not be less than 6 mm. The glass for the mirror shall be uniformly silver plated at the back and shall be free from silvering defects. Silvering shall have a protective uniform covering of red lead paint. The 6 mm. thick plywood shall conform to M-37 the 6 mm. thick A.C. Sheets shall conform to M-24.

**2.0. Workmanship :**

2.1. The mirror of 600 mm. x 450 mm. size mounted on A.C. Sheet or plywood 6 mm. thick with C.P. brass clips shall be fixed as directed, by fixing wooden plugs in wall and C.P. brass screws and washers. The work shall be carried out in best workman like manner.

**3.0. Mode of measurements and payment :**

3.1. The rate includes cost of all labour and Materials : tools and plant etc. required for satisfactory completion of this item.

3.2. **The rate shall be for a unit of One number.**





**23.144.B. Providing and fixing 600 x 200 mm. C.P. brass towel rail complete with C.P. brass brackets fixed to wooden plugs with and C.P. brass screws.**

**1.0. Materials :**

1.1. The C.P. brass towel rail shall be 600 x 20 mm. of best quality as approved by the Engineer-in-charge. The brackets shall be of C.P. brass. The rail shall conform to I.S. 1068-1958.

**2.0 Workmanship :**

2.1. The brackets of the towel rail shall be fixed by means of C.P. brass screws to wooden plugs firmly embedded in the wall with C.M. 1:3 (1 cement : 3 coarse sand). The towel rail shall be fixed as and where directed.

**3.0. Mode of measurements and payment :**

3.1. This rate includes cost of all labour and Materials :, tools and plant etc. required for satisfactory completion of this item.

3.2. **The rate shall be for a unit of One number.**

**23.145. Providing and fixing 600 mm. x 120 mm. glass shelf with C.P. brass brackets and guard rail complete, fixed to wooden plugs with C.P. brass screws.**

**1.0. Materials :**

1.1. The glass shelf of 600 mm. x 120 mm. size shall be of 5 mm. thick plate glass. The edge of the glass shall be grounded. The C.P. over brass guard rail shall be of best quality and make.

**2.0. Workmanship :**

2.1. The C.P. brass brackets of the glass shelf shall be fixed with C.P. screws to wooden plug firmly embedded in the wall C.M. 1:3 (1 cement : 3 coarse sand). The C.P. guard rail shall be fixed to glass shelf as directed.

**3.0. Mode of measurements and payment :**

3.1. The rate includes all labour and Materials : tools and plant etc. required for satisfactory completion of this item.

3.2. **The rate shall be for a unit of One number.**

**23.146.A. Providing and fixing C.P. brass toilet paper holder.**

**1.0. Materials :**

1.1. The toilet paper holder shall be of best quality and make chromium plating shall be of grade 'B' type conforming to I.S. 1068-2958.

**2.0. Workmanship :**

2.1. The toilet paper holder shall be fixed in position be means of screws and wooden plugs embedded in wall with cement 1:3 (1 cement : 3 coarse sand).

**3.0. Mode of measurements and payment :**

3.1. The rate includes cost of all labour and Materials :, tools and plant etc. required for satisfactory completion of this time.



3.2. **The rate shall be for a unit of One number.**

**23.92. Providing and fixing brass screw down bib taps of following size. Polished bright :**  
**(A). (I). 14 mm. dia.**

**1.0. Materials :**

15 mm. dia. brass screw down with bright polished finish shall conform to I.S. 781-1977. the bib cock shall be best Indian make and quality.

**2.0. Workmanship :**

2.1. The screw down bib cock 15 mm. dia. as specified above shall be fixed as directed. The threaded portion shall be smeared with white or red lead and around with a few turns of fine spun yarn round the screwed end of the pipe. The bib cock shall be then screwed and fixed to water tight position.

**3.0. Mode of measurement and payment :**

3.1. The rate includes cost of all labour, Materials ;, tools and plant etc. required for satisfactory completion of this item.

3.2. **The rate shall be for a unit of One number.**

**23.92. Providing and fixing brass screw down bib taps of following size : polished bright :**  
**(A).(II). 20 mm. dia.**

**1.0. Materials & Workmanship :**

1.1 The relevant specifications of item 23.92 (A)(I) shall be followed except that the bib taps of 20 mm. dia. shall be fixed.

**2.0. Mode of measurements and payment :**

2.1. The relevant specification of item 23.92 (A)(I) shall be followed.

2.2. **The rate shall be for a unit of One number.**

**23.92. Providing and fixing chromium plated brass screw down bib taps of following size :**  
**(B). (I). 15 mm. dia.**

**1.0. Materials & Workmanship :**

1.1 The relevant specification of item No. 23.92 (A)(I) shall be followed except that the brass chromium plated screw down tap of 20 mm. dia. shall be fixed.

**2.0. Mode of measurements and payment :**

2.1. **The rate shall be for a unit One number.**

**23.92. Providing and laying chromium chromium plated brass screw down bib taps of following size : 20 mm. dia.**  
**(B). (I).**

**1.0. Materials & Workmanship :**

1.1 The relevant specification of item No. 23.92 (A)(I) shall be followed except that the brass chromium plated screw down tap of 20 mm. dia. shall be fixed.



**2.0. Mode of measurement and payment :**

2.1. **The rate shall be for a unit of One number.**

**23.92. Providing and fixing gun metal screw down bib taps of the following size :  
(C). (I). 15 mm.dia.**

**1.0. Materials & Workmanship :**

1.1. The relevant specification to item No. 23.92 (A)(I) shall be followed except that the 15 mm. dia. gun metal screw down bib tap shall be fixed.

**2.0. Mode of measurements and payment :**

2.1. **The rate shall be for a unit of One number.**

**23.92. Providing and fixing gun metal screw down bib taps of the following size : 20 mm. dia.  
(C). (II).**

**1.0. Materials & Workmanship :**

1.1. The relevant specification to item No. 23.92 (A)(I) shall be followed except that the 20 mm. dia. gun metal screw down bib tap shall be fixed.

**2.0. Mode of measurements and payment :**

2.1. **The rate shall be for a unit of One number.**

**23.95.A. Providing and fixing biller tap capstan head screw down high pressure with screw shank and back nuts : (A) 15 mm. dia. (B) 20 mm. dia.**

**1.0. Materials :**

1.1. The capstan head piller tap of specified dia. of C.P. over brass shall be of best quality and shall conform to I.S. : 1795-1961. The piller taps shall be of tested quality.

**2.0. Workmanship :**

2.1. The capsten head piller tap of specified dia. shall be fixed as directed with required washers of selected leather of rubber asbestos composition or of plastic as directed. The cock shall fixed with pipe line with white zinki end spun yarn, to make joint water tight. The work shall be carried out in best workman like manner.

**3.0. Mode of measurements and payment :**

3.1. The rate includes cost of all labour, Materials :, tools and plant etc. required for satisfactory completion of this item.

3.2. **The rate shall be for a unit of One number.**

**23.96.A. Providing and fixing brass screw down stop cock (A) 15 mm. dia. (B) 20 mm. dia. (C) 25 mm. dia.**

**1.0. Materials :**

1.1. The brass screw down stop cock of specified dia shall conform to I.S. : 781-1977. The stop cock shall be of tested quality.

**2.0. Workmanship :**

2.1. The stop cock shall be fixed in position by means of jam but and socket. The stop cock shall be



fixed near the inlet of the water meter or as directed. The joints shall be done with white zinc and spun yarn. The joint shall be tested for leak proofing.

**3.0. Mode of measurements and payment :**

3.1. The rate includes cost of all labour, Materials :, tools and plant etc. required for satisfactory completion of this item.

3.2. **The rate shall be for a unit of One number.**

**23.99. Providing and fixing gun metal check or non-return valv. (A) 15 mm. dia. (B) 20 mm. dia. (C) 25 mm. dia. (D) 32 mm. dia. (E) 40 mm. dia.**

**1.0. Materials :**

1.1 The gun metal check or not return full way wheel valve or specified dial. Shall conform to I.S. : 778-1964. The non-return valve shall be of tested quality.

**2.0. Workmanship :**

2.1. The gun metal check or non return shall be fully cleared of all foreign matter before fixing. The fixing of shall be done by means of bolts nuts and 3mm. rubbe insertions with flanges of spigot and socketed tail pieces, drilled to the same specification as in case of socket and spigot flanges in case of flanged pips. The jointing shall be done leak proof.

**3.0. Mode of measurements and payment :**

3.1. The rate includes cost of all labour, Materials :, tools and plant etc. required for satisfactory completion of this item.

3.2. **The rate shall be a unit of One number.**

**23.00. Providing and fixing chromium plated brass half flush cock of approved quality including fixing in pipe line etc. complete. (I) 20 mm. dia. (II) 25 mm. dia. (III) 32 mm. dia.**

**1.0. Materials :**

1.1 Chromium ploated brass half turn flush cock shall conform to M-67.

**2.0. Workmanship :**

2.1 The hall turn flush cock of specified diameter shall be fixed as directed. The flush cock shall be fixed in G.I. pipe line with necessary fittings. The joints shall be made leak proof by using spun yarn and white zink. The fixing work shall be carried out as per relevant specifications of item No. 23.2. (4).

**3.0. Mode of measurements and payment :**

3.1 The rate includes cost of all labour and Materials : required for satisfactory completion of this item including fittings.

3.2 **The rate shall be a unit of One number.**

**23.00.4 Providing and fixing chromium plated bottle trap with necessary coupling approved quality jr wash basin.**

**1.0 Materials :**

1.1 The chromium plated bottle trup shall be of approved make and of best quality. The bottle. trap shall be provided with coupling.



**2.0. Workmanship :**

2.1 The bottle trap shall be fixed on wash hand basin with wooden gullies and screws as directed. The work shall be carried out in best workman like manner.

**3.0 Mode of measurements and payment**

3.1 The rate includes cost of all labour and materials for satisfactory completion of this item.

3.2 **The rate shall be a unit of One number.**

**23.122.(A.) Providing and fixing urinal of approved quality including connecting the urinal with waste pipe trap etc. complete : white earthen ware flat back or corner type size 430 mm, x 260 mm x 350 mm.**

**1.0 Materials :**

1.1 The white earthenware flat back or corner type urinal of size 430 mm x 260 mm, x 350 mm. shall conform to M-64.

**2.0. Workmanship :**

2.1 The urinals shall be fixed in position by using wooden plugs and screws and shall be at a height 65 cms. from the floor level to the top of the lip of urinal, unless otherwise directed. The wooden plugs shall be of 50 mm. x 50 mm. at base lapping to 38 mm. x 38 mm. at top and 50 mm. in length shall be fixed in wall in cement. mortar 1:3 (1 cement : 3 coarse sand) The urinal shall be connected to 32 mm. dia. galvanised mild steel waste pipe which shall discharge in the channel or floor trap. The connection between the urinal and flush or waste pipe shall be made by means of putty or white lead mixed with chooped hemp.

**3.0 Mode of measurements and payment**

3.1 The rate includes cost of all labour, materials, tools and plant etc. required for satisfactory completion of this item.

3.2 **The rate shall be a unit of One number.**

**23.124.(A.) Providing and fixing urinal of approved quality including Connection with trap and with integral longitudinal flush pipe squatting plate. pattern white earthenware 550 mm. x 300 mm.**

**1.0 Materials :**

1.1 The squatting plate pattern, white glazed earthenware urinal of 550mm. x 300 mm. shall conform to I.S. 771—1063 It shall be of best Indian make.

**2.0. Workmanship :**

2.1 The squatting plate urinal shall be fixed as directed.

2.2 The top edge of the squatting plate shall be flush with the finished floor level adjust to it. It shall be embedded on a layer of 25mm. thick cement mortar 1:8 (1 cement : 8 line sand) laid over a bed of burnt brick at cement 1:5:10 (1 cement : 5 fine sand, 10 graded brick aggregate 20 mm. nominal size). There shall be 100 mm. dia. glazed earthenware or vitreous china channels as specified with stop and outlet pieces suitably fixed in floor in cement mortar 1:3 (1 cement. : 3 coarse sand) and joint finished with white cement. The earthenware vitreous china shall discharge into 65 mm. brass outlet grating. The trap and fitting shall be fixed as directed.

**3.0 Mode of measurements and payment**



3.1 The rate includes cost of all labour, materials, tools and plant etc. required for satisfactory completion Of this item.

3.2 **The rate shall be a unit of one number.**

**23.134. Providing and fixing rubber plug for sink or wash basin.**

**1.0 Materials :**

1.1 The rubber plug for sink or wash hand basin shall be best quality and make as approved by the Engineer-incharge.

**2.0. Workmanship :**

2.1 The rubber plug with chain shall be fixed in wash basin or sink as directed.

**3.0 Mode of measurements and payment**

3.1 **The rate shall be a unit of One number.**

**23.00.5.(A) Providing and fixing bail cock of approved quality as directed (Copper metal) (I) 25 mm. dia (II) 50 mm. dia.**

**1.0 Materials :**

1.1 The bail cock of specified diameter shall conform to M-75.

**2.0. Workmanship :**

2.1 The ball cock of specified diameter shall be fixed as directed. The fixing of bail cock shall be carried out as per relevant specification of item No. 23 (A) for joints etc.

**3.0 Mode of measurements and payment :**

3.1 The rate includes cost of all materials and labour involve for carrying out satisfactory work.

3.2 **The rate shall be for a unit of One number.**

**23.00.5.(B). Providing and fixing ball cock of approved quality as directed Abonite. (1) 25mm, dia. (11) 50 mm. dia.**

**1.0 Material & Workmanship :**

1.1 The relevant specifications of item No. 23.00.5 (A) shall be followed except that the ball cock of specified dia of Abonite shall be fixed.

**2.0. Mode of measurements and payment :**

2.1 The relevant specifications of item No. 23.00.5(A) shall be followed.

2.2 **The rate shall be for unit of One number.**

**23.00.6. Providing and fixing C.I. Manhole cover 0.60 cm. x 0.45 cm. size having weight not less than 35 kg.**

**1.0 Materials :**

1.1 C.I. Manhole cover of 0.60 x 0.45 cms. size shall be of best quality. The weight of Cl. cover and



frame shall not be less than 35 kg. The C.I. manhole cover shall be of light duty and conform relevant I.S.

**2.0. Workmanship :**

2.1 The C.I. Manhole cover shall be fixed as per relevant specifications of item No. 24,44 except that, the C.I. cover shall be fixed as and where directed.

**3.0 Mode of measurements and payment :**

3.1 The rate includes cost of all labour and materials required for satisfactory completion of this item.

3.2 **The rate shall be for a unit of One number.**

**23.00.7. Providing and fixing G.I. rain water spout of 50 mm. dia. and 30 cms. Length.**

**1.0 Materials :**

1.1 G.I.M.S. tube of 50 mm. dia. shall conform to M.56.

**2.0. Workmanship :**

2.1 The G.I.C of 30 cms. fixed as rain water pipe as directed. The pipes shall be fixed about 1/4 dia. below the floor level so as to make approach of water easy. The inlet of pipe shall be rounded off for easy entry of rain water pipe. The pipe shall be fixed in C.M.1:3.

**3.0 Mode of measurements and payment :**

3.1 The rate includes of all labour and materials required for satisfactory completion of this item.

3.2 **The rate shall be for a unit of One number.**

**23.8. Providing and fixing to wail ceiling and floor 6 Kg. F/Sq. cm. working pressure outside diameter, low density completion with special flange compression type fittings wall clips etc. including making good the wall, ceiling and floor : (A) 20 mm. dia. (B,) 25 mm. dia. (C) 32 mm. dia. (D) 40 mm. dia. (E) 50 mm. dia.**

**1.0 Materials :**

1.1 The low density polythene pipe of specified diameter with 6 Kg/F. Sq.Cm. working pressure shall conform to I.S. 3076-1986. The specials and fittings required shall be of best quality.

**2.0. Workmanship :**

2.1 The P.V.C. Pipes of specified diameter shall be fixed as directed. Due to thermal expansion of rigid P.V.C. Pipes, due all allowances shall be made particularly in over-ground pipe line for any change in length of pipe line which may occur during installation or when pipe line is in service.

2.2 Above ground installation of rigid P.V.C. pipe should be undertaken after precautions are observed for their protection against dirt, sun rays and mechanical damage.

2.3 The rigid P.V.C. lines should not be kept exposed above ground when it passes through public places, railway lines, roads, road side and footpaths.

2.4 PVC. pipes shall be supported at the following intervals - 20 mm. dia. 500 nlm. -25mm. dia. 750 mm. - 32mm. dia, 900 mm.

2.5 Close support spacing shall be provided if recommended by the manufacturer.

2.6 The guide lines indicated by the manufacturer regarding handling, transportation, storing, laying and



jointing of pipes shall be kept in view during execution.

2.7 P.V.C. pipes shall be fixed on wall with wooden plugs and suitable plastic clamps.

2.8 **Jointing the pipes :**

2.8.1. The pipes and sockets shall be accurately cut the ends of the pipes and fittings should be absolutely free from dirt and dust. The outside surface of the pipes and the inside of the fittings shall then be roughened with emery paper and then solvent cement shall be applied to the matching surface and pushed home and joint. Since solvent cement is aggressive to P.V.C. care must be taken to avoid applying excessive, cement to the inside of pipe sockets as any surplus cement cannot, be wiped off after joining. Empty solvent cement tins, brushes, rags of paper impregnated with cement should be buried in the trenches. they should be gathered, not left scattered about, as they can prove to be a hazard to animals, which may chew them.

2.8.2. If any manufacturer recommends its own methods of jointing the same shall be adopted after necessary approval from the Engineer-in-charge.

2.9. **Laying pipes in trenches :**

2.9.1. The pipes shall be laid over uniform relatively soil line grained soil found to be free of presence of hard objects such as large tints, rocky projections, large tree roots, etc. The width of the trenches shall be minimum width required for. Working.

2.9.2. The pipes laid underground shall not be less than one metre from the ground level. The pipe shall be positioned in the trenches so as to avoid any induced stresses due to retraction. Any deviation required shall to be obtained by using proper type of rubber ring joints.

3.0 **Mode of measurements and payment :**

3.1 The relevant specifications of item No. 23.2.(A) shall. be followed except that. the P.V.C. pipes of specified dia. shall be paid under this item.

3.2 **The unit rate shall be for a unit of One running metre.**

## SECTION 24

### Drainage & Sewerage

24.1.(A) **Providing any laying (two level or slopes) and jointing with stiff mixture of cement mortar in proportion 1:1 salt glazed stone-ware pipes, following nominal internal diameters in chiding testing of pipes and joints complete : 100 mm, dia.**

1.0 **Materials :**

1.1 Water shall conform to M— 1 (2) Cement mortar of proportion 1:1 shall conform to M— 11 (3) 100 mm. dia. glazed stoneware pipe shall Conform to M-71.

2.0. **Workmanship :**

2.1 The trenches for stoneware ppe drains shall be carried out as per relevant specifications of item No. 23.4 (A) except that the work is for stoneware pipes of 100 mm. dia.

2.2 **Laying:**

2.2.1. The pipes shall be laid accurately and perfectly true to line, levels and gradients. Great care shall be taken to prevent sand etc. from entering the pipes. The pipes between two manholes shall be laid truly in a straight line without vertical or horizontal undulation. All junctions and changes in direction and diameter shall be made inside manholes by means of curved tapered channels formed





in cement concrete finished smooth and benched on both sides. The body of the pipe shall rest for its entire length, on an even level bed grips being made or left on the bed to receive the sockets of the pipes.

**2.3. Jointing :**

2.3.1. Tarred gask in or yarn soaked in neat cement slurry shall first be placed around the spigot of each pipe and the spigot shall then be placed well home into the socket of the pipe previously laid. The pipe shall then be adjusted and fixed in the correct position and gaskin caulked home so as to till not more than 1/4th of the total depth of (13 mm in depth) of the socket.

2.3.2. The remainder of the socket shall be filled with stiff mixture of cement mortar in proportion of one part of cement and one part of sharp sand. When the socket is filled, a fillet shall be formed round the joints with a trowel, forming an angle of 45° with the barrel of the pipe.

2.3.3. The mortar shall be mixed as necessary for immediate use.

2.3.4. After the joint is made, any extraneous materials shall be removed from the inside of the joints with a suitable scraper or “badger”. The newly made joints shall be protected, until set, from the sun, dry winds rain or frost, sacking of other suitable materials which shall be used for the purpose.

2.3.5. The mortar shall be cured for 10 days.

**2.4. Testing of joints :**

2.4.1. If any leakage is visible the defective part of the work shall be made good at no extra cost. The pipe line shall be tested as directed.

2.4.2. A slight amount of sweating which is uniform may be overlooked, but excessive sweating from a particular pipe or joints shall be watched for and taken as indicating a defect to be made good.

**3.0. Mode of Measurements and payment :**

3.1. Pounding or bottoning of the trenches bed to fit the lower part of the pipe and grips dug to take socket, collars etc. are included in the rate of laying the pipes.

3.2. The measurements shall be net without any allowance for cutting, and waste. The length of bends, junctions, and other connections shall be included in the total length of drain pipes. Nothing extra shall be paid for the same. The rate includes necessary excavation refilling trenches etc. complete.

3.3. **The rate shall be for a unit of One running metre.**

**24.1.(B) Providing and laying and jointing salt glazed stoneware pipes with lime concrete 1:2:4. (1 lime : 2 fine sand 4 graded brick aggregate 40mm. nominal size) bedding with necessary form work and curing etc. complete : 150 mm. dia.**

**1.0. Materials & Workmanship :**

1.1. The relevant specifications of item 24.1.(A) shall be followed except that the diameter of pipe shall be 150mm. dia.

**2.0. Mode of measurements and payment :**

2.1. The relevant specifications of item No. 24.1 (A) shall be followed.

2.2. **The rate shall be for a unit of One running metre.**



**24.2.(A). Providing and laying cement concrete 1:5:10 (1 cement : 5 fine sand : 10 graded stone aggregate 40 mm. nominal size) bedding for stoneware pipe of following internal diameter with necessary formwork and curing complete : 100 mm. dia. 300 mm. width (112 mm. average bed thickness).**

**1.0 Materials :**

1.1. (1) Water shall conform to M-1. (2) Cement shall conform to M-3. (3) Sand shall conform to M-6 (4) Stone aggregate 40 mm. nominal size shall conform to M—12.

**2.0 Workmanship :**

2.1 The relevant specifications of item 5.3.4. shall be followed except that the concrete work shall be carried out in trenches as bedding for stoneware pipes. The width of concrete shall be 300 mm. and average thickness of bedding shall be 112 mm. The concrete shall be brought up atleast to the invert level of the pipe to form a cradle and to avoid line contact between the pipe and the bed.

**3.0 Mode of Measurements and payment :**

3.1. The rate includes cost of all labour and materials required for satisfactory. completion of this item.

3.2. The rate includes cost of necessary form work required if any.

3.3. **The rate shall be for a unit of One running metre.**

**24.2. (B). Providing and laying cement concrete 1:5:10 (1 cement : 5 fine said : 10 graded stone aggregate 40 mm. nominal size) bedding for stoneware pipe of following internal diameters with necessary form-work and curing complete : 150 mm. dia. 450 mm. width (16.6 mm. average bed thickness).**

**1.0 Materials & Workmanship :**

1.1. The relevant specifications of item 24.2 (A) shall be followed except that the cement concrete work shall be carried out for bedding of stoneware pipe of 150 mm. dia. The average thickness of bedding shall be 166 mm. and width shall be 450 mm.

**2.0 Mode of Measurements and payment :**

2.1. The relevant specifications of item 24.2 (A) shall be followed.

2.2. **The rate shall be for a unit of One running metre.**

**24.19. (1). Providing and fixing S. W. gully trap with C.I. grating brick masonry chamber and watertight C.I. cover with frame of 300 mm. x 300 mm., size (Inside) with standard weight : (A.) square mount taps 100 mm. x 100 mm. size P type.**

**1.0 Materials :**

1.1. (1) Water shall conform to M-1. (2) Cement mortar of proportion 1.5 shall conform to M-11. (3) Burnt brick shall conform to M-1,5. (4) The S.W. Galley trap of 100 mm. x 100 mm. size shall conform to M-70.

**2.0 Workmanship :**

2.1 Excavation for gully trap shall be done true to dimensions and levels as indicated on plans or as directed. The excavation work shall generally be done as per relevant specification of item 4.0.0 of earth work.



2.2. **Fixing:**

2.2.1. The gulley trap shall be fixed over cement concrete 1:5:10 (1 cement : 5 and : 10 graded brick bats aggregate, 40 mm. nominal size) foundation, 650 mm. square and 100 mm. thick. The depth of top of concrete below the ground level shall be 675 mm. The jointing of gulley outlet to the branch drain shall be done similar, to jointing of S.W. pipe as described in item No. 24,1.(A).

2.3. Brick masonry chamber : After fixing and testing gulley and branch drain, a brick masonry 300 x 300 mm. inside with bricks in CM 1:5 (1 cement : 5 sand) shall be built with a 100 mm, brick work round the gulley trap from the top of the concrete upto ground level. The space between the chamber walls and the trap shall be filled with cement concrete 1:5:10. The upper portion of the chamber i.e. above the top level of the trap shall be plastered inside with cement mortar 1:3 (1 cement : 3 sand) finished with floating coat of neat cement. The corners and bottom of the chamber shall be rounded of so as to slope towards the grating.

2.4. C.I. cover with frame 300 mm. x 300 mm. (inside) size shall then be fixed on the top of the brick masonry with C.C, 1:2:4 (1 cement : 2 coarse sand : 4 graded aggregate, 2.0 mm. nominal size) 40 mm. thick and rendered smooth. The finished top of the cover shall be left about 40 mm. above the adjoining ground level. So as to exclude the surface water form entering the gulley trap.

3.0. **Mode of Measurements and payment :**

3.1. The rate includes cost of all labour, materials, tools and plant etc. required for satisfactory completion of this item as described above.

3.2. **The rate shall be for a unit of One number basis.**

24.22. **Providing and laying (to level or slopes) and jointing reinforced concrete light duty non-pressure pipe I. S. class N.P 2 of the following internal diameters with colliers and butt ends prepared for collar joints including testing of joints etc. complete. (B) 150 mm. (C) 250 mm. (3) 300 mm. (E) 450 mm. fl 500 mm. (G) 600 mm. (H) 900 mm. (K) 1000 mm. (M,) 1200 mm.**

1.0 **Materials :**

1.1. The reinforced concrete light duly non-pressure pipes of specified diameter shall conform to LS. 458-1971.

2.0. **Workmanship :**

2.1. The relevant specifications of item No. 24.1. shall be followed for work, of trenches except that the excavation in trenches shall be for reinforced concrete pipes of specified diameter.

2.2. **Laying:**

2.2.1. The pipes shall be lowered into the trenches carefully. Mechanical appliances may be used. Where necessary pipe shall be laid in straight lines or with easy curves and true to line and gradient as specified. The laying of pipe shall proceed upgrade of a slope. In the pipe spigot and socket joints, the socket ends shall face upstream, In case of pipes with joints to be made with loose collars, the collars shall be slipped on before the next pipe is laid.

2.2.2. In case where the foundation conditions are unusual such as the proximity, of tress or holes, under existing or proposed alround in 150 mm. thick cement concrete 1 :5:10 (1 cement : 5 fine sand : 10 graded stone aggregate 40 mm. nominal size) or compacted sand or gravel.

2.2.3. In case where the natural foundation is inadequate the pipes shall be laid either in concrete cradle, supported on proper foundations or on any other suitably designed structure. If concrete bedding is used, the depth of concrete, below bottom of the pipe shall be atleast 1/4 of the internal diametre of the pipe subject to a minimum of 100 mm. and a maximum 300 mm. The concrete shall be extended up the sides of the pipe atleast to a distance of 1/4 of the outside diameter for pipes 300



mm. and over in diameter.

- 2.2.4. In case where the natural foundation is inadequate the pipes shall be laid either in concrete cradle, supported on proper foundations or on any other suitably designed structure. If concrete bedding is used, the depth of concrete, below bottom of the pipe shall be atleast 1/4 of the internal diameter of the pipe subject to a minimum of 100 mm. and a maximum 300 mm. The concrete shall be extended up the sides of the pipe atleast to a distance of 1/4 of the outside diameter for pipes 300 mm. and over in diameter.

2.3. **Jointing :**

- 2.3.1. The joints shall be done by slipping the collar over and clear of the end of the pipe. The recess of the end of the pipe shall be filled with jute threading in hot bitumen. The new pipe shall then be brought forward until the bitumen ring in recess of first pipe is set into the recess of the second pipe. The process shall be repeated for two or three pipes which shall then jacked up so as to thoroughly compress the bitumen. The quantity of jute and bitumen shall be just enough to fill the recess when pressed hard by jacking, care being taken that no offset of the jute braiding shall be just enough to fill the recess when pressed hard by jacking, care being taken that it offset of the jute braiding shall be visible either outside or inside of pipe. The collar shall then be set up over the joints covering equally both the pipe and leaving an even caulking space all round. Cement and sand mortar 1:1:1/2. shall then be well punched or pressed home with a caulking tool within this caulking space. Care shall be taken that the underside of the joints is properly filled with mortar.

2.4. **Curing :**

- 2.4.1. Every joint shall be kept wet for about 10 day for maturing. The section of the pipe line laid and jointed shall be covered immediately to protect from weather effects. Minimum bore of 100 mm. is considered adequate.

- 2.4.2. The joints shall be left exposed for observation.

2.5. **Testing of joints :**

- 2.5.1. The testing of joints shall be done as per relevant specifications of item No. 24.1 (A) except that the testing of reinforced concrete pipes shall be done.

3.0. **Mode of Measurements and payment :**

- 3.1. The relevant specifications of item 24.1. (A) shall be followed except that the rate includes for laying to level or slope in trenches etc. (measured separately), making the joints as indicated and, testing to stand the water test.

- 3.2. The measurements shall be net without any allowance for cutting and waste. The length of bends, junctions and other connections (measured along the centre line) shall be included in the total length of the pipes the connections being numbered after-wards and paid for extra over pipes.

- 3.3. The size of the bends, junctions, etc. shall suit the size of pipe. The bore (internal diameter of pipe) shall be the criterion for payment.

- 3.4. Nothing extra shall be paid separately for the use of mechanical appliances, where necessary as described above.

- 3.5. **The rate shall be for a unit of one running metre.**

- 24.27. **Constructing Manhole with R.C.C. top slab in 1:2:4 mix (1 cement : 2 coarse sand : 4 graded Stone aggregate 20 mm. nominal size) foundation concrete 1:3:6 (1 cement : 3 coarse sand : 6 brick bats 40 to 50 mm. size) inside plastering 15 mm. thick with C.M.1:5 (1 cement : 5 coarse sand) finished with floating coat of neat cement and making channels in CC.1:2:4 mix (1 cement : 2 coarse sand : 4 stone aggregate 20 mm. nominal size) finished smooth complete**



including curing and testing (I) Inside size 900 mm. x 120 mm. and 1.5 mm. deep, including CI cover with frame size 560 mm. diameter, total weight of cover and frame to be not less than 128 Kgs. (Wt. of cover 64 kg. and Wt. of frame 64 Kg.) (A) with 230 mm. thick walls of brick masonry using bricks having crushing strength not less than 35 Kg/Sq.cm. in C.M.1:5 ( 1 cement : 5 coarse sand )

- i A type depth 0.90 metre for 150 mm. sewer
- ii B type depth 1.50 metre for 150 mm. sewer
- iii C type depth 2.25 metre for 150 mm. sewer
- iv D type depth 3.15 metre for 150 mm. sewer

## 1.0 Materials :

1.1. Water shall conform to M-1. Cement shall conform to M-6. Burnt bricks shall conform to M—156. Brick hats of 40 to 50 mm. size shall conform to M—14. Stone coarse aggregate of 20 mm. nominal size shall conform to M-12. Grit shall conform to M—8. Cement mortar of specified proportion shall conform to M—11. The cast iron manhole cover of 560 mm. dia. with frame shall conform to I.S.1726-1966.

## 2.0 Workmanship :

2.1. The manholes of different types and sizes as specified shall be constructed in sewer line at such places and to such levels and dimension as shown in drawing or as directed.

### 2.2. Bed Concrete :

2.2.1. The manholes of different types and sizes as specified shall be constructed in sewer line at such places and to such levels an dimension as shown in drawing or as directed.

### 2.2. Bed Concrete :

2.2.1. The manhole shall be built on a bed of cement concrete 1:3:6 (1 cement : 3 coarse sand : 6 brick bats) (40 to 50 mm. nominal size) to the thickness of the bed concrete shall be 15 cms. for manhole upto 1 M. depth and 20 cms. for manholes over metre and upto 2 metres. depth and 30 cms. for manhole Upto I M. depth and 20 cms. for manholes over metre and upto 2 metres depth and 30 cms. for manholes of greater depth.

2.2.2. Projection of bed concrete beyond the masonry wall shall be 15 cms.

### 2.3. Walls :

2.3.1. The walls of manhole shall be carried out with burnt bricks using bricks, having crushing strength not less than 35 Kg/Cm<sup>2</sup> in C.M.1:5 (1 cement : 5 coarse sand). The thickness of brick masonry wall shall be 230 mm The jointing face of such brick shall be well buttered with cement mortar before laying so as to ensure full joints.

### 2.4. Plaster :

2.4.1. The inside of walls shall be plastered 15 mm. thick with C.M.1:5 (1 cement : 5 coarse sand) are Finished with floating coat of neat cement. All angles shall be rounded to 7.50 cm. radius and all rendered in internal surface shall have hard in pervious finish obtained by using a steel trowel. The external Joints of masonry shall be finished smooth.

### 2.5. Channels & Benching :

2.5.1. Channels shall be semicircular in the bottom half and of diameter equal to the sewer, Above the horizontal diameter, the sides shall be extended vetically to the same level as the crown of the out going pipe and the top edge shall be suitably rounded off. The branch channels shall also be similarly constructed with respect to the benching but at their junction with the main channel an appropriate fall suitably rounded off in the direction of flow in the main channel shall be given.



2.5.2. The channel and benching shall be done in C.C.1:2:4 (1 cement : 2 coarse sand : 4 graded stone aggregate 20 mm: nominal size) rising at a slop in line from edges of channel. The channels of the bottom of the chamber shall be plastered with C.M.1:2 (1 cement : 2 coarse sand) and steel, trowelled smooth.

2.6. **Cover Slab :**

2.6.1. The cover slab of R.C.C.1:2:4 (1 cement : 2 coarse sand : 4 graded stone aggregate 20 mm nominal size) 15 cms, thick reinforced with 10 mm. bars at 15 cms. C/C both ways, surface and edges finished fair. Full hearing equal to the width of wall shall be given to the slab on all sides. The frame of manhole cover shall be embedded firmly in R.C.R., slab SO that the top of the frame remains flush with the top of RCC. Slab.

2.7. **Testing :**

2.7.1. Manhole shall be tested by filling with water to a depth not exceeding 1.2 M. as directed.

2.7.2. After completion of work, manhole covers shall be sealed by means of thick grease.

3.0. **Mode of measurements and payment :**

3.1. The depth of man holes shall be distance between the top of the manhole cover and the invert level of the main drain. The rate includes all labours, materials, tools, and plant etc. required for satisfactory completion of this item as directed above.

3.2. **The rate shall be for a unit of One number.**

**24.28.(I). Extra rate for constructing B.B. masonry for every additional depth of 0.1 M or part thereof over item 24.27(1) for depth from 0.90 M. to 1.5 M.**

1.0. **Materials and Workmanship :**

1.1. The relevant specifications of item No. 24.27 (I) shall be followed for excavation except that the depth of manhole shall be done 0.1. M. or part thereof more than 0.90 metre upto 1.5 M. The extra payment shall be made for additional depth of 0.1 M. or part thereof manhole done over and above the depth 0.90 metre.

2.0. **Mode of measurements and payment :**

2.1. The relevant specifications of item No. 24.27(1) shall be followed except that the extra rate shall be paid for every additional depth of 0.1 M. and part thereof shall be paid over and above the rate of item No.

2.2. **The rate shall be for a unit of one number :**

**24.28.(II). Extra rate for constructing B.B. masonry for every additional depth of 0.1. M. and part thereof over item 24.27 (ii) for depth from 1.5 M. to 2.25 M.**

1.0. **Materials and Workmanship :**

1.1. The relevant specifications of item No. 24.27(II) shall be followed except that the depth of manhole shall be done 0.1. M. or part thereof more than 1.5. M. upto 2.25 M. The extra payment shall be made for additional depth of 0.1.M. or part thereof manhole done over and above the depth 1.50.m. upto 2.25 M.

2.0. **Mode of measurements & payment :**



2.1. The relevant specifications of item No, 24.27(II) shall be followed except the extra rate shall be paid for 0.1M. or part there of additional depth of manhole provided over and above item 24.27 (I).

2.2. **The rate shall be for a unit of One number.**

**24.28.(III). Extra rate for constructing B.B. masonry for every additional depth of 0.1. M. and part thereof over item 24.27 (ii) for depth from 1.5 M. to 2.25 M.**

**1.0. Materials and Workmanship :**

1.1. The relevant specifications of item No. 24.27(II) shall be followed except that the depth of manhole shall be done 0.1. M. or part thereof more than 1.5. M. upto 2.25 M. The extra payment shall be made for additional depth of 0.1.M. or part thereof manhole done over and above the depth 1.50.m. upto 2.25 M.

**2.0. Mode of measurements & payment :**

2.1. The relevant specifications of item No, 24.27(II) shall be followed except the extra rate shall be paid for 0.1M. or part there of additional depth of manhole provided over and above item 24.27 (I).

2.2. **The rate shall be for a unit of One number.**

**24.28(IV) Extra rate for constructing B.B, masonaly for every additional depth 0.1 M. or Part there over item 24.7 (IV) fir depth above 3.15 M.**

**1.0. Materials and Workmanship :**

1.1. The relevant specifications of item No. 24.27 (IV) shall be followed except that the depth of manhole shall be done 0.1. M. or part thereof more than 3.15 M. upto

1.2. The Extra payment shall be made for additional depth in manhole 0.1. M. or part thereof done above 3.15 M. and above depth.

**2.0. Mode of measurements & payment :**

2.1. The relevant specifications of item No. 24.27(IV) shall be followed except that the extra shall be paid for every additional 0.1 m. or part thereof depth provided for and above item 24.27 (IV).

2.2. **The rate shall be for a Unit of One number.**

**24.33. Providing and fixing CI. steps of size 500 x 150 mm. 22.5 in. and painting with two coats (4 anticorrosive paint etc. complete.**

**1.0 Materials :**

1.1. The C.I. steps of size 500 x 500 x 22.5 mm. size shall conform I.S. 5455-1969. Paint shall conform to M-44.

**2.0. Workmanship :**

2.1 The C,I. steps of size 500 x 150 x 22.5 mm. size shall be fixed in manhole as and where directed. The steps shall be staggered in vertical runs 380 mm. apart horizontally. The top step shall be 450 mm. below the manhole cover and lowest not more than 300 mm above the benching. The steps shall be embedded in wall of manhole with C.C.1:3:6 upto 200 m. depth and the surface finished with cement plaster 15 mm. thick in C.M, - 1:5. The steps shall be painted with two coats. of anti-corrosive paint.



**3.0. Mode of Measurements and payment :**

3.1. The rate includes all labour, materials, tools and plants etc. required for satisfactory completion of this item.

3.2. **The rate shall be for a unit of One Number.**

**24.39. Providing and erecting at the site of work steel ventilating column of 150 mm. dia. And 12.20 M. high from G.L. to bottom of top grill, including C.I. grill and base plate, bolts and nuts etc. and excavations in foundation of size 120 x 120 x 165 cms. and filling the pit with 1st layer or cement concrete 1:3:6 mix (1 cement : 3 coarse sand : 6 graded stone aggregate 20 mm. nominal size) of size 120 x 120 . 90 cm. and remaining pit with B.B.C.C.1:3:6 mix (1 cement : 3 coarse sand : 6 brick bats 40 to 50 mm. size) and providing ,filled in cement concrete : 1:2:4 mix (1 cement : 2 coarse sand: 4 graded stone aggregate 20 mm. nominal size) at G.L. and 3 coats of silver paint etc. complete.**

**1.0 Materials :**

1.1. The steel ventilating column internal dia.150 mm.12.20 M. high shall be of standard make and best quality as approved. Stone aggregate of 20 mm. nominal size shall conform to M-12. Brick-hats 40 to 50 mm. nominal size shall conform to M-14 Cement shall conform to M-3 Water shall conform to M-1. Silver (aluminium) paint shall conform to I.S. 2339-1963.

**2.0 Workmanship :**

2.1 The vent Shaft shall be provided at the starting point of main sewer and at such points where the flow of sewerage is disturbed i.e. at falls, syphons etc. As far, as possible, the location shall be at Such a place where it receive sunrays for the maximum period of the day.

2.2. A pit of 120 x 120 x 165 mm. size shall be dug. The cement concrete of 1:3:6 (1 cement : 3 coarse sand : 6 graded stone aggregate 20 mm. nominal size) shall be first laid in the pit to form 90 cms. thick concrete foundation which shall be allowed to set for 24 hours. The vent shaft shall then be erected at the centre of the pit truly in plumb by means Of such as shear legs, pullies, backless and rope etc.

2.3. The connection with sewer man-hole shall be made using 150 mm. diameter cement concrete pipe. After the connection is completed, the pit shall be filled with cement concrete 1:3:6 (1 cement : 3 coarse sand : 6 brick bats 40 to 50 mm. nominal size) round the vent shaft upto ground level except top i50 mm. which shall be filled with C.C. I:2:4 (1 cement : 2 coarse sand : 4. graded stone aggregate 20 mm. nominal size) and rendered smooth. The junction of vent shaft with cement concrete shall be grouted with cement mortar 1:1 (1 cement : 1 sand) The concrete work shall be cured for 7 days.

2.4. The steel shaft shall be painted with silver paint (aluminium paint) 3 coats. The relevant specification of item of painting shall be followed for painting.

**3.0. Mode of Measurements and payment :**

3.1. The rate shall include the cost of all labours and materials, tools and plant etc. required for satisfactory completion of this item as directed above.

3.2. **The rate shall be for a unit of One number.**

**24.00.1.(A). Providing and laying lime concrete 1:2:4 (1 lime putty.: 2 find sand : 4 graded brick aggregates 40 mm. nominal size) bedding for stoneware pipes of following internal diameters with necessary form work and curing complete : 100 mm. dia. (112 mm. average bed thickness).**





**1.0 Materials :**

- 1.1. Water shall conform M-1. Lime mortar shall conform to M-10. Brick aggregate 40 mm. nominal size shall conform to M-14.

**2.0 Workmanship :**

- 2.1 The relevant specifications of item No. 5.1.8 shall be followed except that the, proportion of mix shall be 1:2:4 (1 Lime putty : 2 fine sand : 4 graded brick has aggregate 40 mm nominal size) and the concrete work shall be done in trenches for bedding of stoneware pipes of 100 mm. dia, The width of concrete shall be 300 mm, and the thickness of bedding shall be 112 mm. average.

**3.0 Mode of Measurements and payment :**

- 3.1. The rate shall be for a unit of One running metre.

**24.00.i. (B) Providing and laying lime concrete 1:2:4 (1 lime poutty : 2 fine sand : 4 graded brick aggregates 40 mm. nominal size) bedding for stoneware pipes of following internal diameters with necessary form work and curing complete : 150 mm.. dia. (166 mm.. average bed thickness).**

**1.0 Materials and Workmanship :**

- 1.1. The relevant specification of 24.00 (A) shall be followed except that the concrete bedding shall be carried out for 150 mm. dia. stoneware pipe. The width of concrete bedding shall be 450 mm. and the average thickness shall be 166 mm.

**2.0 Mode of Measurements and payment :**

- 2.1. The relevant specification of item 24.2(A) shall be followed.

- 2.2. **The rate shall be for a unit of One running metre.**

**24.27.(ii). Extra over item 24.1. for providing salt glazed stoneware fittings : Bends of required degree (any radius) of following internal diameters : A -100 mm dia. B. 150 mm. dia.**

**1.0 Materials & Workmanship :**

- 1.1. The relevant specifications of item 24.1.(A) shall be followed except that the salt glazed stoneware bends of any degree of specified diameter shall be provided.

**2.0 Mode of Measurements and payment :**

- 2.1. The relevant specifications of item No, 24.1(A) shall be followed except that. extra payment shall be made for providing salt glazed stoneware bend of specified diameter of required degree of any radius over and above the of item No, 24.1.

- 2.2. **The rate shall be for a unit of one number.**

**24.27.(ii). Extra over item 24.1. for providing salt glazed stoneware fittings : Taper bends of required degree of following internal diameters : 100 mm. x 150 mm.**

**1.0 Materials & Workmanship :**

- 1.1. The relevant specifications of item 24.1. (A) shall be followed except that the salt glazed stoneware taper bend of required degree of 100 mm x 150 mm. shall be fixed.



**2.0. Mode of Measurements and payment :**

2.1. The relevant specifications of item No. 24.1(A) shall be followed except that extra payment shall be made for providing salt glazed stoneware taper bend of required degree of 100 mm x 150 mm. size over and above the rate of item No, 24.1.

2.2. **The rate shall be for a unit of One number.**

**24.27. (III). Extra over item 24.1. for providing salt glazed stoneware fittings Single junction of required angle of following internal diameters : A—100 mm. dia B-150 mm. dia.**

**1.0 Materials & Workmanship :**

1.1. The relevant specifications of item 24.1(A) shall be followed except that the salt glazed stoneware junction of required angle of specified diameter shall be fixed.

**2.0. Mode of Measurements and payment :**

2.1. The relevant specifications of item No. 24.1 (A) shall be followed except that extra payment shall be made for providing salt glazed stoneware single junction of required angle for specified diameter over and above the of item No. 24.1.

2.2. **The rate shall be for a unit of One number.**

**24.18 Providing and laying, joining and pointing with stiff mixture of C.M.1 : (I cement : 1 fine sand) 150 mm. internal diameter salt glazed stoneware half round C.**

**1.0 Materials & Workmanship :**

1.1. The relevant specifications of item 24.1(A) shall be followed except that the half round channels of 150 mm. internal diameters shall be fixed in cement mortar 1:1.

**2.0. Mode of Measurements and payment :**

2.1. The relevant specifications of item No.24.1(A) shall be followed.

2.2. The rate shall be for a unit of One running metre.

**24.35 Supplying and fixing C. I. cover 300 x 300 mm, without frame for gully trap (Standard pattern). The weight of cover to be not less than 4.53 Kg.**

**1.0 Materials & Workmanship :**

1.1. The C.I. cover of 300 x 300 mm. size without frame shall be fixed on top of the brick masonry with cement concrete 1:2:4 (1 cement : 2 sand : 4 graded stone aggregate 20 mm. nominal size) 40 mm. thick and rendered smooth. The finished top of the cover shall be left about 40 mm; above the adjoining ground level so as to exclude the surface water from entering the gully trap.

**2.0. Mode of Measurements and payment :**

2.1. The relevant specifications of item 24.19 shall be followed.

2.2. **The rate shall be for a unit of One number.**

**24.40 Constructing brick masonry road gully chamber 500 x 600 mm. including 600 mm. x 450 mm. C.I. horizontal gratings with frame complete.**



**1.0 Materials :**

- 1.1. Water shall conform to M-1. Cement shall conform to M-3. Sand shall conform to M-6. Brick shall conform to M-15. C.I. Grating of 500 x 450 mm. size of standard make shall be of approved quality. Stone aggregate 40 mm. nominal size shall conform to M- 12. coal tar shall conform to relevant M—5.

**2.0 Workmanship :**

- 2.1. The chamber shall be of size 500 mm. x 450 mm. internal clear dimensions between the masonry wall faces. The height of 500 mm. shall be measured from the top of the bed concrete to the top of the C.I. frame. The size of grating indicate the clear internal dimensions of the C.I. frame of the grating.
- 2.2. The excavation shall be done to true dimensions and levels.
- 2.3. The foundation concrete shall consist of 150 cms x 100 cms x 15 cms. thick C.C.1:5:10 (1 cement : 5 sand : 10 graded stone aggregate 40 mth. nominal size).
- 2.4. The wall of the chamber shall be constructed in brick work with C.M.1:5 and 23 cms. thick as per relevant specifications of item 6.12 (B).
- 2.5. The walls and the bed concrete of chambers shall be plastered inside with 12 mm, thick cement plaster 1:3 (1 cement : 3 coarse sand) finished smooth.
- 2.6. The gully grating cover shall be hinged to frame to facilitate its opening for cleaning and repairs. The frames of the gully grating shall be fixed on the top of masonry wall is of the chamber in 15 cms thick C.C.1:2:4 (1 cement : 2 coarse sand : 4 graded stone aggregate 20 mm. nominal Size) laid over the full thickness of walls.
- 2.7. The chamber shall have connection pipe. the length of which in metre between the road gully chamber and the manhole of the drain shall not be less than 1140 times the nominal diameter of the pipe in MM. i.e. for 150 mm. connection pipe, the length shall not be less than 3.75 metre, The invert of be pipe at the junction with the wall shall be flush with the top of the cement plaster on the bed concrete.
- 2.8. **Painting :** After the completion of the work of the exposed surface of the grating of the frame shall be painted with a thick coat of coal tar.

**3.0 Mode of Measurements and payment :**

- 3.1. The cost of connection pipes is not included in the item and shall be paid separately. However, fixing the connection pipes in the walls of gully chamber is included in the rate for gully chambers and nothing extra shall be paid for this separately.
- 3.2. **The rate shall be for a unit of One number.**

**24.41 Constructing brick masonry road gully chamber 450 mm. x 450 mm. x 775 mm, with vertical grating complete.**

**1.0 Materials & Workmanship :**

- 1.1. The relevant specifications of item 24.40 shall be followed same except the size of road gully chamber is 450 mm. 775 mm. with vertical grating complete.

**2.0 Mode of Measurements and payment :**

- 2.1. The relevant specifications of item 24.40 shall .be followed.



2.2. **The rate shall be for a unit of One number.**

**24.42 Constructing brick masonry road gully chamber 450 mm. x 450 mm. x 775 mm, with vertical grating complete.**

**1.0 Materials & Workmanship :**

1.1. The relevant specifications of item 24.40 shall be followed except that the size of road gully chamber shall be 1 100 mm x 500 mm x 775 mm. including 500 mm. x 45(1 mm. C.I. horizontal grating with frame and vertical grating complete.

**2.0. Mode of Measurements and payment :**

2.1. The relevant specifications of item No. 24.40 shall be followed.

2.2. **The rate shall, be for a unit of One sq. metre.**

**24.44(I) Constructing brick masonry chamber for underground C.I. inspection chamber and bends with brick having crushing strength not less than 35 kg./Cm<sup>2</sup> in C.M.1:5 C.I cover with frame (light duty) 455 x 610 mm internal dimensions, total weight of cover with frame to be nor less than 38 Kg. (Wt. of cover 23 Kg. and Wt. of frame 15 Kg.) R.C.C. top slab C.C.1:2:4 Mix (1 cement :L 2 coarse sand : 4 graded aggregate 20 mm. size) foundation concrete 1:5:10 inside plaster 15 mm. thick with C.M.1:3 finished smooth with a finishing coat of neat cement on walls and bed concrete etc. complete : Inside dimensions 455 mm. x 610 mm. and 450 mm. deep for single pipe-line.**

**1.0 Materials :**

1.1. Water shall conform to M-1 Cement shall conform to M-3. Coarse sand shall conform to M-5. Brick shall conform to M-15. Stone aggregates shall conform to M-12. Brick bat shall conform to M-14 Ms. bat shall conform to M—18.

**2.0. Workmanship :**

2.1. C.I. inspection chamber with provision of C.I. bends of specified size with bolts, nuts and fell washers for underground drain shall be enclosed in masonry chamber which shall be constructed as under

2.2. The excavation shall be done true to dimensions and levels shown on the plans or as directed.

2.3. Bed concrete shall be 15 cms. thick C.C.1:5:10 (1 cement : 5 coarse sand : 10 graded brick bat aggregates. The projection of bed concrete beyond the masonry walls shall be 7.5 cms.

2.4. Masonry walls and plaster work shall be carried out as per relevant specifications of item 24.40.

2.5. The cover slab shall be constructed as per relevant. specifications of 24.27 (I).

**3.0. Mode of Measurements and payment :**

3.1. The earth work in excavation, providing and laying C.I. inspection chamber and bends shall be measured and paid for separately.

3.2. **The rate shall be for a unit of One number.**

**24.44(II). Constructing brick masonry chamber for underground C. I. inspection chamber and bends with brick having crushing strength not less than 35 Kg./Cm<sup>2</sup> in C.M.1:5 C.I. cover with frame (light duty) 455 x 610 mm. internal dimensions, total weight of cover with frame to be not less than 38 kg. (Wt. of cover 23 kg. and Wt. of frame 15 Kg.) R.C.C. top slab C.C.1:2:4**



mix (1 cement : 2 coarse sand : 4 graded aggregate 20 mm. size) foundation concrete 1:5:10 inside plaster 15 mm. thick with C.M.1:3 finished smooth with a finishing coat of neat cement on walls and bed concrete etc. complete : Inside dimensions 500 mm. x 700 mm. and 450 mm. deep for pipeline, with one or two inlets.

**1.0 Materials & Workmanship :**

1.1. The relevant specifications of item 24.44 (1) shall be followed except that the inside dimension of brick masonry chamber shall be 500 mm. x 700 mm. and 450 mm. deep for pipe line with one or two inlets.

**2.0. Mode of Measurements and payment :**

2.1. The relevant specifications of item No. 24.44 (1) shall be followed 2.2. The rate shall be for a unit of One number.

**24.44.(III). Constructing brick masonry chamber for underground C.I. inspection chamber and bends with brick having crushing strength not less than 35 Kg./Cm<sup>2</sup> in C.M.1:5 C.I. cover with frame (light duty) 455 X 610 mm. internal dimensions, total weight of cover with frame to be not less than 38 Kg. (Wt of cover 23 Kg. and Wt of frame 15 Kg.) R.C.C. top slab C.C.1:2:4 mix (1 Cement : 2 coarse sand : 4 graded aggregate 20 mm. size ) foundation concrete 1:5:10 inside plaster 15 mm. thick with C.M.1:3 finished smooth with a finishing coat of neat cement on walls and bed concrete etc. complete : Inside dimensions 6.00 mm. x 850 mm and 450 mm. deep for pipe-line.**

**1.0 Materials & Workmanship :**

1.1. The relevant specifications of item 24.44(I) shall be followed except that the inside dimension of chamber shall be 600 mm. x 850 mm. and 450 mm. deep for pipe line with three or more inlets.

**2.0. Mode of Measurements and payment :**

2.1. **The rate shall be for a unit of one number.**

**24.46. Extra over item 24.44 for every additional depth of 1 M. or part there of beyond 450 mm. depth for brick masonry chamber: (i) For 455 mm. x 610 mm. size. (ii) for 500 mm. x 700 mm. size. (iii) For 600 main. x 850 mm. size.**

**1.0 Materials & Workmanship :**

1.1. The relevant specifications of item 24.44(i), (ii), (iii) shall be followed same except that extra depth of 0.1 M. or part thereof shall be constructed over and above the depth of respective items.

**2.0. Mode of Measurements and payment :**

2.1. The relevant specifications of item 24.44 (1) shall be followed except that extra shall be paid for providing additional depth of 0.1 M or part thereof over and above the item No. 24.44 (i), 24.44(ii), 24.44(iii) as the case may be.

2.2. **The rate shall be for a unit of one number.**

**24.00.2.(A). Providing soak pit of 2 cum. Volume including excavating and filling brick bastwith dry masonry work at top 450 cms. Height including covering, the top with stone including providing Vatas in C.M. 1:3 with finishing curing etc. complete as directed.**

**1.0 Materials :**

1.1. Water shall conform to M-1. Cement mortar shall conform to M-11. Burnt Bricks shall confirm to M-15. Rough stone slab 40 to 50 mm. thick shall conform to M-48. Brick bat shall confirm to M-



14.

**2.0. Workmanship :**

- 2.1. The excavation for soak pit shall be carried out as per relevant specifications of item 4.00.1 (A) except that the size of soak pit such that the clear volume shall remain 2 cum. The diameter and depth shall be as directed.
- 2.2. The periphery of the soak pit shall be provided with dry masonry wall with burnt bricks in 23 cms. Thick. The masonry wall shall be done with best workman like manner in true line and plumb.
- 2.3. The soak pit shall be done with best workman like manner in true line and plumb.
- 2.4. The top of the soak pit shall be covered with rough kotah stone slab 40 to 50 mm. thickness. The length of the stone shall be in single piece in length.
- 2.5. The cement mortar 1:3 shall be used to fill up the joints and preparing vata as directed.
- 2.6. The cement work shall be cured for 4 days.

**3.0. Mode of Measurements and payment :**

- 3.1. The rate includes costs of all labour and materials required for satisfactory completion of this item as described above.
- 3.2. **The rate shall be for a unit one number.**

**24.00.2.(B). Providing soak pit of 5 cum. Volume including excavating and filling brick bastwith dry masonry work at top 45 cms. Height including covering, the top with stone including providing vatas in CM 1:3 with finishing curing etc. complete as directed.**

**1.0 Materials & Workmanship :**

- 1.1. The relevant specification of item 24.00.2 (A) shall be followed except that the volume of soak pit shall be 5 cum. Clear.

**2.0. Mode of Measurements and payment :**

- 2.1. The relevant specifications of item 24.00.2(A) shall be followed.
- 2.2. The rate shall be for a unit of one number.



**Equivalent Plain areas of Uneven Surfaces**  
( Vide specifications for item relating to : Painting & polishing )

Sr. No.	Description of work	How measured	Multiplying Factor
(1)	Paneled or framed and barced on ledged and battened or ledged and braced joinery	Measured flat (not girthed) including chowkat or frame Edges, chocks cleats etc. shall be deemed to be included in item.	1.30 (for each side)
(2)	Flush joinery	Measured flat (not girthed) including chowkat or frame Edges, chocks cleats etc. shall be deemed to be included in the time.	1.20 (for each side)
(3)	Fully glazed or gauzed joinery	Measured flat (not girthed) including chowkat or frame Edges, chocks cleats etc. shall be deemed to be included in the time.	0.80 (for each side)
(4)	Partly paneled and partly glazed or gauzed joinery	Measured flat (not girthed) including chowkat or frame Edges, chocks cleats etc. shall be deemed to be included in the time.	1.00 (for each side)
(5)	Fully venetioned or louvered joinery	Measured flat (not girthed) including chowkat or frame Edges, chocks cleats etc. shall be deemed to be included in item.	1.80 (for each side)
(6)	Weather boading	Measured flat (not girthed) supporting frame work shall not be measured separately.	1.20 (for each side)
(7)	Wood single roofing	Measured flat (not girthed)	1.10 (for each side)
(8)	Boarding with cover fillets at match boarding.	Measured flat (not girthed)	1.05 (for each side)
(9)	Tile and State battening	Measured flat, over all. No deduction shall be made for open space.	0.80 (for painting over)
(10)	Trellies (or Jafri) work one way or two way	Measured flat, over all, No deduction shall be made for the open spaces, supporting members shall not be measured separately.	1.00 (for painting over)
(11)	Guard bars, balustrades, gates, gratings, grills, expanded metal and railings.	Measured flat, over all, No deduction shall be made for the open spaces, supporting members shall not be measured separately.	1.00 (for painting over)
(12)	Gates and open palisade fencing including standards	Measured flat, over all. No deduction shall be made for the open space supporting members shall not be measured separately (see note)	1.00 (for painting over)
(13)	Curved or enriched work	Measured flat	2.0 (for each side)
(14)	Steel roller shutter	Measured flat (size of opening) over all, jamb, guides bottom rails and locking arrangement etc. shall be included in the item (top cover shall be measured separately)	1.10 (for each side)
(15)	Plain sheet steel door and windows	Measured flat (not girthed) including frame.	1.10 (for each side)
(16)	Fully glazed or gauze steel door and windows	Measured flat (not girthed) including frame edges etc.	1.10 (for each side)
(17)	Partly paneled and partly glazed or gauzed steel doors	Measured flat (not girthed) including frame edges etc.	0.08 (for each side)
(18)	Collapsible gate.	Measured flat (size of opening) no separate measurements shall be taken for the top and bottom guide rails, rollers, fittings et.	1.50 (for each side)

Note : The height shall be taken from the bottom of the lowest rail if the palisades do not go below (or from the lower end of palisades, if they protect below the lowest rail) upto the top of palisades, but not upto the top of standards if they are higher than the palisades.



### 10. ADDITIONAL TECHNICAL SPECIFICATIONS :

<b>Additional Specifications Item no. 01.</b>	<b>Providing &amp; laying medium duty black colour polyurethane sheet on compacted soil with overlapping of minimum 75 mm. or as directed, as backing of plinth slab, as directed, etc. complete. Actual quantities shall be measured on site without allowing any laps. (As per Rate Analysis / P. 27 ).</b>
	<b>Materials :</b>
	<p>The medium duty black polyurethane sheet shall be from “Om Agor Industrial Plastics Pvt. Ltd.”, or “Profeel”, “Ramplast” or as approved by the Architect or Engineer-in-Charge.</p> <p>It shall be produced by using a continuous, smooth chemical process, at constant pressure and temperature. The polyethylene sheets should be light weight, soft, smooth and flexible, which can be easily handled and laid. It shall be 100 % waterproof, acid proof, alkali proof, resistant and fully opaque.</p> <p>It shall be fully impervious to provide a complete water barrier system. The tensile strength of the film shall not be less than 450 kg./cm<sup>2</sup>. The tear resistance of the film shall not be less than 3,200 gm/100/micron having 650 % ultimate elongation. The impact tensile strength &amp; temperature resistance shall not be less than 2,000 kg./cm<sup>2</sup> and 90 degree C respectively.</p> <p>The film shall be flexible having uniform thickness as specified in the respective item. It shall have long life in buried condition. Saline or mineral water and alkali content in soil or cement of most of the chemicals shall have no effect on the film. It shall discourage weed growth under the lining.</p> <p>It shall be resistant to fungus, moth, toxic gases and agents having affinity to water. It shall have excellent bonding strength and thermal conductivity shall be 0.023 Kcal/m hr C. It shall conform to IS : 5913 and IS : 3792, wherever applicable. It shall prevent corrosion, chemical action, leakage.</p>
	<b>Workmanship :</b>
	The polyurethane sheet shall be laid on compacted soil having minimum 75 mm. wide overlaps at all the edges as directed by the Engineer-in-Charge.
	<b>Mode of measurements and payment :</b>
	The Work shall be measured on the basis of out to out measurements, without allowing any extra for the overlaps.
	Rate shall be for a unit of one Sq. metre.
<b>Additional Specifications Item no. 02.</b>	<b>Providing and adding Super Plasticizing Admixture "Plast Super" by "Concare" or approved equal quality, for high Workability at low water cement ratio and thereby achieving higher compressive strength in Concrete Works in proportion as recommended by the manufacturer's guide, etc. complete.</b>
	<b>Materials : Super Plasticising Admixture :</b>
	The extremely powerful water reducing, plasticising admixture for controlling the water / cement ratio in concrete, shall be ‘Plast Super’ by ‘Concare’ or its equivalent as approved by the Architect or Engineer-in-Charge.





	<p>It shall meet the specifications mentioned in ASTM C 494 types F, BS 5075 Part 3, IS 9103 – 1979.</p> <p>It shall be an aqueous solution of chemical dispersants, based on high molecular weight polymers, mixed with Naphthalene Formaldehyde. It shall be a dark brown or reddish brown liquid, having specific gravity of 1.25 at 25<sup>0</sup> C. It shall have no chloride or nitrate content.</p> <p>The powerful cement dispersing and deflocculating properties of the plasticiser make the concrete mix highly Workable at low W/C ratio, needing no extra addition of free water for increasing Workability, reducing the risk of segregation and bleeding, giving improved surface finish due to ease of compaction and placement.</p> <p>It shall be used to improve the Workability at low W / C ratio, as also to increase the compressive strength of the concrete and to waterproof the mix, thus forming dense impermeable concrete.</p> <p>It is typically used at the areas where there is highly congested reinforcement.</p>
	<b>Workmanship :</b>
	<p>It shall be added with gauging water to the concrete / mix during the mixing cycle. It shall never be added to the dry mix.</p> <p>280 ml. of the plasticizer shall be added to a 50 kg. bag of cement.</p>
	<b>Mode of measurement and payment :</b>
	The rate shall be unit of one litre.
<b>Additional Specifications Item no. 03.</b>	<b>Providing and applying concrete bonding agent - Styrene Butadiene Rubber Based Polymer for high strength repair, "Bond Repair" by "Concare" or approved equal quality, for bonding old concrete to new concrete, in dosages as recommended by the manufacturer's guide, etc. complete.</b>
	<b>Materials :</b>
	<p>Concrete Bonding Agent , Styrene Butadiene Rubber Based Polymer for high strength repair, shall be 'Bond Repair' by 'Concare' or its equivalent as approved by the Architect or Engineer-in-Charge.</p> <p>It shall be an aqueous modified Styrene Butadiene Co-Polymer dispersion latex, specially formulated for modifying concrete for superior performance in terms of structural bonding and repairs, corrosion inhibition, etc.</p> <p>It shall be used to provide excellent adhesion to concrete, steel, etc. It shall also be used to provide high resistant water penetration, repairs to spalled concrete beams, columns, slabs, etc.</p> <p>It shall be a milky white liquid, having specific gravity of 1.02, solid contents of 45 + - 1 %, and pH value of 9.50 to 10.00. It shall be compatible with all grades of cement. It shall be soluble in water, non-toxic, anti-oxidant and bactericide.</p> <p>Its tensile strength shall be 5.00 to 7.00 N/mm, flexural strength shall be 10.00 to 13.00 N/mm. and compressive strength shall be 40.00 to 45.00 N/mm.</p>
	<b>Workmanship :</b>
	To use it as a Bonding Agent, it shall be applied in the ration of 1 : 1 cement : CBR bonding slurry, using a stiff nylon brush to give a thickness of 3.50 mm. to the already prepared and pre-wetted concrete surface. Then the fresh concrete is poured on it.



	<p>To use it for structural repairs for spalled concrete beams, columns, slabs, etc., the defective loose concrete substrate is removed by using suitable tools like chipping hammer, wire brush, polish paper, etc. Then the corrosion from the bars is removed by mechanical means using wire brush, polish paper, etc. A primer coat of 1 : 1 CBR by volume is applied by brush over the freshly cleaned and dry reinforcement. The primer is allowed to dry overnight. The bonding slurry using 1 : 1 cement : CBR by weight is applied to the already prepared, pre-wetted concrete surface and reinforcement. As soon as the bonding slurry becomes tacky, apply polymer modified mortar in a thickness of 15.00 to 20.00 mm. by hand jabbing method. Where higher thickness of mortar is required, the same procedure is repeated in layers to the required thickness on the next day. Then it moisture cured for 24 hours and allowed to dry off.</p>
	<b>Mode of measurement and payment :</b>
	The rate shall be unit of one litre.
<b>Additional Specifications Item no. 04.</b>	<b>Providing and mixing Fibre with cement concrete for r.c.c. works in dosages as recommended by the manufacturer's guide, etc. complete.</b>
	<b>Materials :</b>
	<p>The fibre shall be "Recron 3S" by Reliance Industries Ltd., or its equivalent as approved by the Architect or Engineer-in-Charge.</p> <p>It shall be triangular shaped fibre for improved holding together of cement aggregates. It shall have a denier of 2.5d, tensile strength of 6,000 kgs./ Sq.cm., melting point of more than 250 degrees centigrade. It shall have excellent dispersion factor, acid resistance and good resistance to alkalis.</p> <p>It prevents shrinkage cracks, which develop during curing. It shall prevent / arrest racking in plaster, caused by expansion and contraction. By reducing micro cracks, it shall reduce water permeability. It shall reduce rebound "splattering" of mortar. It shall increase flexural strength, as the modulus of elasticity of the fibre is high compare to that of the mortar binder.</p> <p>It shall be mixed with cement concrete for all r.c.c. works.</p>
	<b>Workmanship :</b>
	The fibre is mixed in the ratio of 150 gms. of fibre per 1 bag of cement of 50 kgs., along with the mortar for minimum of 4 minutes. Dry mixing is preferred.
	<b>Mode of measurement and payment :</b>
	The rate shall be unit of one kg.
<b>Additional Specifications Item no. 05.</b>	<b>P &amp; 1 250 mm. X 625 mm. X 200 mm. thick steam cured cellular ( aerated ) light weight block masonry of " Siporex" by "Siporex India Ltd.", or 650 mm. x 250 mm. 190 mm. thick "Flotocrete" CLC Blocks by Neelkamal Light Blocks Pvt. Ltd., or 250 mm. x 600 mm. x 200 mm. thick "Silfoam" "Cellular Light Weight Bricks Masonry" by Nishu Cemblock Pvt. Ltd., confirming to IS 2185 - part 3 - 1984, and carried out as per IS 6041 - 1985, in CM 1 : 6, with plasticizer, in line, level &amp; plumb as directed and instructed by the manufacturer, etc. complete, on all floors.</b>
	<b>MATERIALS :</b>
	The pre-fabricated, autoclaved, cellular light weight concrete blocks - building elements shall be machine molded, made in a factory.



	<p>CLC blocks shall be steam cured. They shall be machine cut into rectangular shape. They shall have smooth rectangular faces with sharp corners and shall be uniform in color. They shall be free from cracks, flaws and nodules of free lime.</p> <p>The dimensions of CLC blocks shall be 625 mm. or 600 mm. lengths with <math>\pm 5</math> mm. tolerances, 250 mm. height and 200 mm. thickness as specified. The CLC blocks shall be consistent and constant in dimensions, having minimum variations.</p> <p>CLC blocks shall have oven dry density of 551 to 650 Kgs./ C.Mt. for 200 mm. thick blocks as per IS 2185 part ( III ) - 1984, and its masonry shall be carried out as per IS 6041 (1985 ) and IS 1905 ( 1987 ). The design density shall be 800 Kgs./C.Mt. They shall be light weight, having density which is <math>1/3^{\text{rd}}</math> the density of bricks and <math>1/4^{\text{th}}</math> the density of R.C.C., resulting in the reduction of dead loads on the structure.</p> <p>CLC blocks shall have compressive strength of 30 Kgs./ Cm<sup>2</sup> for 200 mm. thick blocks. They shall have shear strength 1 kg./ Cm<sup>2</sup>, modulus of elasticity of <math>2.1 \times 10^4</math> Kgs./ Cm<sup>2</sup>, and co-efficient of linear expansion shall be 0.000008 per <sup>o</sup>C.</p> <p>CLC blocks shall have thermal conductivity of 0.122 Kcal / hr. / M <sup>o</sup>C and sound reduction index of 45 db for 200 mm. thick blocks. The cellular structure, having millions of tiny air cells created during their manufacturing process, shall provide good thermal resistance and sound insulation.</p> <p>CLC blocks shall be inorganic and providing 3 hours of fire resistance for 200 mm. thick walls.</p> <p>CLC blocks shall be impervious to rot, insects and other pests.</p> <p>CLC blocks shall be inert, non-toxic and recyclable, causing no air pollution and illnesses indoors because of not being a source off gassing.</p> <p>CLC blocks shall have very easy workability, and they shall be easily cut, drilled, chased and nailed by using normal hand tools or power tools. They can be cut into virtually any shape or angle, making them extremely adoptable.</p>
	<p><b>Workmanship :</b></p>
	<p>The relevant specifications of item no. 6.12 ( A ) shall be followed, except that the bricks to be used shall be CLC building blocks elements and the proportion of cement mortar is 1 : 6.</p> <p>Necessary scaffolding shall be provided. The supports of the scaffolding plunk shall be fixed. Simple scaffolding shall be allowed normally. In this case scaffolding hole header horizontal coarse only. Minimum number of holes shall be left in block work for supporting horizontal scaffolding poles. The Contractor is responsible for providing and maintaining sufficiently strong scaffolding so as to withstand all loads likely to come upon it.</p> <p>For the face of block work, joints shall be racked out to a depth not less than thickness of joints. The face of block work shall be cleaned and mortar dropping removed on very same day that block work is laid.</p> <p>Interlocking shall not be done at the junctions of load bearing and non – load bearing partition walls. Connections between these walls shall be achieved by : a. 125 mm. cut nails in every third joint with 12 mm. galvanized or aluminium nails or b. 125 mm. cut nails in every third joint, or c. 6 mm. dia., 200 mm. long bars or d. Chicken mesh.</p> <p>At the junctions between conventional brick masonry and CLC block masonry work, chicken mesh shall be provided in the plaster to avoid future cracking at the corners and junctions.</p>



	<b>Mode of measurements and payment :</b>
	The CLC block masonry of ground floor, above plinth level to floor two level shall be measured and paid under this item.
	The rate shall be for a unit of one square meter.
<b>Additional Specifications Item no. 06.</b>	<b>Providing &amp; fixing 32 mm. thick single / double door shutters, treated in vacuum pressure, chemically treated plant, with molded textured finished door skin.</b>
<b>1.0.</b>	<b>Materials :</b>
1.1.	The molded panel door shutter shall be of the best quality from manufacturers. The paneled door shutters shall be as per IS 2202 and IS 1003 The door shutters shall be of 32 mm. thickness, having two panels, the top panel being having an arch at the top, manufactured from Green Teak ( Non-teak ) wood duly processed under various treatments. The wood shall be seasoned in a modern seasoning plant as per IS 1141 and treated in high tech vacuum pressure chemical treatment plant, as per IS 401 and manufactured using latest wood Working machinery, having strict quality control with latest electronic equipment, resulting in high level craftsmanship.
	The door shutters shall be equivalent to teak wood doors in strength and durability.
	The door shutters shall be 100 % termite & water resistant and absolutely free from fungal effects.
	The molded panel door facing shall be of densified wood fiber plate, having 3.0 mm. thickness 3.33 Kgs./ S.Mt. base weight, 1.05 Gms/CC. density 20.7 Mpa modulus of structure matching the ASTM standard, D1037 Sec. 150-153, modulus of elasticity 3,800 Mpa, Cleavage ( Minimum load value ) 27 Kg., Minimum fiber/wood failure 75 %, 24 hour water soak absorption ( Maximum ) 45 % matching the ASTM standard 1037 Sec. 158-159, thickness swell ( Maximum ) 35 % modulus of structure matching the ASTM standard 1037 Sec. 158-159, tensile strength parallel to surface ( Minimum Value ) 10.3 Mpa modulus of structure matching the ASTM standard, D1037 Sec. 154-155 and Perpendicular to surface ( Minimum value ) 0.34 Mpa modulus of structure matching the ASTM standard, D1037 Sec. 156-157, immersion in boiling water no disintegration @ 100 + / - 3 degree C for 4 hours.
1.2.	04 nos. of 125 mm. x 31 mm. x 4 mm. thick railway brass hinges with stainless steel pin, 150 mm. long x 8 mm. dia. Brass rod tower bolt in BCP finish, 22 mm. dia. 316 grade stainless steel handle with a set of lock and key hole cap, 01 no. door stopper, and 01 no. pvc buffer, etc. as required per shutter, as per the "Schedule of Hardware", shall be provided & fixed as per the instruction of Engineer-in-Charge. The finished thickness specified shall be finished thickness, and no tolerance shall be permitted.
1.3.	All the shutters shall be finished with high quality paint / polish as their final finish as per the selection of the Architect and Engineer-in-Charge. The paint / polish shall conform to M-93.
<b>2.0.</b>	<b>Workmanship :</b>
2.1.	All the members of the shutters shall be straight, without any warp, dent or bow, and shall have textured, well finished faces at right angles to each other, free of any defects whatsoever.
2.2.	The shutters shall be erected plumb, using the specified number of hinges at the location specified in the design drawings, leaving a 8 mm. gap from the finished floor. All the hardware shall be fixed as per the design drawings.



<b>3.0.</b>	<b>Mode or measurement and payment :</b>
3.1.	The out to out dimensions of the door shutters shall be measured.
3.2.	The rate shall be for a unit of one sq. meter.
<b>Additional Specifications Item no. 07.</b>	<b>Providing and fixing ceiling – hung Series 600 toilet partitions &amp; doors system</b> , by “The Mills Company” or its equivalent, approved by the Engineer-in-Charge, consisting of partition panels, doors and pilasters, constructed from solid phenolic core, the surfaces being selected laminates, fused to the resin - impregnated core, composed of compressed cellulose fibre, as per the list of approved brands, using required s. s. hardware, as specified, the pilasters being attached with pre-installed structural ceiling support of 40 mm. x 25 mm. anodized aluminium tube framing with hardwood filled in, hung from the r.c.c. slab using 75 mm. long r.c.c. anchor fasteners as per details, in line, level & plumb as per design & details, etc. complete.
<b>1.0.</b>	<b>Materials :</b>
1.1.	The components of the toilet partition system, namely the panels, the doors and the pilasters shall have solid phenolic core, which is composed of cellulose fibres, impregnated with resins. The material is non-absorbent, impact – resistant and graffiti – resistant, impervious to steam, soaps and detergent, and shall not mildew.
1.2.	The panels shall be 12 mm. ( 0.5” ) thick. The doors & the pilasters shall be 18 / 19 mm. ( 0.75” ) thick.
1.3.	The ceiling edge of the pilasters shall be provided with mechanically cascand 9 mm. ( 3/8” ) steel leveling bar. The pilasters shall be attached to the structural framing support, pre-installed, hung off the r.c.c. slab, using a lead anchor, 9 mm. ( 3/8” ) threaded rod, hex nuts and washers to provide vertical and horizontal adjustment.
1.4.	The surface laminate of selected color shall be a high-pressure decorative laminate having matte finished surface, and shall be fused to the resin – impregnated core to make it an integral part of the core material, with all the edges machined and finished smooth with a 15 - degree edge.
1.5.	Standard hardware by the manufacturer is constructed from cast stainless steel with satin brushed finished or stamped stainless steel for the door hinge only. Stainless steel torx head fastners shall be used for attaching the components with light weight block masonry walls.
1.5.1.	Door hardware : Stainless steel surface - mounted hinges shall be thru – bolted to the doors and pilasters. Surface – mounted slide latch with emergency egress shall have no twisting motion. Strike / keeper shall be thru – bolted the doors shall be provided with the combination coat hook / bumper. Theft – resistant facteners shall be supplied by all hardware.
1.5.2.	Brackets : Stainless steel surrup – type single – ear, double – ear and u – brackets shall be brackets.
1.5.3.	4 – piece sleeves shall be 100 mm. ( 4” ) high, 300 Series stainless steel with # 04 satin brushed finished, and shall be secured to the edge of the pilasters with torx – head fastners.
<b>2.0.</b>	<b>Workmanship :</b>
2.1.	Pre-finished Materials : shall be delivered to the site in original, unopened cartons or other packaging Materials :, necessary to protect the finishes. The material shall be stored in the manufacturer’s packaging until installation. The partitions shall be stored in horizontal position with adequate support to ensure flatness and to prevent damaged to the pre-finished surfaces.



2.2.	The partition panels, doors and pilasters shall be installed in accordance with the detailed drawings and the manufacturer's installation instructions. Leave all the components complete, clean and free from defects in Workmanship :. The doors and the hardware shall be thoroughly adjusted and left in proper working condition. Set the doors in closed position. The door shall be opening inside the toilet cubicles and not outside so that the doors never open more than 105 degrees.
<b>3.0.</b>	<b>Mode or measurement and payment :</b>
3.1.	The out to out dimensions of the door shutters, partition panels and pilasters shall be measured.
3.2.	The rate shall be for a unit of one sq. meter.
<b>Additional Specifications Item no. 08.</b>	<b>Providing &amp; fixing sliding windows using aluminium sections as per detail.</b>
<b>1.0.</b>	<b>Materials :</b>
1.1.	Aluminium sections, fixtures & fittings shall conform to M-31. The glass shall conform to M-38.
<b>2.0.</b>	<b>Workmanship :</b>
2.1.	Providing & applying the anodizing of 25 micron of approved make & shade, and oven backing the same at required temperature to give even shade & finish. The rate shall also include the required pre-treatment to sections such as cleaning, buffing, chromating, etc. complete as per the approval of the Architect and Engineer-in-Charge. The bidder has to submit the details of their anodizing process, by which they wish to perform the Work.
2.2.	The windows are to be fixed with the external finished surface. Hence, all the necessary rubber strips, packing and poly-sulphide polymer ( viz. Pidiseal ) between the frame of the windows and the adjoining surfaces all around, shall be provided within the rate quoted so as to make the junction fully water tight and air tight.
2.3.	During the course of Workthe Bidder shall take due care to avoid staining on the anodized sections, and if required the Bidder shall provide necessary protective arrangement as directed by Architect or the Engineer-in-Charge, for which no extra payment shall be made. After the installation is completed the aluminium Workshall be washed with mild solution of non-alkali soap and water, if required by the Architect or the Engineer-in-Charge.
2.4.	The Bidder shall be responsible for setting the windows straight, in plumb and level, and for their satisfactory operation after the fixing is completed.
<b>3.0.</b>	<b>Mode or measurement and payment :</b>
3.1.	The out to out dimensions of the door shutters shall be measured.
3.2.	The rate shall be for a unit of one sq. meter.
<b>Additional Specifications Item no. 09.</b>	<b>Providing &amp; fixing top-hung / casement windows using aluminium sections as per detail.</b>
<b>1.0.</b>	<b>Materials :</b>



1.1.	Aluminium sections, fixtures & fittings shall conform to M-31. The glass shall conform to M-38.
<b>2.0.</b>	<b>Workmanship :</b>
2.1.	Providing & applying the anodizing of 25 micron of approved make & shade, and oven backing the same at required temperature to give even shade & finish. The rate shall also include the required pre-treatment to sections such as cleaning, buffing, chromating, etc. complete as per the approval of the Architect and Engineer-in-Charge. The bidder has to submit the details of their anodizing process, by which they wish to perform the Work.
2.2.	The windows are to be fixed with the external finished surface. Hence, all the necessary rubber strips, packing and poly-sulphide polymer ( viz. Pidiseal ) between the frame of the windows and the adjoining surfaces all around, shall be provided within the rate quoted so as to make the junction fully water tight and air tight.
2.3.	During the course of Work the Bidder shall take due care to avoid staining on the anodized sections, and if required the Bidder shall provide necessary protective arrangement as directed by Architect or the Engineer-in-Charge, for which no extra payment shall be made. After the installation is completed the aluminium Work shall be washed with mild solution of non-alkali soap and water, if required by the Architect or the Engineer-in-Charge.
2.4.	The Bidder shall be responsible for setting the windows straight, in plumb and level, and for their satisfactory operation after the fixing is completed.
<b>3.0.</b>	<b>Mode or measurement and payment :</b>
3.1.	The out to out dimensions of the door shutters shall be measured.
3.2.	The rate shall be for a unit of one sq. meter.
<b>Additional Specifications Item no. 10.</b>	<p><b>Glass Curtain Wall :</b></p> <p>Providing &amp; fixing in position as per details and design the glass curtain wall system, consisting of 12 mm. thick plain float glass by "Asahi" or "Saint Gobain" or "Modi" or "Sejal" or its equivalent as approved by the engineer-in-charge, smooth polishing all the edges of the cut to size and shape glass panels to make perfect rectangle or the required shape as per the details as well as site conditions, making the required size holes in all the glass panels for fixing them in place by way of using "spider" fitting system, getting all the panels toughened / tempered as specified, fixing the glass panels into place by using satin stainless steel ( SSS ) grade 316, 250 mm. x 170 mm. splice plates at the bottom and top of the curtain wall, SSS grade 316, 200 mm. x 200 mm. 4-way spider fittings for flush glazing to suit assembly of 4 &amp; / or 2 glass panels, SSS grade 316, 200 mm. 2-way spider fittings for flush glazing to suit assembly of 2 glass panels, to be installed at 180 degrees, SSS grade 316, flat type routels ( not countersunk type ), having nylon washers, s.s. washers, cap nuts, ball bolt and standard nuts, SSS grade 316, 300 mm. x 180 mm. x 100 mm. high fin plates to connect the vertical glass panels at 90 degrees to the curtain wall ( fin glass ), with the glass curtain wall, providing &amp; applying grey colored, average 9 mm. thick, weatherproof structural sealant - 789 / Tremco / Waker silicone sealant ( neutral cure ) by Dow Corning or its equivalent by GE, having movement capability of + / - 30 % and durometer hardness of 24 points in the joint and as specified, at all the junctions between adjoining glass panels as per specifications and details, finishing the entire work neat and clean, etc. complete.</p>
<b>1.0.</b>	<b>Materials :</b>
<b>1.1.</b>	<b>References :</b>



	<ul style="list-style-type: none"> <li>A. ANSI/ASCE-7 - Minimum Design Loads for Buildings and Other Structures.</li> <li>B. ANSI Z97.1 - Glazing Materials : Used in Buildings, Safety Performance Specifications and Methods of Test.</li> <li>C. ASTM C1048 - Standard Specification for Heat-Treated Flat Glass Kind HS, Kind FT Coated and Uncoated Glass</li> <li>D. ASTM E283 - Standard Test Method for Determining the Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen.</li> <li>E. ASTM E 330 - Standard Test Method for Structural Performance of Exterior Windows, Curtain Walls, and Doors by Uniform Static Air Pressure Difference.</li> <li>F. ASTM E 331 - Standard Test Method for Water Penetration of Exterior Windows, Skylights, Doors, and Curtain Walls by Uniform Static Air Pressure Difference</li> <li>G. CAN 2-12.1-79 National Standard.</li> <li>H. CPSC 16 CRF Part 1201 II - Safety Standard for Architectural Glazing Materials :</li> </ul>
<p><b>1.2.</b></p>	<p>Spider/Stabilizing Grid Assembly Design Requirements :</p> <ul style="list-style-type: none"> <li>1. Curtain wall system: AustVision Spider AustFix System as manufactured by A.G.A. and supplied by InKan Ltd. Glass Systems or by “Enox” or by “Ozone” or its equivalent as approved by the Engineer-in-Charge.</li> <li>2. The system consists of tempered glass lites connected at the corners by spider fittings and laterally braced by supporting grid of glass, metal rods and cables or a combination of both.</li> <li>3. System design shall be Glass Fin System.</li> <li>4. Fittings shall be designed to give flush appearance to outward surface of glazing system.</li> <li>5. The design of the fittings is the sole responsibility of InKan Ltd., or other approved suppliers.</li> <li>6. Movement diaphragms of stainless steel and durable flexible discs shall be incorporated in connections to accommodate oversize holes in plate members which allow for thermal movement and glass manufacturing tolerances.</li> <li>7. The system shall provide for unitized pre-fixing of all items to glass prior to erection.</li> </ul>





<p><b>1.3.</b></p>	<p>Curtain wall manufacturer/installer shall be solely responsible for fabrication and installation of the system as specified under this Section, plus the following components specified under other Section :</p> <p>Sealants related to curtain wall systems, including perimeter sealant.</p>
<p><b>1.4.</b></p>	<p><b>Structural Performance:</b> Design and construct curtain wall system to withstand loading requirements not less than specified herein.</p> <p><b>Wind Loads:</b> Design and construct system based on ANSI/ASCE-7 criteria for wind load.</p>
<p><b>1.5.</b></p>	<p><b>Safety Factor for Design :</b> Ultimate load capacity of total system, including glass, sealants, glazing tapes, frame components, and connections to structural frame shall be designed and fabricated to withstand a wind pressure of 1.5 times "Design Wind Load" without failure of any components.</p> <p>Design ultimate load capacity of anchor components to withstand 2.0 times "Design Wind Load" without failure.</p>
<p><b>1.6.</b></p>	<p><b>Thermal and Differential Movement:</b> Design and construct curtain wall system to accommodate anticipated movement indicated herein, without damage or deterioration to glazing or gasket systems : without buckling, opening of joints and glass breakage.</p> <p>Thermal and differential movement within system (both directions).</p> <p>Thermal and differential movement between system and adjacent construction.</p> <p>Movement between curtain wall framing and brick masonry walls.</p> <p>Movement between curtain wall framing and r. c. c. beam bottoms and any other roof components.</p> <p>Movement between curtain wall framing and long term shortening of structural frame (creep) and deflection of structural framework (sway).</p> <p>Vibration harmonics, window whistle, noise caused by thermal movement and thermal movement transmitted to other systems. Loosening, weakening, or fracturing of attachment or components of system is not permitted.</p> <p>Base thermal movement on temperature differential of not less than 77 degrees C (170 degrees F).</p>
<p><b>1.7.</b></p>	<p><b>Air Infiltration:</b> Installed system shall conform to the following minimum standards when tested to comply with ASTM E283.</p> <p>Fixed wall area: Test pressure 30.5 kgf/sq m (6.24 psf): 12 Lm/sqm (0.04 cfm/sf) allowable.</p>
<p><b>1.8.</b></p>	<p><b>Water Resistance:</b> Installed system shall conform to the following minimum standards when</p>



	<p>tested to comply with ASTM E 331.</p> <p>No water penetration to interior surface.</p> <p>Test pressure regardless of location: Static Water at 73 kg/sq m (15 psf) : No Leakage.</p>
<p><b>1.9.</b></p>	<p><b>Submittals :</b></p> <p>Curtain wall submittals shall be prepared (engineered and detailed) by the curtain wall manufacturer and signed by both the chief engineer for the manufacturer and the installer.</p> <p><b>Product Data :</b> Manufacturer's data sheets on each product to be used, including</p> <p>Detailed specification of construction and fabrication.  Manufacturer's installation instructions.</p> <p>Certified test reports clearly indicating compliance with performance requirements specified herein.</p> <p>Sealant manufacturer's data on surface preparation and application for each type of sealants proposed.</p> <p><b>Shop Drawings :</b></p> <p>Indicate dimensioning, general construction, specific modifications, component connections, anchorage methods, hardware, and installation procedures, plus the following specific requirements.</p> <p>Elevate entire openings of system.</p> <p>Indicate conditions at adjacent and dissimilar construction, corners, terminations, parapets, soffits, sills, etc.</p> <p>Indicate anchorage details, including dimensioning for sizing and setting embedded items, expansion joints both vertically and horizontally.</p> <p>Indicate glass types, sizes, and edge clearances.</p> <p>Indicate jamb, head, sill, and corner conditions and specific anchorage details for each situation.</p> <p><b>Selection Samples:</b></p> <p>For each finish product specified, two complete sets of color chips representing manufacturer's full range of available colors and patterns.</p> <p><b>Finish selection:</b> Glass connector hardware.</p> <p><b>Glass:</b> 305 mm by 305 mm (12 inches by 12 inches) sample of glass.</p> <p>Where normal color and texture variations are to be expected, include 2 or more units in each set of samples showing the limits of such variations.</p> <p>Finish shall represent color range, finish thickness, and sheen to be expected in the finished</p>



	<p>Work.</p> <p><b>Verification Samples:</b></p> <p>For each finish product specified, two samples, minimum size 150 mm (6 inches) square, representing actual product, color, and patterns.</p> <p><b>Finish selection:</b> glass connector hardware.</p> <p><b>Glass:</b> 305 mm by 305 mm (12 inches by 12 inches) sample of glass.</p> <p><b>Quality Control Submittals:</b></p> <p>Statement of qualifications for manufacturers and installers.</p> <p>Statement of compliance with regulatory requirements.</p> <p>Professional certifications.</p> <p>Mock-up Assembly.</p> <p>Field Quality Control Submittals as specified in Part 3.</p> <ul style="list-style-type: none"> <li>a. Sealant adhesion field tests.</li> <li>b. Field performance tests.</li> <li>c. Manufacturer's field services.</li> </ul> <p><b>Contract Closeout Submittals:</b></p> <p>Operating and maintenance manuals.</p> <p>Special warranties.</p> <p>Glass warranties, including manufacturer's written certification of compatibility between glazing material and hermetic seal.</p>
<p><b>1.10.</b></p>	<p><b>Quality Assurance :</b></p> <p><b>Manufacturer Qualifications :</b> Not less than 10 years experience in the actual production of specified products.</p> <p>Components shall be factory fabricated and engineered by single entity.</p> <p><b>Installer Qualifications :</b></p> <p>Not less than 10 years experience with structural silicone systems.</p> <p>Successfully completed not less than 5 comparable scale projects using this system.</p> <p><b>Sole Source Responsibility :</b></p> <p>Acceptable to InKan Ltd., or any other selected supplier of system hardware.</p> <p>Provide a letter signed by representative of InKan Ltd., or any other selected supplier of system hardware, with company's authorization stating that installer is acceptable and</p>



	<p>qualified to install system.</p> <p>The installer of the InKan Ltd., or any other selected supplier of system hardware, Structural Glass System is responsible for supplying and erecting the complete structural glazing system, coordinating and maintaining tolerances between structure and glazing system.</p> <p><b>Regulatory Requirements :</b></p> <p>Where safety glass is indicated or required by authorities having jurisdiction, provide type of products which comply with ANSI Z97.1 and testing requirements of 16 CFR, Part 1201 for category II Materials :</p> <p><b>Engineering Qualifications and Certifications :</b></p> <p>Perform design and engineering work of this section under direct supervision of a professional engineer registered in the state of the project location.</p> <p><b>Mock-Up :</b></p> <p>Provide a mock-up for evaluation of surface preparation techniques and application Workmanship :.</p> <p>Finish areas designated by Engineer-in-Charge.</p> <p>Do not proceed with remaining work until Workmanship :, color, and sheen are approved by Engineer-in-Charge.</p> <p>Refinish mock-up area as required to produce acceptable work.</p>
<p><b>1.11.</b></p>	<p><b>Delivery, Storage and Handling :</b></p> <p>Store products in manufacturer's unopened packaging until ready for installation.</p> <p>Store and dispose of solvent-based Materials :, and Materials : used with solvent-based Materials :, in accordance with requirements of local authorities having jurisdiction.</p>
<p><b>1.12.</b></p>	<p><b>Project Conditions :</b></p> <p>Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's absolute limits.</p> <p><b>Field Measurements:</b> Check openings by field measurement before fabrication to ensure proper fitting of work; indicate measurements on shop drawings.</p> <p>Where necessary, proceed with fabrication without measurements, and coordinate fabrication tolerances to ensure proper fit.</p>
<p><b>1.13.</b></p>	<p><b>Project Warranty :</b></p> <p>Contractor/manufacturer/installer has responsibility for an extended Corrective Period for work of this Section for a period stated from date of Substantial Completion against all the conditions indicated below, and when notified in writing from Owner, Contractor/manufacturer/installer shall promptly and without inconvenience and cost to Owner correct said deficiencies.</p>



	<p><b>Manufacturer Warranty:</b></p> <p>Provide twelve year warranty for design and Materials : provided. Provide written requirements for notification of manufacturer and terms for maintaining warranty provisions.</p> <p><b>Installer Warranty:</b></p> <p>Warrant the installation for a period of five years for installation and repairs of failures. Provide written requirements for notification of installer and terms for maintaining warranty provisions.</p> <p>Stress breakage resulting from improper framing design.</p> <p>Breakage resulting from chipped or damaged edge conditions from original installation or thermal stresses.</p> <p>Water and air infiltration in excess of performance requirements specified herein.</p> <p>Sealant failure, both around perimeter and within curtain wall system.</p>
<p><b>1.14.</b></p>	<p><b>Products :</b></p> <p>Acceptable Manufacturers :</p> <p>“Enox” by Pooja Hardware Pvt. Ltd., 21/170, Kuldeep Co-operative Housing Society, Rajendra Nagar, Datta Tada Road, Opp. Rationing Office, Borivali ( East ), Mumbai 400 066. Telephone no. : 022-2870 6050/51/52/54/55, Fax : 022 – 2870 6053. E-mail : <a href="mailto:info@enoxindia.com">info@enoxindia.com</a>. Web site : <a href="http://www.enoxindia.com">www.enoxindia.com</a>.</p> <p>Ozone Overseas Ltd. Telephon no. : 011-45576677 ( 30 lines ). Fax : 011-45576699. e-mail : <a href="mailto:ozone@ozone-india.com">ozone@ozone-india.com</a> web site : <a href="http://www.ozone-india.com">www.ozone-india.com</a>.</p> <p>INKAN Ltd., : 14 Indell Ln. ; Brampton, ON, Canada L6T 3Y3; Toll Free Tel: 800-387-2481; Tel: 905-793-4747; Fax: 905-793-9367; Email: <a href="mailto:request@inkan.on.ca">request info</a>; Web: <a href="http://www.inkan.on.ca">www.inkan.on.ca</a></p> <p><b>Substitutions:</b></p> <p>Requests for substitutions may be considered upon merit and equivalence by the Engineer-in-Charge.</p> <p><b>Components :</b></p> <p><b>Glass :</b></p> <p>Glass shall be 12 mm. thick float glass by “Asahi” or “Saint Gobain” or “Modi” or “Sejal” or its equivalent as approved by the Engineer-in-Charge.</p> <p><b>Construction for Face Plates and Stabilizing Fins :</b></p> <p>19 mm (3/4 inch) clear. Straight profile as indicated on drawings.</p> <p>Glass shall be fully tempered and heat soaked. Thickness and make up of face plates and stabilizing fins to be determined by the installer. Rollerwave distortion is a key element of this specification. Distortion shall be certified not to exceed 0.05 mm.</p> <p>Glass shall be horizontally tempered eliminating tong marks.</p> <p><b>Structural Silicone Sealant:</b></p>



	<p>Single component silicone elastomeric sealant.</p> <p>Acceptable manufacturers and products:</p> <p>Dow Corning or GE or its equivalent as approved by the Engineer-in-Charge : Formulation determined by glazing system manufacturer.</p> <p>Fittings:</p> <p>Splice Plates:</p> <p>Satin Stainless Steel ( SSS ), grade 316, 300 mm. x 180 mm. x 100 mm. high Fin plates and 250 mm. x 170 mm. splice plates shall be a minimum thickness of 8 mm. ( 5/16 inch ).</p> <p>Architectural Routed :</p> <p>SSS, grade 316, bright machine finished, socket head bolt with hexagonal shank, flat type.</p> <p>Base Metal and Finish:</p> <p>As scheduled. Refer to drawings.</p> <p>All structural bolts to carry an S.A.E. grade or A.S.T.M. specification as defined on the drawings.</p> <p><b>Spider Fittings:</b></p> <p>SSS, grade 316, 4-way spider fittings for flush glazing to suit 4-glass panels assembly.</p> <p>SSS, grade 316, 2-way spider fittings for flush glazing to suit 2-glass panels assembly at 180 degrees.</p> <p>All structural bolts to carry an S.A.E. grade or A.S.T.M. specification as defined on the drawings.</p> <p>No exterior plates, caps, disks or buttons Shall be permitted.</p> <p>Base Metal and Finish: As scheduled. Refer to drawings.</p>
<p><b>1.15.</b></p>	<p><b>Execution :</b></p> <p><b>Examination :</b></p> <p>Verification of Conditions:</p> <p>Examine areas and conditions under which Work is to be performed and identify conditions detrimental to proper and or timely completion.</p> <p>Do not proceed until unsatisfactory conditions have been corrected.</p> <p><b>Installation :</b></p> <p>Install curtain wall system to comply with manufacturer's instructions.</p> <p>Comply with AISC "Manual of Standard Practice" for installation of steel elements.</p> <p>Plate to plate joints of glass are sealed with silicone sealant. Joint dimensions shall be</p>



designed to be compatible with sealant properties and live load movement of the structure.

**Bolt Torque:**

Torque bolts to torques specified on shop drawings using calibrated tool. Lock torqued bolts into position to prevent backoff. Reset calibrations regularly to ensure accurate torquing.

**Erection Tolerances:**

Installed system shall be less than the limits specified herein. Shim system to maintain tolerances.

Limit variations from plumb, level, or dimensional angle to the following:

Not more than 3 mm (1/8 inch) deviation in 1 story height, in 3 m (10 foot) vertical, angular run, or in 6 m (20 foot) horizontal run.

Not more than 6 mm (1/4 inch) deviation in 12 m (40 foot) run, in any direction.

At battered wall areas, plumb is defined to match indicated slope.

Limit variations from location (theoretical calculated position in plan or elevation based on established floor lines and column lines), including variations from plumb and level, to the following:

Not more than 9.5 mm (3/8 inch) total deviation for member at any location.

Not more than 3 mm (1/8 inch) change in deviation for member for 3 m (10 foot) run.

**Weathering Sealants:**

Install sealants as indicated and required to achieve water and airtight assembly, complying with requirements of curtain wall manufacturer.

Clean and prime joints as recommended by sealant manufacturer. Install sealant and related backing material around perimeter of frames.

Apply sealant filling joint and tool smooth to insure full contact with adjacent surfaces. Strike off excess material.

**Field Quality Control :**

**Sealant Adhesion Field Test:**

Comply with the following.

**Weathering Sealant Adhesion :**

After liquid-applied sealant is fully cured, perform sealant adhesion test according to sealant manufacturer's recommendations.

**Structural Glazing Sealant Adhesion:**

After sealant is fully cured, perform not less than 2 adhesion tests for structural silicone sealant complying with AAMA Structural Sealant Glazing Systems Design Guide.

**Manufacturer's Field Services:**



	<p>Field engineer from curtain wall manufacturer shall visually inspect the system at the following stages to ensure compliance with manufacturer's recommendation for installation.</p> <p>Prior to erection, verify structural support system is within tolerances and proper alignment.</p> <p><b>During installation:</b></p> <p>Provide periodic inspection during installation at critical stages of each curtain wall system.</p> <p><b>Upon completion of installation:</b></p> <p>Inspect entire system for areas of non-conformance to either manufacturer's recommendations or mock-up test report recommendation. Issue written report within 48 hours of each Site inspection to Contractor and Architect.</p> <p><b>Cleaning and Protection :</b></p> <p>Clean metal and glass surfaces complying with manufacturer's recommendations prior to Substantial Completion, exercising care to avoid damage to protective coatings and finishes. Remove excess glazing and sealant compounds, dirt, and other substances. Touch up factory finish.</p> <p>Initiate and maintain protection and other precautions required to ensure that system will be without damage or deterioration (other than normal weathering) at time of acceptance.</p>
<b>2.0.</b>	<b>Mode or measurement and payment :</b>
2.1.	The rate shall be for a unit of one sq. meter. The measurement shall be taken of the glass surface area in elevation only, and the surface area of glass fins shall not be considered separately at all.
<b>Additional Specifications Item no. 11.</b>	<b>Providing and mixing plasticiser "Plast-WR" by "Concare" or approved equal quality, for high Workability at low water cement ratio in external plaster Works in proportion as recommended by the manufacturer's guide, etc. complete.</b>
<b>1.0.</b>	<b>Materials : Plasticizer :</b>
1.1.	<p>The general water reducing plasticizer for controlling the water / cement ratio in concrete, plasters and mortars shall be 'Plast WR' by 'Concare' or its equivalent as approved by the Architect or Engineer-in-Charge.</p> <p>It shall meet the specifications mentioned in ASTM C 494 types A &amp; D, CRD -C-87 types A &amp; D, BS 5075 Part 1.</p> <p>It shall be a dark brown or black liquid, having specific gravity of 1.20 at 25<sup>0</sup> C. It shall have no chloride or nitrate content. The maximum air entrainment shall be 1 % dependent upon the types of aggregate used it shall be compatible with all grades of cement.</p> <p>It shall be used to improve the Workability at low W / C ratio. It shall also be used to increase the strength of the concrete or plasters, to reduce the rebound losses while plastering or grouting, and to waterproof the mix, thus forming impermeable concrete.</p> <p>It is typically used at the areas where there is highly congested reinforcement.</p>
<b>2.0.</b>	<b>Workmanship :</b>
2.1.	<p>It shall be added with gauging water to the concrete / mix during the mixing cycle. It shall never be added to the dry mix.</p> <p>The powerful cement dispersing and deflocculating properties of the plasticiser make the concrete mix highly Workable at low W / C ratio, needing no extra addition of free water for increasing Workability.</p>





	280 ml. of the plasticizer shall be added to a 50 kg. bag of cement.
<b>3.0.</b>	<b>Mode or measurement and payment :</b>
3.1.	The rate shall be for a unit of one Litre.
<b>Additional Specifications Item no. 12.</b>	<b>Providing &amp; fixing aluminium "C" - sections, as approved by the Engineer-in-Charge, fixed into plaster on the walls as grooves, in line, level &amp; plumb, as per the details, etc. complete.</b>
<b>1.0.</b>	<b>Materials :</b>
1.1.	Aluminium C - sections shall conform to M-31.
<b>2.0.</b>	<b>Workmanship :</b>
2.1.	The aluminium "C" - sections, as approved by the Engineer-in-Charge shall be fixed into the plaster on the walls as grooves, by means of using 19 mm. long screws, in line, level & plumb, as per the details, etc. complete.
<b>3.0.</b>	<b>Mode or measurement and payment :</b>
3.1.	The rate shall be for a unit of running meter.
<b>Additional Specifications Item no. 13.</b>	<b>Providing &amp; fixing 4.00 mm. thick exterior grade aluminum composite panels :</b>
<b>1.0.</b>	<b>Materials :</b>
1.1.	Aluminium sections, fixtures & fittings shall conform to M-31. M. S. structural steel shall conform to M-22. The required fittings and fixtures, fastners, gasket, and silicon sealant shall be provided as specified in the details and drawings.
1.2.	The aluminium composite panel ( ACP ) shall conform to M-92. The ACP shall be 4.00 mm. thick.
	<p><b>M.92. ALUMINIUM COMPOSITE PANELS :</b></p> <p>The aluminium composite panels ( ACP ) shall be of the premium quality, by manufacturers such as 'Eurobond' or 'Durabuild' or 'Aluma' or 'Alstrong' or 'Alex' or of equivalent quality as approved by the Architect or Engineer-in-Charge.</p> <p>They shall be manufactured using the procedures of chromating, surface coating, processed LDPE Panel-sheet compound, petlamilating, etc., which are fully controlled by computers. The company must have passed ISO 9002 certification.</p> <p>The ACPs shall be either 4 mm. thick as specified in the detailed design drawings.</p> <p>The ACPs, to be used for exterior purpose, shall have a surface treatment of Kynar 500 ( minimum 70 % ) PVDF coating, consisting of a thermoplastic resin core, laminated between two sheets of high strength, 0.5 mm. thick aluminium boards-panels. The thermoplastic resin core shall be without toxicity. The aluminium boards shall be covered on one side with PVDF primer, PVDF face coating, PVDF light coating and finally a protecting film, and they shall be covered on the other side with anti-corrosive protecting film and anti-corrosive primer.</p> <p>The minimum unit weight of 4 mm. thick ACPs shall be 5.50 Kgs./S.Mt. as per ASTM D792.</p>



	<p>The resistant to outdoor temperature shall be as per ASTM D1654. The thermal expansion shall be 24-28 as per ASTM D648. Thermal conduction shall be 0.102 kcal/m.hr degree C. as per ASTM 976.</p> <p>The flexural rigidity shall be <math>14.0 \times 10^5</math> as per ASTM C393.</p> <p>The impact resistant shall be 1.650 kgf as per ASTM D372.</p> <p>The adhesive strength shall be 0.78 kgs./mm. as per ASTM D903.</p> <p>The sound insulating rate shall be 25 db as per ASTM E413.</p> <p>The flexural elasticity shall be 4055 Kgs./mm<sup>2</sup> as per ASTM D790.</p> <p>The shear resistant shall be 2.60 kgf/mm<sup>2</sup> as per ASTM D732.</p> <p>The minimum bending radius shall be 70 mm. as per ASTM D790.</p> <p>The fire propagation shall be as per ASTM E84.</p> <p>The smoke developed shall be less than 45 as per ASTM E84.</p> <p>The wind pressure resistant shall be as per ASTM E330.</p> <p>The properties against water shall be as per ASTM E331.</p> <p>The properties against air shall be as per ASTM E283.</p> <p>The colors and the surface texture shall be as specified in the detailed design drawings.</p> <p>The ACPs shall be easily processed using the normal wood Working machines and tools. They shall be easily grooved on conventional grooving machines and CNC machining centers. Grooved ACPs shall be bent with jig, press brake or plate punch, using a top die having the desired radius, or with a three-roller bender.</p> <p>The tolerances in width shall be <math>\pm 0.2</math> mm, in length shall be <math>\pm 4</math> mm, in thickness shall be <math>\pm 0.2</math> mm. in bow maximum 0.5 % of the length, and in square ness shall be maximum 5.00 mm.</p>
<b>2.0.</b>	<b>Workmanship :</b>
2.1.	The fixing brackets, using 50 mm. x 50 mm. x 5 mm. m. s. structural angles, fixed to masonry, columns, beams by concrete fasteners at required specified area as per details, 50 mm. x 40 mm. x 25 mm. aluminium tubes frame Work, cutting & bending to required shape as per details, fixing to bracket and on to wall, columns or beams with bolts, and also fixing ACP sheet to the aluminium framing in shape, with required cutting, bending & molding edges by using tapping screws, appropriate sealant as specified in details, shall be such that it allows free movement of components due to temperature variations.
2.2.	The Bidder shall be responsible for setting the ACP panels straight, in plumb and level, and for removing protective shield film after the fixing is completed as per instruction by the manufacturer.
<b>3.0.</b>	<b>Mode or measurement and payment :</b>
3.1.	The out to out dimensions of the ACP panels shall be measured.
3.2.	The rate shall be for a unit of one sq. meter.



<b>Additional Specifications</b> <b>Item no. 14.</b>	<b>Polymer Vata :</b>  <b>Providing and making quarter round polymer vata, using mixture of cement, sand and styrene butadiene rubber ( SBR ) based polymer, as per the manufacturer's guide, as per the list of approved brand or a brand approved by the Engineer-in-Charge, at the junctions of horizontal and vertical surfaces on chhajjas, underground tanks at sunk slabs of toilets and on terrace, etc. complete.</b>
<b>1.0.</b>	<b>Materials :</b>
1.1.	Water shall conform to M-1, Cement shall conform to M-3. Sand shall conform to M-6.
1.2.	Styrene Butadiene Rubber ( SBR ) is an aqueous emulsion of styrene butadiene co-polymer latex, especially formulated for use with cement. SBR modifies the properties of cement in mortar and concrete to make them perform better in terms of waterproofing, repairs, inhibition of corrosion, bonding, durability and wear resistance.
<b>2.0.</b>	<b>Workmanship :</b>
2.1.	The modified mortar shall have 1 kg. of cement 2.60 kg. of zone-II sand, 200 ml. of SBR, 150 ml. of water, giving a yield of 2.00 litres. The 10 mm. thick mortar covers approximately 0.20 S.Mts. or 2.15 S.Ft. This mortar looks very dry, but no further addition of water or SBR shall be made.
2.2.	Apply passivalar coat of SBR + cement slurry, using 1 part of cement to 1 part of SBR. On a cleaned and prepared wet surface, apply SBR bonding slurry. Then apply SBR modified mortar by float or trowel to form an uniform smooth surface. Since the bonding slurry sets very fast, the application of modified mortar shall be made very fast, an immediately after the application of bonding slurry. One litre of SBR with 1 kg. of cement should cover approximately 1.86 to 2.30 S.Mts. of an area.
<b>3.0.</b>	<b>Mode or measurement and payment :</b>
3.1.	The rate shall be for a unit of one running meter.
<b>Additional Specifications</b> <b>Item no. 15.</b>	<b>Chemical based Waterproofing Treatment :</b>
<b>1.0.</b>	<b>Materials &amp; Workmanship :</b>
	<p><b>Providing &amp; applying chemical based waterproofing treatment as follows :</b></p> <p><b>Preparing the surface by way of chipping and removing extra mortar, slurry, etc., &amp; / or any loose material with wire brush and cleaning the surface of any dust particles by using a blower.</b></p> <p><b>Opening up the existing cracks and making "V" grooves of size 5 mm. to 15 mm. using a cutter machine, wherever necessary, providing &amp; filling the same with acrylic polymer non-shrink, high-strength grout crack filler as per the list approved brands or as approved by the Engineer-in-Charge, etc. complete.</b></p> <p><b>Treating construction joints, if required.</b></p> <p><b>Providing &amp; treating the construction joints by applying paste made out of polymer and grout, etc. complete.</b></p>



	<p>Providing &amp; treating the honeycombs by drilling the points at specific locations, inserting nozzle and sealing with a mixture of cement and styrene butadiene Rubber ( SBR ) based polymer, pressure grouting with a mixture of cement and SBR in the proportion of 1 bag of cement as to 1.00 ltr. of SBR, and filling the holes with rich cement mortar 1 : 1 and SBR, etc. complete. Materials : as per the list of approved brands or as approved by the Engineer-in-Charge. Mode of measurement shall be per point of grout consisting of 2.50 kgs. of cement and 0.05 ltr of SBR per point.</p> <p><b>Applying coats of Elastomeric Membrane - Flexicoat :</b></p> <p>Providing and applying 02 coats of synthetic resin based elastomeric membrane - 'Flexicoat' coats as per the list of approved brands or as approved by the Engineer-in-Charge, on the walls &amp; floors of u. g. tanks &amp; sunk slabs and / or terrace floors, and applying 1 : 1 cement mortar as screeding for developing mechanical key, as directed by the Engineer-in-Charge, etc. complete, at walls and floors of underground tanks and sunk slabs, and terrace area on all floors and balconies.</p> <p>The whole sunk area / terrace area so finished shall be flooded with water for a minimum period of twenty days for curing and final test of leakage, as directed by the Engineer-In-Charge.</p> <p>The whole works to be executed through specialised agency with a guarantee of 10 ( ten ) years given on a prescribed performa duly stamped.</p>
2.0.	<b>Mode of measurement and payment :</b>
2.1.	The rate shall be unit of one square meter.
<b>Additional Specifications Item no. 16.</b>	<p><b>Indian style cement based waterproofing :</b></p> <p>P &amp; I Indian style cement based waterproofing by way of applying cement and S.B.R. slurry, evenly spread on slab and laying 19 mm. thick cement mortar in CM 1 : 2, placing fresh brick bats, up to 150 mm. thickness, laid in slope as directed, the voids to be filled up with 1 : 3 cement mortar, finished with 19 mm. thick cement plaster / I.P.S., including making checks of 300 mm. x 300 mm. as directed by the Engineer-in-Charge, including curing and testing for leakages, if any, after 28 days, etc. complete.</p>
1.0.	<b>Materials : :</b>
1.1.	The relevant specifications of item no. 14.71. ( A ) shall be followed, except that the thickness of the plaster shall be 20 mm. and SBR shall be added to the cement slurry.
1.2.	Styrene Butadiene Rubber ( SBR ) is an aqueous emulsion of styrene butadiene co-polymer latex, especially formulated for use with cement. SBR modifies the properties of cement in mortar and concrete to make them perform better in terms of waterproofing, repairs, inhibition of corrosion, bonding, durability and wear resistance.
1.3.	The relevant specifications of item no. 6.12. ( A ) shall be followed, except that the proportion of cement mortar shall be 1 : 2. Brick shall conform to M – 15. Cement mortar shall conform to M – 11.
2.0.	<b>Workmanship :</b>
2.1.	The relevant specifications of item no. 14.71. ( A ) shall be followed, except that the thickness of the plaster shall be 20 mm. and SBR shall be added to the cement slurry.



2.2.	The cement mortar in CM 1 : 2, shall be spread evenly on slab and / or chemical waterproofing carried out already, then placing fresh brick bats, up to 150 mm. thickness, laid in slope as directed, the voids shall be filled up with 1 : 3 cement mortar, finished with 20 mm. thick cement plaster / I.P.S., including making checks of 300 mm. x 300 mm. as directed by the Engineer-in-Charge, including curing and testing for leakages, if any, after 28 days, etc. complete.
3.0.	<b>Mode of measurement and payment :</b>
3.1.	The rate shall be for a unit of one square meter.
<b>Additional Specifications Item no. 17.</b>	<b>Providing and filling in depression with cinder or fly ash on all floors :</b>
1.0.	<b>Materials :</b>
1.1.	The cinder shall conform to M – 9.
2.0.	<b>Workmanship :</b>
2.1.	The relevant specification of item no. 4.12 shall be followed, except that cinder shall be filled in sunken area of W. C. and bathroom at all floors as per the instructions by the Engineer-in-Charge.
3.0.	<b>Mode of measurement and payment :</b>
3.1.	The relevant specification of item no. 4.12 shall be followed.
3.2.	The rate includes cost of collecting and carting of cinder with all leads and labour required for filling in sunk.
3.3.	The measurement shall be taken of the area covered with the layer of cinder with depth.
3.4.	The rate shall be for a unit of one cubic meter.
<b>Additional Specifications Item no. 18.</b>	<p><b>Providing &amp; laying in position for flooring as per the designed pattern ceramic &amp; vitrified tiles of approved sizes, make and colors, of first quality as per design, set in cement slurry ( 3.30 Kg. Cement / S.Mt. ) over a minimum 25 mm. thick cement mortar, 1 : 3, bedding and laid to proper slope and level, the finishing done with flush pointing in “Bal-Endura” sealer &amp; grout, and skirting, including curing &amp; cleaning with mild oxalic acid, etc. complete, as specified and shown in detail design drawings, as directed by the Architect and the Engineer-in-Charge.</b></p> <p><b>The various types of tiles and their sizes shall be as follows :</b></p> <ol style="list-style-type: none"> <li>1. 900 mm. x 900 mm. Vitrified tiles.</li> <li>2. 600 mm. x 600 mm. Vitrified tiles.</li> <li>3. 300 mm. x 300 mm. Ceramic tiles.</li> <li>4. 300 mm. x 300 mm. Ceramic group-IV tiles.</li> <li>5. 600 mm. x 600 mm. Ceramic group-IV tiles.</li> <li>6. 1,200 mm. x 600 mm. full body vitrified tiles slab.</li> </ol>
1.0.	<b>Materials :</b>
1.1.	Water shall conform to M-1. Cement mortar shall conform to M-11. The ceramic tiles shall conform to M-84. The vitrified tiles shall conform to M-85.



	<p><b>FLOOR TILES :</b></p> <p>Floor tiles shall be of the best quality from manufacturers such as H. &amp; R. Johnson ( India ) Ltd., Swastik, Simpolo, City Tiles, Nitco or equivalent, as approved by the Architect and Engineer-in-Charge. They shall conform to the IS 4457.</p> <p>They shall be monolithic and available glossy, mirror like finish or in anti-skid finish, as per details, having the sizes as mentioned in the title of item no. 18 above.</p> <p>Maximum deviation in length <math>\pm 0.3</math> %, maximum deviation in thickness <math>\pm 2.0</math> %, maximum wedging allowed <math>\pm 0.2\%</math>, maximum surface flatness shall be <math>\pm 0.2</math> %, water absorption capacity <math>&lt; 0.5</math> %, maximum Mohs hardness 8.0, flexural strength shall be of <math>&gt; 45</math> N/mm<sup>2</sup>, maximum Abrasion resistance <math>&lt; 144</math> mm<sup>3</sup>, maximum thermal expansion <math>&lt; 6 \times 10^{-6}</math>, maximum thermal shock resistance shall be of no damage, resistance to acid ( wt. loss ) <math>&lt; 0.4</math> %, Skid resistance ( friction coefficient ) <math>&gt; 0.6</math>, breaking strength shall be 2600 N, density of ( g/cm<sup>3</sup> ) shall be 2.4 &amp; no moisture expansion.</p>
<b>2.0.</b>	<b>Workmanship :</b>
<b>2.1.</b>	Bedding :
<b>2.1.1.</b>	The sub-grade shall be chipped to level the floor, cleaned, wetted and mopped. The bedding of cement mortar of specified proportions and 40-50 mm. thickness, shall be laid evenly over the surface, in specified slope and level. The mortar shall have sufficient plasticity for laying, and there shall be no hard lumps, which may interfere with the evenness of the bedding.
<b>2.2.</b>	<b>Fixing the tiles :</b>
<b>2.2.1.</b>	Neat grey cement slurry at 3.30 kgs. of cement / S.Mt., having honey-like consistency, shall be spread over the mortar bedding as directed by the Engineer-in-Charge. The edges of the tiles shall be smeared with neat cement slurry. The tiles shall then be well-pressed and gently tapped with a wooden mallet till the tiles are properly bedded and in level with the all the adjoining tiles. There shall be no hollow space left over in bed or joints. The joints between the tiles shall be kept as thin as possible, either in a straight line or as per pattern as shown in the detail design drawings. The tiles shall not have any staggered joints.
<b>2.2.2.</b>	<p>The floor trap, coming in the flooring, if any, shall be so positioned that only one tile shall have to be cut to allow for the grating of the floor trap. Wherever the full size tiles cannot be fixed, they shall be cut by cutter machine to the required size, and their edges shall be rubbed smooth to ensure straight and true joints. The outlets for drainage shall mark as per the drawing, and tile fixing shall be carried out accordingly only after laying and testing the drainage lines.</p> <p>After the tiles are laid the joints shall be cleaned for grouting, using a wire brush to a depth of about 5 mm. Then the joint shall be grouted using polymer based grout of approved make such as “Bal-Endura”, using the specified pigment to match the shade of the tiles. A coat of sealant of the specified make such as “Bal-Endura” shall be apply over the grouted joints and the surfaces of the tiles cleaned immediately. The entire flooring area shall be kept wet and allow to cure undisturbed for 7 days.</p>
<b>2.2.3.</b>	While laying, any chiseling, which may be required for making the skirting or dado flush with the finished wall, shall be done.
<b>2.3.</b>	<b>Cleaning :</b>
<b>2.3.1.</b>	The surplus cement slurry and grout, that may have come out of the joints while fixing, shall be cleaned off before it sets. Once the flooring has set it shall be carefully washed and



	cleaned using mild oxalic acid and dried. Proper precautions and measures shall be taken to ensure that the tiles are not damaged in any way till the completion of the construction.
<b>2.3.2.</b>	If any tile is disturbed, dented, chipped or damaged in any way, it shall be replaced, properly jointed, grouted and sealed until the completion of the construction as directed by the Architect or the Engineer-in-Charge.
<b>3.0.</b>	<b>Mode of measurement and payment :</b>
3.1.	The measurement shall be taken of the entire area covered with the layer of tiles, excluding the area covered by the skirting or dados as the case may be. No deduction shall be made or extra paid for any opening in the floor having an area up to 0.10 S.Mt. No extra payment for laying the flooring at different levels in same room.
3.2.	No extra payment shall be made for any small quantities such as narrow widths, mitered or returned ends, rounds, cutting, fixing and making good up to and around the pipes, fittings and fixtures, etc.
3.3.	The basic rate, if at all provided or agreed upon, shall include the cost of Materials :, all the taxes, levies, etc. and the cost of delivery and unloading at site.
3.4.	The rate shall be for a unit of one square meter for flooring and dado. The dado shall be measured from the finished floor level to the top of the tile fixed as dado.  The rate shall be for a unit of one running meter for skirting.
<b>Additional Specifications Item no. 19.</b>	<b>P &amp; I 20 mm. thick X 150 mm. wide strip of ruby red colour granite stone laid as directed with proper bedding of C.M. 1 : 3 in line, level &amp; slope, including filling the joints with matching coloured grout &amp; sealer of "Bal-Endura" or approved equal make &amp; quality, with proper curing, etc. complete on all floors.</b>
<b>1.0.</b>	<b>Materials :</b>
1.1.	Water shall conform to M-1. Cement mortar shall conform to M-11. The granite stone slab shall conform to M-52.
<b>2.0.</b>	<b>Workmanship :</b>
2.1.	The relevant specifications of item no. 14.36. ( A )/ P-97 and Item no-187 shall be followed, except that 20 mm. thick jet black granite stone slab flooring on landing of the staircase, shall be used in place of marble stone.
<b>3.0.</b>	<b>Mode of measurement and payment :</b>
3.1.	The rate shall be for a unit of one running meter.
<b>Additional Specifications Item no. 20.</b>	<b>P &amp; I 20 mm. thick double coat smooth cement plaster ( I. P. S. ) on steps &amp; risers at area below seating, with adding, polyester fiber as instructed, in 8 mm. thick second coat of 1 : 1 ( 1 cement : 1 coarse sand ), followed by 12 mm. thick first coat of 1 : 3 ( 1 cement : 3 coarse sand ) in slope and level as directed.</b>
<b>1.0.</b>	<b>Materials : :</b>
1.1.	The relevant specifications of item no. 14.71. ( A ) shall be followed, except that the thickness of the plaster shall be 20 mm.



2.0.	<p>The fibre shall be “Recron 3S” by Reliance Industries Ltd., or its equivalent as approved by the Engineer-in-Charge.</p> <p>It shall be triangular shaped fibre for improved holding together of cement aggregates. It shall have a denier of 2.5d, tensile strength of 6,000 kgs./ Sq.cm., melting point of more than 250 degrees centigrade. It shall have excellent dispersion factor, acid resistance and good resistance to alkalis.</p> <p>It prevents shrinkage cracks, which develop during curing. It shall prevent / arrest racking in plaster, caused by expansion and contraction. By reducing micro cracks, it shall reduce water permeability. It shall reduce rebound “splattering” of mortar. It shall increase flexural strength, as the modulus of elasticity of the fibre is high compare to that of the mortar binder.</p> <p>It shall be mixed with cement mortar while carrying out the internal plaster.</p>
2.1.	<b>Workmanship :</b>
	The relevant specifications of item no. 14.71. ( A ) shall be followed, except that the thickness of the plaster shall be 20 mm.
	To use Recron 3S as a Bonding Agent, it shall be applied in the ration of 1 : 1 cement : CBR bonding slurry, using a stiff nylon brush to give a thickness of 3.50 mm. to the already prepared and pre-wetted concrete surface. Then the fresh concrete is poured on it.
	20 mm. thick double coat smooth cement plaster ( I. P. S. ) shall be applied after adding polyester fiber as instructed, in 8 mm. thick second coat of 1 : 1 ( 1 cement : 1 coarse sand ), followed by 12 mm. thick first coat of 1 : 3 ( 1 cement : 3 coarse sand ) in slope and level as directed.
	<b>Mode of measurement and payment :</b>
3.0.	The rate shall be for a unit of one square meter.
3.1.	The rate shall be for a unit of one running meter.
<b>Additional Specifications Item no. 21.</b>	<b>Providing &amp; fixing 100 mm. wide x 920 mm. long x 3.00 mm. thick U. V. resistant vinyl tiles :</b>
1.0.	<b>Materials :</b>
2.0.	The vinyl tiles shall conform to M-91. The adhesive solution shall be rubber based, such as Dunlop S-758, Pidilite SR or equivalent.
<b>M.91.</b>	<b>PVC / VINYL FLOORING :</b>
100.1	PVC sheets / tiles for PVC / Vinyl floor covering shall be of the best quality like ‘LG Floors’, ‘Wonder floor’ or equivalent, as approved by the Architect and the Engineer-in-Charge. It shall be of homogeneous flexible type, conforming to IS : 3462. The PVC covering shall neither develop any toxic effect while put to use nor shall give off any disagreeable odour.
100.2	Thickness of flexible type covering tiles shall be as specified in the description of the item. The flexible type shall be backed with Hessian or other woven fabric. It shall be available in form of tiles of sizes up to 600 mm. x 600 mm. or rolls of 1.50 mts. width and of continuous length of 20 mts. The thickness shall be approximately 1.50 mm. to 2.0 mm. The dimensional stability shall be 0.30 %. The following tolerance shall be applicable on the nominal dimensions of the rolls or tiles :





	<p>Thickness : + 0.15 mm.  Length or Width :  1.30 mm. square tiles, + 0.20 mm.  3.90 mm. square tiles, + 0.60 mm.  2.60 mm. square tiles, + 0.40 mm.  4 sheets and roll, + 0.10 %.</p>
100.3	It shall offer color fastness to daylight as per the relevant IS : 3462. Allowance for curling shall be 0.60 mm. It shall be flexible and shall not break, crack or show any signs of failure.
100.4	It shall offer above average resistance to mild and diluted acids, alkalies, soaps and detergents. It shall have high abrasion resistance. At normal temperature, it shall develop an indent of 0.15 mm., after one minute and 0.20 mm., after ten minutes. It shall offer insulation resistance as per the IS : 2259. It shall have a sound reduction factor of 3 db for 2.00 mm. thickness and 2 db for 1.50 mm. thickness. It shall have self extinguishing property and water absorption at room temperature for 24 hours shall be 0.10 %.
100.5	It shall be available in various designs and shall be recommended for floors and walls, in homes, institutions, commercial establishments, clinics and hospitals.
100.6	The adhesive for PVC flooring shall be of the type and make recommended by the manufacture of PVC sheets / tiles.
<b>2.1.</b>	<b>Workmanship :</b>
<b>2.2.</b>	The sub-grade shall be even, hard, cleaned and well dried, before the commencement of laying, so as to provide good adhesion.
<b>2.3.</b>	The sub-grade shall be even, hard, cleaned and well dried, before the commencement of laying, so as to provide good adhesion.
<b>3.0.</b>	A coat of approved base binding agent, a rubber based adhesive solution of thickness as specified by the Manufacturer, shall then be spread evenly over the bedding / sub-grade. The tiles/roll shall be then fixed to the floor, in the pattern and color arrangement indicated in the Architect's drawing or as instructed by the Engineer-in-Charge. The joints shall be jointed with the same adhesive solution. After allowing it to become sufficiently dry, the tiles/roll shall be pressed down with even pressure until it adheres well to the bed material. During application of pressure, if the adhesive solution rises from the joints, it shall be removed. Thermo welding with vinyl chord or cold sealant welding ensures seamless waterproof surface. The flooring shall be laid in accordance with approved manufacturer's directions.
<b>3.1.</b>	The floor shall be cleaned with the tile finish wax and polished with muslin cloth, to the satisfaction of the Engineer-in-Charge. The flooring shall be inspected after 30 days for any adjustments, repairs or replacement.
<b>3.2.</b>	<b>Mode of measurement and payment :</b>
	The clear visible area of work done, flooring, skirting and dado, shall be measured and paid. The rate shall include all Materials :, labour, tools, wastage and equipments etc. required for satisfactory completion of the item.
	The rate shall be unit of one square meter.



<b>Additional Specifications Item no. 22.</b>	<b>Providing &amp; fixing open well submersible pumps in u.g. collection tank :</b>
<b>1.0.</b>	<b>Materials :</b>
<b>1.1.</b>	Providing & fixing ISI mark ISO 9001 & 14001 65 mm. dia. suction and 50 mm. dia. discharge, 25.00 mts. head, 3.00 HP, three - phase open well submersible pumps, including power characteristic for safety of motor, required 2.5 mm.2/ DOL PVC insulated 3 - core cable up to 1.00 mt. length above top slab of U.G. tank, three - phase starter switch, panel board with automatic control system, etc. as per the list of approved brands & as approved by the Engineer-in-Charge, etc. complete.
<b>2.0.</b>	<b>Mode of measurement and payment :</b>
<b>2.1.</b>	The rate shall be for a unit of one no. system.
<b>Additional Specifications Item no. 23.</b>	<b>Providing &amp; fixing 38 mm. outer diameter 316 grade stainless steel pipe, with 25 mm. wide X 10 mm. thick 8 mm. as well as 10 mm. thick stainless steel plate &amp; 20 mm. diameter tube as vertical support :</b>
<b>1.0.</b>	<b>Materials :</b>
<b>1.1.</b>	The stainless steel pipes & plates shall conform to M-91.
	<b>91.00: STAINLESS STEEL PIPES &amp; PLATES :</b>  The stainless steel pipe shall be of 316 grade, best quality stainless steel.  The handrail shall be of 38 mm. diameter stainless steel pipe.  The pipes used for balustrade shall be of 20 mm. diameter stainless steel pipes.  The vertical support shall be of 25 mm. wide x 10 mm. thick stainless steel plates.
<b>2.0.</b>	<b>Workmanship :</b>
<b>2.1.</b>	The relevant specifications of item no. 11.4. ( A ) shall be followed, except that the steel Work shall be replaced by stainless steel and done by welding.
<b>3.0.</b>	<b>Mode of measurement and payment :</b>
<b>3.1.</b>	The rate shall be for a unit of one running meter.
<b>Additional Specifications Item no. 24.</b>	<b>MODULAR STAINLESS STEEL HANDRAIL with GLASS PANEL :</b>  Providing & fixing modular s. s. handrail with glass panel, consisting of 8 mm. dia., 16 gauge s. s. pipe of AISI 316 grade, as the top handrail with mitred junctions, supported by 40 mm. x 40 mm. square tube x 16 gauge s. s. balusters of AISI 316 grade, floor mounted by means of 120 mm. dia. base plate, having 04 studs in the base, with panels of 12 mm. thick toughened / tempered float glass of "Asahi" or "Modi" or "Saint Gobain", with all the edges polished, held with s. s. patch fittings, as per design & details, etc. complete.
<b>1.0.</b>	<b>Materials :</b>
<b>1.1.</b>	The relevant specifications of additional specification item no. 23 shall apply, except that instead of stainless steel wire ropes, panels of 12 mm. thick toughened / tempered float glass of "Asahi" or "Modi" or "Saint Gobain", with all the edges polished, held with s. s. patch fittings, as per design & details, shall be used.



<b>2.0.</b>	<b>Workmanship :</b>
2.1.	The relevant specifications of item no. 11.4. ( A ) shall be followed, except that the steel Work shall be replaced by stainless steel and done by welding.
<b>3.0.</b>	<b>Mode of measurement and payment :</b>
3.1.	The rate shall be for a unit of one running meter.
<b>Additional Specifications Item no. 25.</b>	<b>BUBBLE GUARD TILES / FLOOR PROTECTOR :</b> <b>Providing &amp; laying 2 mm. thick x 1,800 mm. x 1,200 mm. "Cello" Bubble Guard Tiles / Floor Protector Sheets by "Wim Plast Ltd.", or approved equal, laid on the floor by means of 50 mm. wide PVC tape at the joints, to be removed and taken away only after all the work in the area is fully completed, etc. complete.</b>
<b>1.0.</b>	<b>Materials :</b>
1.1.	2 mm. thick x 1,800 mm. x 1,200 mm. "Cello" Bubble Guard Tiles / Floor Protector Sheets by "Wim Plast Ltd.", having air bubbles between two skins of plastic, or approved equal, laid on the floor by means of 50 mm. wide PVC tape at the joints.
<b>2.0.</b>	<b>Workmanship :</b>
2.1.	The sheets are laid nextto each other and taped firmly with the finished floor by means of 50 mm. wide pvc tape such that no damage to the finished floor material takes place. No gaps shall be left anywhere, and cut sheets shall be fixed to fit the balance space of the finished floor. The sheet shall be fixed vertically on the skirting also using the same PVC tape.
2.2.	These sheets shall be removed only after all types of work, including interior works, are fully completed.
<b>3.0.</b>	<b>Mode of measurement and payment :</b>
3.1.	The rate shall be unit of one square meter.
<b>Additional Specifications Item no. 26.</b>	<b>Providing and applying 3 coats of exterior paints as per selection, with required type of primer as base coat, including bands of any widths, grooves, recesses, etc. as directed, including curing as required, etc. complete on all floors.</b> <b>'ICI' DULUX "WEATHERSHIELD" exterior ACRYLIC EMULSION paints or approved equal quality.</b>
<b>1.0.</b>	<b>Materials :</b>
1.1.	The 'Weather Shield' acrylic emulsion exterior paints of 'ICI' shall conform to M-95. Water shall conform to M-1.
<b>2.0.</b>	<b>Workmanship :</b>
2.1.	The relevant specifications of item nos. 18.51, 18.54 & 18.56 shall be followed.
<b>3.0.</b>	<b>Mode of measurement and payment :</b>
3.1.	The relevant specifications of item no. 18.11 shall be followed.



<b>3.0.</b>	<b>Mode of measurement and payment :</b>
<b>3.1.</b>	The rate shall be unit of one square meter.
<b>Additional Specifications Item no. 27.</b>	<b>Providing &amp; applying textured wall finish/s on exterior walls of different specified texture/s &amp; color/s as approved by the Engineer-in-Charge, of 2 mm. thick paste having combination of quartz, silica, aggregates unorganic pigments and additives base apply with spray &amp; / or trowel as per instructions as given in product's guide, followed with required base coat / primer if required, finished with selected exterior grade paint shade, etc. complete, the whole works to be executed through specialized agency by trained applicator, etc. complete.</b>
<b>1.0.</b>	<b>Materials :</b>
<b>1.1.</b>	The 'Weather Shield' acrylic emulsion exterior paints of 'ICI' shall conform to M-95. The material for the texture wall finish shall be as specified by the selected suppliers. Water shall conform to M-1.
<b>2.0.</b>	<b>Workmanship :</b>
<b>2.1.</b>	The relevant specifications of item nos. 18.51, 18.54 & 18.56 shall be followed. The textured wall finish/s on exterior walls of different specified texture/s & color/s as approved by the Engineer-in-Charge, shall consists of 2 mm. thick paste, having combination of quartz, silica, aggregates, unorganic pigments and additives base, applied with spray & / or trowel as per the instructions given in product's guide, followed with required base coat / primer, if required, finished with selected exterior grade paint shade, etc. complete. The whole works shall be executed through a selected specialized agency having trained applicators.
<b>3.0.</b>	<b>Mode of measurement and payment :</b>
<b>3.1.</b>	The relevant specifications of item no. 18.11 shall be followed.
<b>3.2.</b>	The rate shall be unit of one square meter.
<b>Additional Specifications Item no. 28.</b>	<b>P &amp; f white colour basin countertops with integral bowls and cove backsplashes, having bowl size of 575 mm. x 415 mm. of oval shape, with required brackets, waste couplings, bottle traps, etc. fittings of approved make, fixed in line &amp; level, including connecting properly with outlet - inlet pipes, sealing the joints with white cement and tested for any leakages,curing, etc. complete.</b>
<b>1.0.</b>	<b>Materials :</b>
<b>1.1.</b>	The solid polymer components, namely the countertops, the integral bowls and the cove backsplashes, shall be cast, non-porous, filled polymer, not coated, laminated or of composite construction, with through body colors, meeting ANSI Z124.3 or ANSI Z124.6, having minimum physical and performance properties specified.
<b>1.2.</b>	Superficial damage to a depth of 0.010 inch (.25 mm) shall be repairable by sanding and/or polishing.
<b>1.3.</b>	The sheet shall be 12 mm. ( 0.50" ) thick for horizontal surfaces and 6 mm. ( 0.25" ) thick for vertical surfaces.
<b>1.4.</b>	Edge treatment : The top edge of the splash board shall be chamfered as per the details. The front edge of the counter top shall be moulded quarter-round to merge seamlessly with the front fascia panel as per details.



	<ol style="list-style-type: none"> <li>1. Fabricate using manufacturer's approved method.</li> <li>2. Rout 1/8" deep max. groove for inlay to pattern indicated on designer's drawings.</li> <li>3. Fill groove using methods approved by manufacturer, avoiding air bubbles or voids.</li> <li>4. Overfill inlay area.</li> <li>5. Allow area to fully cure.             <ol style="list-style-type: none"> <li>a. Do not overheat inlay while sanding.</li> </ol> </li> <li>6. Finish and touch up to uniform appearance.</li> </ol>																																							
1.5.	A 575 mm. x 415 mm. x 250 mm. deep oval - shaped with rounded edges all around as per details, white colored basin shall be integrated with the countertop such that the joints appear to be non-existent, and the entire countertop unit appears to be monolithic and jointless, and the finished product shall be so touched up and finished as to give an uniform appearance.																																							
1.6.	Back splash, side splash and front fascia panel shall be integrated with the countertop as described in 1.5 above. The front edge of the back splash and side splash shall be chamfered as per details and finished smooth.																																							
1.7.	The countertop shall have holes drilled of the specified size as required at the required location to allow for the installation of sensotronik sensor faucets. The inside surface of the drilled holes shall be polished smooth.																																							
1.8.	The countertop shall be supported on m. s. brackets, 550 mm. long, oil painted, cantilevered off the rear wall, fixed to the wall using 100 mm. long screws, fixed into rawl plugs, as per details.																																							
1.9.	<p>Performance characteristics:</p> <table border="1"> <thead> <tr> <th>Property Test</th> <th>Typical Result</th> <th></th> </tr> </thead> <tbody> <tr> <td>Tensile Strength 638</td> <td>6,000 psi</td> <td>ASTM D</td> </tr> <tr> <td>Tensile Modulus 638</td> <td>1.5 x 10<sup>6</sup> psi</td> <td>ASTM D</td> </tr> <tr> <td>Tensile Elongation ASTM D 638</td> <td>0.4% min.</td> <td></td> </tr> <tr> <td>Flexural Strength ASTM D 790</td> <td>10,000 psi</td> <td></td> </tr> <tr> <td>Flexural Modulus ASTM D 790</td> <td>1.2 x 10<sup>6</sup> psi</td> <td></td> </tr> <tr> <td>Hardness "M"</td> <td>&gt;85</td> <td>Rockwell</td> </tr> <tr> <td>Scale</td> <td>56</td> <td>AS TM D 785</td> </tr> <tr> <td></td> <td>Barcol Impressor</td> <td>AS TM D 2583</td> </tr> <tr> <td>Thermal Expansion ASTM D 696</td> <td>3.02 x 10<sup>-5</sup> in./in./°C</td> <td></td> </tr> <tr> <td></td> <td>(1.80 x 10<sup>-5</sup> in./in./°F)</td> <td></td> </tr> <tr> <td>Gloss (60° Gardner) ANSI Z124</td> <td>5-75 (matte—highly polished)</td> <td></td> </tr> <tr> <td>Light Resistance 3-2000</td> <td>(Xenon Arc) No effect</td> <td>NEMA LD</td> </tr> </tbody> </table>	Property Test	Typical Result		Tensile Strength 638	6,000 psi	ASTM D	Tensile Modulus 638	1.5 x 10 <sup>6</sup> psi	ASTM D	Tensile Elongation ASTM D 638	0.4% min.		Flexural Strength ASTM D 790	10,000 psi		Flexural Modulus ASTM D 790	1.2 x 10 <sup>6</sup> psi		Hardness "M"	>85	Rockwell	Scale	56	AS TM D 785		Barcol Impressor	AS TM D 2583	Thermal Expansion ASTM D 696	3.02 x 10 <sup>-5</sup> in./in./°C			(1.80 x 10 <sup>-5</sup> in./in./°F)		Gloss (60° Gardner) ANSI Z124	5-75 (matte—highly polished)		Light Resistance 3-2000	(Xenon Arc) No effect	NEMA LD
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Me



	Wear and Cleanability ANSI Z124.3 & Z124.6	Passes	thod 3.3
	Stain Resistance: Sheets Z124.3 & Z124.6	Passes	ANSI
	Fungus and Bacteria Resistance Boiling Water Resistance 3-2000	Does not support microbial growth No visible change	ASTM G21&G22 NEMA LD
	Method 3.5 High Temperature Resistance NEMA LD 3-2000	No change	
	Izod Impact ASTM D 256 (Notched Specimen) (Method A)	0.28 ft.-lbs./in. of notch	Method 3.6
	Ball Impact 3-2000	No fracture—1/2 lb. ball:	NEMA LD
	Resistance: Sheets Method 3.8	1/4" slab—36" drop 1/2" slab—144" drop	
	Weatherability ASTM G 155	$\Delta E^*_{94} < 5$ in 1,000 hrs.	
	Specific Gravity †	1.7	
	Water Absorption 570	Long-term	ASTM D
		0.4% (3/4") 0.6% (1/2") 0.8% (1/4")	
	Toxicity Protocol	99 (solid colors) 66 (patterned colors) Test ("LC50" Test)	Pittsburgh
	Flammability ASTM E 84,	All colors (Class I and Class A)	NF PA 255 & UL 723
	Flame Spread Index	<25	
	Smoke Developed Index	<25	
	† Approximate weight per square foot: 1/4" (6 mm) 2.2 lbs., 1/2" (12.3 mm) 4.4 lbs. Shapes meet or exceed the ANSI Z124.3 and ANSI Z124.6 standards for plastic sinks and lavatories.  NEMA results based on the NEMA LD 3-2000.		
<b>1.91.</b>	<b>ACCESSORIES :</b>		



	<p>A. Joint adhesive:</p> <ol style="list-style-type: none"> <li>1. Manufacturer’s standard one- or two-part adhesive kit to create inconspicuous, nonporous joints.</li> </ol> <p>B. Sealant:</p> <ol style="list-style-type: none"> <li>1. Manufacturer’s standard mildew-resistant, FDA-compliant, NSF 51-compliant (food zone — any type), UL-listed silicone sealant in colors matching components.</li> </ol> <p>C. Sink/lavatory mounting hardware:</p> <ol style="list-style-type: none"> <li>1. Manufacturer’s standard bowl clips, panel inserts and fasteners for attachment of undermount sinks/lavatories.</li> </ol> <p>D. Conductive tape:</p> <ol style="list-style-type: none"> <li>1. Manufacturer’s standard aluminum foil tape, with required thickness, for use with cutouts near heat sources.</li> </ol> <p>E. Insulating felt tape:</p> <ol style="list-style-type: none"> <li>1. Manufacturer’s standard for use with conductive tape in insulating solid surface material from adjacent heat source.</li> </ol>
<p><b>1.92.</b></p>	<p><b>FACTORY FABRICATION :</b></p> <p>A. Shop assembly :</p> <ol style="list-style-type: none"> <li>1. Fabricate components to greatest extent practical to sizes and shapes indicated, in accordance with approved shop drawings and manufacturer’s printed instructions and technical bulletins.</li> <li>2. Form joints between components using manufacturer’s standard joint adhesive without conspicuous joints. <ol style="list-style-type: none"> <li>a. Reinforce with strip of solid polymer material, 2" wide.</li> </ol> </li> <li>3. Provide factory cutouts for plumbing fittings and bath accessories as indicated on the drawings.</li> <li>4. Rout and finish component edges with clean, sharp returns. <ol style="list-style-type: none"> <li>a. Rout cutouts, radii and contours to template.</li> <li>b. Smooth edges.</li> <li>c. Repair or reject defective and inaccurate work.</li> </ol> </li> </ol> <p>B. Thermoforming :</p> <ol style="list-style-type: none"> <li>1. Comply with manufacturer’s data.</li> <li>2. Heat entire component. <ol style="list-style-type: none"> <li>a. Material shall be uniform, between 275 and 325 degrees Fahrenheit during forming.</li> </ol> </li> <li>3. Form pieces to shape prior to seaming and joining.</li> <li>4. Cut pieces to finished dimensions.</li> <li>5. Sand edges and remove nicks and scratches.</li> </ol>
<p><b>1.93.</b></p>	<p>The countertop shall be white in color as per the manufacturer’s standard colors. The surface shall have a uniform surface, “matte”, having gloss range of 5 – 20.</p>
<p><b>1.94.</b></p>	<p>Execution :</p> <p><b>EXAMINATION :</b></p> <ol style="list-style-type: none"> <li>A. Examine substrates and conditions, with fabricator present for compliance with requirements for installation tolerances and other conditions affecting performance of work.</li> <li>B. Proceed with installation only after unsatisfactory conditions have been corrected.</li> </ol> <p><b>INSTALLATION :</b></p>



	<p>A. Install components plumb, level and rigid, scribed to adjacent finishes, in accordance with approved shop drawings and product data.</p> <ol style="list-style-type: none"> <li>1. Provide product in the largest pieces available.</li> <li>2. Form field joints using manufacturer's recommended adhesive, with joints inconspicuous in finished work.</li> <li>a. Exposed joints/seams shall not be allowed.</li> <li>3. Reinforce field joints with solid surface strips extending a minimum of 1 inch on either side of the seam with the strip being the same thickness as the top.</li> <li>4. Cut and finish component edges with clean, sharp returns.</li> <li>5. Rout radii and contours to template.</li> <li>6. Anchor securely to base cabinets or other supports.</li> <li>7. Align adjacent countertops and form seams to comply with manufacturer's written recommendations using adhesive in color to match countertop.</li> <li>8. Carefully dress joints smooth, remove surface scratches and clean entire surface.</li> <li>9. Install countertops with no more than 1/8-inch (3 mm) sag, bow or other variation from a straight line.</li> </ol> <p>B. Coved backsplashes and sidesplashes:</p> <ol style="list-style-type: none"> <li>1. Provide coved backsplashes and sidesplashes at all walls and adjacent millwork.</li> <li>2. Fabricate radius cove at intersection of counters with backsplashes to dimensions shown on the drawings.</li> <li>3. Adhere to countertops using manufacturer's standard color-matched Joint Adhesive.</li> </ol> <p>C. Integral sinks/vanities:</p> <ol style="list-style-type: none"> <li>1. Provide solid surface Materials : bowls and/or lavatories sinks with overflows in locations shown on the drawings.</li> <li>2. Secure sinks and lavatory bowls to tops using manufacturer's recommended sealant, adhesive and mounting hardware to maintain warranty.</li> </ol>
<p><b>1.95.</b></p>	<p><b>REPAIR :</b></p> <p>Repair or replace damaged work which cannot be repaired to architect's satisfaction.</p>
<p><b>1.96.</b></p>	<p><b>CLEANING AND PROTECTION :</b></p> <ol style="list-style-type: none"> <li>A. Keep components clean during installation.</li> <li>B. Remove adhesives, sealants and other stains.</li> </ol>
<p><b>1.97.</b></p>	<p><b>SCHEDULE :</b></p> <p>Countertops :</p> <p>Surfaces of material adhesively joined with inconspicuous seams.</p> <ol style="list-style-type: none"> <li>a. Vertical Thickness : 6 mm. ( 0.25" )</li> <li>b. Horizontal Thickness : 12 mm. ( 0.50" )</li> <li>c. Edge Details : Chamfered and rounded as per details.</li> <li>e. Finish : Matte. Gloss range of 05 – 20.</li> <li>f. Backsplash : 100 mm. high with front top edge chamfered as per details.</li> <li>g. Sidesplash : 100 mm. high with front top edge chamfered as per details.</li> <li>h. Front fascia panel : 150 mm. high with front top edge rounded as per details.</li> </ol>





1.98.	<p><b>SOLID SURFACE FABRICATIONS :</b></p> <p>Countertops with seamed undermount solid surface sinks :</p> <p>Surfaces of material adhesively joined with inconspicuous seams.</p> <p>a. Finish : Matte. Gloss range of 05 – 20.</p> <p>b. Basin : 575 mm. x 415 mm. x 250 mm. deep oval - shaped with rounded edges all around as per details, white colored.</p>
2.0.	<b>Mode of measurement and payment :</b>
2.1.	The rate shall be for a unit of one running meter.
<b>Additional Specifications Item no. 29.</b>	<p><b>P &amp; f urinal dividers, out of 12 mm. thick float plain glass by "Asahi" or "Saint Gobain" or "Modi" or "Sejal" or its equivalent quality as approved by the Engineer-in-Charge, with grounding done on one face as per detail &amp; design, fixing into the wall using s. s. "d" brackets, including polishing the edges rounded as per details and design, with required installation kit, etc. complete.</b></p>
1.0.	<b>Materials :</b>
1.1.	12 mm. thick float plain glass by "Asahi" or "Saint Gobain" or "Modi" or "Sejal" or its equivalent quality as approved by the Engineer-in-Charge. The exposed edges of the glass shall be rounded and polished as per the details and design.
1.2.	The glass shall be grounded on one face as per the details and design.
1.3.	02 nos. of s. s. "d" brackets shall be used per divider to fix the divider into the wall as per the details and design at the height shown on the drawings.
2.0.	<b>Mode of measurement and payment :</b>
2.1.	The rate shall be for a unit of one no. set.
<b>Additional Specifications Item no. 30.</b>	<b>Providing &amp; fixing gas based geyser :</b>
1.0.	<b>Materials :</b>
1.1.	Providing & installing 300 – litre capacity gas based, storage type hot water geyser, as per the list of approved brands & as approved by the Engineer-in-Charge, having highest operational safety device, automatic thermostatic control valve to maintain required temperature, tank surface coated with anti-corrosive rubber paint to resist the corrosive attack of hot water chemicals, fine wool insulation, durable cast iron burner, flue baffle for maximum heat dispersion to tank water to retard air movement, with guarantee, etc. complete.
2.0.	<b>Mode of measurement and payment :</b>
2.1.	The rate shall be for a unit of one no. system.
<b>Additional Specifications Item no. 31.</b>	<p><b>Providing and fixing H.D.P.E. single wall construction one piece moulded cylindrical vertical with closed top/lid water storage tank of required capacity on all floor of approved brand ( Sintex or equivalent ) etc. complete as directed by Engineer In charge.</b></p>
	<b>Material :</b>
	Polyethylene used for manufacture of tanks and manhole lids may be low density (LDPE) of linear low density (LLDPE) and shall be compounded with carbon black soft as to make resistant to ultra violet rays from the sun. The percentage



	<p>of carbon black content in polyethylene shall be <math>2.5 \pm 0.5</math> percent and it shall be uniformly distributed.</p> <p>The Materials : used for the manufacture of tank, manhole lid and fittings shall be such that they neither contaminate the water nor impart any taste, colour, odour or purity of water.</p>
	<b>Manufacture and Finish :</b>
	<p>The tanks shall be manufactured by rotational moulding process. Each tank- and the manhole lid shall be single piece having arrangement for fixing and locking the manhole lid with tanks. Excess material at the mould partition line and near the top rim shall be neatly cut and finished. The internal and external surface of the tanks shall be smooth, clean, and free from hidden internal defects like air bubble, pit and metallic or other foreign material inclusion Capacity of the tank, minimum weight of the empty tank (without manhole lid) and the manufacture brand name shall be embossed on the top surface of the tank near manhole.</p>
	<b>Shape, Size :</b>
	<p>The tank shall be cylindrical vertical with closed top having a manhole. The diameter and height of the tank of various capacities shall be as per manufacturer's specifications and a clearance of + 3 percent shall be permitted on these dimensions.</p>
	<b>Weight and Wall Thickness :</b>
	<p>Maximum weight of the empty tank (exclusive of manhole lid and fittings) and the minimum wall thickness of top, bottom and sides shall be specified Wall thickness shall be checked beyond 150 mm of the edge where the direction the plane of tank surface changes.</p>
	<b>Installation and fittings :</b>
	<p>The flat base of the tank shall be fully supported over its whole bottom area on a durable rigid flat and level platform sufficiently strong to stand without deflection the weight of the tank when fully filled with water. Depending on the capacity and location tank, tank may be suitably anchored as per the directions of the Engineer in charge. For inlet, outlet and other connections fully threaded GI, HDPE or PVC connections with hexagonal check nuts and washers on either side of the tank wall shall be provided. Holes for threaded connections shall be drilled and not punched Pipes entering or leaving the tank shall be straight to avoid pressure on tank walls due to water.</p>
	<b>Manhole Lid:</b>
	<p>The lid shall rest evenly and tight over the rim of the manhole so as to prevent the ingress of any foreign matter into the tank.</p>
	<b>Rate:</b>
	<p>The rate shall include the cost of tank, manhole lid, carriage and delivery at the place specified, hoisting, installation on platform and anchoring. The rate shall be paid per litre basis as per actual Work done.</p>
<b>Additional Specifications Item no. 32.</b>	<b>Providing &amp; fixing open well submersible pumps in u.g. collection tank :</b>



<b>1.0.</b>	<b>Materials :</b>
<b>1.1.</b>	Providing & fixing ISI mark ISO 9001 & 14001 40 mm. / 50 mm. dia. outlet, 24.00 mts. head, 1.00 HP, three - phase open well submersible pumps, including power characteristic for safety of motor, required PVC insulated 3 - core cable up to 1.00 mt. length above top slab of U.G. tank, three - phase starter, panel board with automatic control system, etc. as per the list of approved brands & as approved by the Engineer-in-Charge, etc. complete.
<b>2.0.</b>	<b>Mode of measurement and payment :</b>
<b>2.1.</b>	The rate shall be for a unit of one no. system.
<b>Additional Specifications Item no. 33.</b>	<b>Providing &amp; fixing skylight roofing of 1.70 mm. thick polycarbonate sheets on framing of aluminium tubular sections with anodized coating :</b>
<b>1.0.</b>	<b>Materials :</b>
<b>1.1.</b>	The polycarbonate sheets shall conform to M-88. The aluminium section shall conform to M-31.
<b>2.0.</b>	<b>Workmanship :</b>
<b>2.1.</b>	Providing & applying the anodizing of 25 micron of approved make & shade, and oven backing the same at required temperature to give even shade & finish. The rate shall also include the required pre-treatment to sections such as cleaning, buffing, chromating, etc. complete as per the approval of the Architect and Engineer-in-Charge. The bidder has to submit the details of their anodizing process, by which they wish to perform the work.
<b>2.2.</b>	The frame shall be fabricated by connecting together the anodized aluminium tubular sections using metal screws as per the detailed design drawings.
<b>2.3.</b>	The framing shall be fixed to the top of the m. s. structure, using m. s. angle cleats, nuts & bolts, as specified in detailed design drawings.
<b>2.4.</b>	The skylight roof shall be prepared out of 1.70 mm. thick 'Compact' series, polycarbonate sheets in combination of clear and bronze sheets by 'Lexan' of "GE Plastic India" or approved equal quality, as per the detailed design drawings, making it watertight by using specified silicon sealant at all the joints between the sheets, also using gasket, cleats, tapping screws, etc. as required for the framing, and using special caps, washers and clamps for the sheets for the purpose of fabricating, installing and making the domes absolutely watertight.
<b>2.5.</b>	The skylight roof shall be installed in perfect line and level.
<b>3.0.</b>	<b>Mode of measurement and payment :</b>
<b>3.1.</b>	The out to out dimensions of the skylight roof shall be measured.
<b>3.2.</b>	The rate shall be for a unit of one square meter.
<b>Additional Specifications Item no. 34.</b>	<b>MODULAR STAINLESS STEEL HANDRAIL with STAINLESS STEEL PIPE :</b> Providing & fixing modular s. s. handrail with 16 gauge s. s. pipe of AISI 316 grade, as the top handrail with mitred junctions, supported by 40 mm. x 40 mm. square tube x 16 gauge s. s. balusters of AISI 316 grade, floor mounted by means of 120 mm. dia. base plate, having 04 studs in the base, with s. s. patch fittings, as per design & details, etc. complete.
<b>1.0.</b>	<b>Materials :</b>



1.1.	The relevant specifications of additional specification item no. 23 shall apply, except that instead of stainless steel wire ropes, panels of 12 mm. thick toughened / tempered float glass of "Asahi" or "Modi" or "Saint Gobain", with all the edges polished, held with s. s. patch fittings, as per design & details, shall be used.
<b>2.0.</b>	<b>Workmanship :</b>
2.1.	The relevant specifications of item no. 11.4. ( A ) shall be followed, except that the steel Work shall be replaced by stainless steel and done by welding.
<b>3.0.</b>	<b>Mode of measurement and payment :</b>
3.1.	The rate shall be for a unit of one running meter.

**Signature of the Applicant :**

**Registrar**  
**VEER NARMAD SOUTH GUJARAT UNIVERSITY.**



### 11. SCHEDULE FOR TESTING OF MATERIALS :

Sr. No.	Brief description of Materials : to be tested	Prescription of test, which shall be carried out	Frequency at which test shall be carried out (As per GERI Q.C. Vol-12002)
1.	Sand	(1) Gradation	1/150 Cmt. for concrete or as per requirement of relevant specification.
		(2) Fineness Modulus	
		(3) Specific Gravity	
		(4) Water Absorption	
		(5) Silt Content	
2.	Coarse Aggregate	(1) Gradation	1/150 Cmt. for concrete or as per requirement of relevant specification.
		(2) Impact Value	
		(3) Flakiness Index	
		(4) Water Absorption	
		(5) Stripping Value	
3.	C.C.Cube	(1) Compressive Strength	1-5 Cmt. 1-Test 6-15 Cmt. 2-Test 16-30 Cmt. 3-Test 31-50 Cmt. 4-Test 51 Cmt. & above 4 + 1 for each additional 50 Cmt. or part of thereof.
4A.	Flush Door	(1) End Immersion Test	Randomly as per IS:7638:1975
		(2) Glue Adhesion Test	
4B.	Cement Bonded Door	- As per IS:14276:1995	As per IS:
5.	Tiles	(1) Wet Transverse Strength (2) Water Absorption	Randomly as per Strength IS:4905:1968
6.	Fly ash Brick	(1) Compressive Strength	As per IS:5454:1978
		(2) Water Absorption	

**Notes :**

- (1) For Sand and Coarse aggregate, 02 nos. of full bag for one sample shall be supplied by the agency.
- (2) For water test, 5.00 liters of water shall be supplied by the agency in plastic container for each sources.
- (3) Sample from the lot shall be selected by authorized representative along with representative of Engineer-in-Charge.
- (4) Selected sample shall be handed over personally by representative of VNSGU in sealed condition with a letter containing sample no. and sampling date.
- (5) Test report shall be received by the department containing reference of department's letter, sample No. sampling date and date of testing.

**Signature of the Applicant :**

**Registrar  
VEER NARMAD SOUTH GUJARAT UNIVERSITY.**



## 12. SCHEDULE OF APPROVED MAKE FOR VARIOUS MATERIALS :

SR. NO.	ITEM DESCRIPTION	APPROVED BRANDS AND MANUFACTURERS	
		FIRST PREFERENCE	OTHERS
<b>A.</b>	<b>CIVIL WORKS :</b>		
01.	53 grade Cement. PPC/ OPC, confirming to IS 12269/87 as per latest amendments	: Ambuja, Ultratech, Sanghi, Hathi, Siddhi, J. K. Laxmi.	
02.	Fine Aggregate.	: From Tapi river from standard approved stretches, beyond tidal influence, and the material shall be as per specification.	Best locally available. Sample to be approved.
03.	Coarse Aggregate.	: Areth, Songadh.	Best locally available. Sample to be approved.
04.	Reinforcement Steel. TMT – Fe 415, Fe 500 confirming to IS 1786/85 as per latest amendments	: Tata, Sail, Rashtriya Ispat Nigam Ltd. ( RINL ), Electro Therm, Ram Swaroop.	
05.	Structural Steel.	: Tata, Sail, Rashtriya Ispat Nigam Ltd. ( RINL ).	
06.	Admixtures.	: Concure.	Perma, Fosroc, Roff as approved.
07.	Bonding agent.	: Concure.	Perma, Fosroc, Roff as approved.
08.	Plasticiser.	: Concure.	Perma, Fosroc, Roff as approved.
09.	Water Proofing Chemicals.	: Concure.	Perma, Roff, Fosroc as approved approved.
10.	Synthetic resin based WP membrane.	: Concure.	Perma, Fosroc, Roff as approved.
11.	Fibre.	: “Recron” Reliance.	Saint gobain as approved.
12.	Bricks.	: APC.	Best locally available. SZP, JBC, Amit. Sample to be approved.
13.	First quality Ceramic Tiles.	: H. & R. Johnson.	Nitco, Siddharth, Naveen, Euro, Endura, as approved.
14.	First quality Vitrified Tiles.	: H. & R. Johnson.	Nitco, Siddharth, Naveen, Euro, Endura, as approved.
15.	First quality Glazed Tiles.	: H. & R. Johnson.	Somany, Nitco as approved.
16.	Tiling Aids, Grout & Sealer.	: Bal-Endura.	Shipra, Roff as approved.
17.	Chemically treated, Moulded Panel Door.	: ‘Masonite’ by Gujcon.	Glo-door, Kalptaru as approved.
18.	Concrete Fastners an Anchor bolts.	: Fischer.	Hilti as approved.



19.	Aluminium frame Works.	:	Jindal.	National Aluminum, Banco, Hindalco as approved.
20.	Glass & Mirror.	:	Saint Gobain.	Asahi Float, Modi Guard, as approved.
21.	Plywood manufactured out of Garjan wood. .	:	Ecotec Greenply.	Anchor, Donear, Centuryply, Archidply, Kitply as approved.
22.	Fibre Cement Board.	:	Cemply.	Bison Panel Board, as approved.
23.	Hardware Fittings.	:	Everite.	Godrej, Navbharat, Chetna, Netal fold as approved.
24.	Door Closers.	:	EGL.	HardwinEverite as approved.
25.	Floor Springs.	:	Hardwin.	Omega, Everite as approved.
26.	Adhesives.	:	Fevicol SH and Araldite.	Mahacol, Vamicolm, as approved.
27.	Color coated zinc aluminium roofing sheets	:	Manaksia.	Ispat, as approved.
28.	Anti-Termite Chemical	:	VNSGU approved.	Chlorpyriphos, Lindane as approved.
29.	External acrylic emulsion paint and primer	:	ICI Dulux.	Asian Paints, Berger Paints, as approved.
30.	Textured Paint	:	Alltek.	Sterling, Walltex, Snow Decor, as approved.
<b>B.</b>	<b>PLUMBING AND SANITATION WORKS :</b>			
01.	U-PVC SWR Pipes & Fittings.	:	Supreme.	Prince, Finolex, Kisan as approved.
02.	R C C NP 2 Pipes.	:		As approved.
03.	PVC Plain threaded Pipes & Fittings.	:	Supreme.	Prince, Finolex, Kisan as approved.
04.	Chlorinated Polyvinyl Chloride CPVC pipes accordance to ASTM D 2846 and solvent cement	:	Astral.	Flowguard, as approved.
05.	Non - return Valve, Ball type.	:	Astral.	Prince, Supreme, as approved.
06.	Sanitary Fittings & Fixtures, Faucets and Sensors.	:	Jaquar.	Parryware, Aquel, Marc, as approved.
07.	Sanitary wares	:	Parryware, Johnson Padder.	Roka, Cera, Neycer, as approved.
08.	Stainless Steel Sinks	:	Parryware.	Nirali, Diamond as approved.
09.	C. I. Manhole Covers	:	Neco.	BIC, SIL, RIF as approved.
10.	C P Brass Accessories	:	Jaquar Continental.	Or its equivalent as approved.
11.	Dispensors and Dryers	:	Kimberley & Technocraft.	Toshi, as approved.
12.	Submersible Pumps	:	KSB.	Kirloskar, "CRI", Grundfoss.
13.	Open Well Submersible Pumps	:	KSB.	Kirloskar, "CRI", Grundfoss.



14.	Gas based Geysers	:	Nupur.	Spherehot, Hotfit, Warm Stream.
15.	HDPE Overhead Tanks	:	Sintex.	Reno, as approved.

**For other Materials : not mentioned above, First quality, ISI marked products shall be used after obtaining approval of Engineer-in-Charge.**

**Signature of the Appicant :**

**Registrar  
VEER NARMAD SOUTH GUJARAT UNIVERSITY.**



Item Number (upto 200 characters)	Item Description	Quantity (only figures)	UNIT (upto 50 characters)	Tender Rate ( Upto 2 Decimals )	Amount (Upto 2 Decimals)
1	<b>CIIVL &amp; ALLIED WORKS</b> : Demolition including stacking of serviceable materilas and disposal of unserviceable materials with all lead and lift. (i) R.C.C. work	3.00	Cu.m.	1047.38	3142.14
2	Demolition of Brick work and stone masonry including stacking of serviceable materilas and disposal of unserviceable materials with all lead and lift. (i) In Cement Mortar.	11.00	Cu.m.	544.95	5994.45
3	Dismantaling tiled of stone floors laid in mortar including stacking of serviceable materilas and disposal of unserviceable materials with all lead and lift.	676.00	sqm	47.25	31941.00
4	Removing and scraping of old deteriorated plaster of any thickness fromm wall / R.C.C member including stacking of serviceable material and disposal of unserviceable from site of work with all lead and lift	125.00	sqm	19.38	2422.50
5	Brick work using common burnt clay building bricks having crushing strength not less than 35 kg./Sq.Cm. in foundation and plinth in Cement Mortar 1:6. (1Cement: 6-finesand) (B) Conventional	15.00	Cu.m.	3981.21	59718.15
6	Extra for brick work in superstructure above floor two level Item No. 2(6.13) (B)Conventional	15.00	Cu.m.	39.79	596.85
7	(i) Half brick masonry in common brunt clay building bricks having crushing strength not less than 35 Kg/Sq.Cm. in Cement mortar 1:4(1-Cement : 4 -coarse sand )in foundation and plinth (B)Conventional	110.00	Sqm	593.90	65329.00
8	Extra for half brick masonry in superstructure above plinth level upto floor two level. (B) Conventional	110.00	Sqm	52.80	5808.00
9	Providing 10mm thick cement plaster in single coat on brick/concrete walls for interior plastering upto floor two level and finished even and smooth in (iii) Cement mortar 1:6 (1-cement:6-sand)	225.00	Sqm	111.20	25020.00
10	Providing 15mm thick cement plaster in single coat on Rough (Similar)side of single or half brick walls for interior plastering upto floor two level and finished even and smooth in (iii) Cement mortar 1:6 (1cement:6-sand)	50.00	Sqm	145.85	7292.50
11	Providing and laying ordinary cement concrete 1:2:4 (1- Cement 2- coarse sand : 4graded stone aggregates 20 mm nominal size) for R.C.C lintel including finishing smooth with,curing etc. complete including the cost of formwork but excluding the cost of reinforcement.	3.00	Cu.m.	8933.10	26799.30
12	Providing TMT Bar FE 500D reinforcement for R.C.C. work including bending, binding and placing in position complete upto floor two level	800.00	Kg	75.46	60368.00
13	Providing corrugated G.I. sheet of class-3 roofing fixed with glavanished iron J or L Hooks, Bolts and nuts 8mm diameter with bitumen and G.I. limpet washer or G.I.limpet washer. filled with white lead complete excluding the cost of purlins, Rafters and Trusses.(1) 0.80 mm thick sheet.	856.90	Sqm	719.93	616908.02
14	Boring holes 3.5 m deep in ordinary soil (forcast in situ piles) and getting out the soil and disposal of the surplus excavated soil as directed within a lead of 50 Meter for following diameter of pipes.(ii) 250 mm (2) 250 m.m.	12.00	Each	1290.97	15491.64
15	Providing and laying cement concrete 1:3:6(1- Cement : 3- Coarse sand : 6- Graded brick bat aggregate 40mm normal size) and curing complete excluding cost of formwork in (A) Foundation and Plinth	7.00	Cu.m.	2956.44	20695.08
16	Providing and laying controlled cement concrete M.200 and curing complete excluding the cost of formwork and reinforcement for reinforced concrete work in (A) Foundations, footings, Base or columns and Mass concrete	9.00	Cu.m.	3918.70	35268.30

17	Providing and laying controlled cement concrete M.200 exposed work with curing etc. complete including the cost of formwork but excluding the cost of reinforcement for R.C.C. work in (A) BEAMS :(ii) Having cross-sectional area more than 0.08Sq.M and upto 0.12 Sq.M	4.00	Cu.m.	9392.03	37568.12
18	Providing formwork of ordinary timberplanking so as to give a rough finish including centering shuttering strutting and propping etc. Height of propping and centering below supporting floor to ceiling not exceeding 4 M. and removal of the same for in situ reinforced concrete and plain concrete work in. (B) Flat surfaces such as soffits of supspened floors slabs Landings and the like. (1) Floors etc. upto 200 mm in thickness.	12.00	sqm	253.58	3042.96
19	Steel work welded in built up sections, framed work including cutting, hoisting, fixing in position and applying a priming coat of red lead paint. (A) in beams & joists channels angles, tees, flats with connection plates or angle cleats as in main & cross beams,hip & trussed purlins connected to common ruffers & the like.	250.00	Kg	63.93	15982.50
20	Steel work welded in built up sections, framed work including cutting, hoisting, fixing in position and applying a priming coat of red lead paint. (C) in trusses & trussed purlins upto 25m.Span &15m.Overall height.	750.00	Kg	64.74	48555.00
21	<b>INTERIOR WORK :</b> Application of Out door Texture on the surfaces of exterior walls as per Design and Selection of Architect & Engineer in - charge including Labour, Materials and Scaffolding	1021.93	sqm	392.00	400596.56
22	Providing and fixing standared extruded of alluminium section of size 63.50 x 38.10 x 1.95 mm,@ Wt 1.094Kg /Rmt with colour Powder Coated alluminium frame with 5mm thick transparent bronze colour tinted float glass as details etc complete for Fix window.	92.90	sqm	1815.14	168626.51
23	Providing & laying granite slab 18mm thick in Window-Door seal Frame Etc laid on 10mm thick cement mortar 1:4 (1 Cement : 4 Coarse sand) with nessary adhesive material and finished with flush pointing in white or colour cement, including rubbing & polishing comp..including chamfereing, grooving dhar polished as per Architects design and instruction from Engineer - in- charge.	241.55	sqm	1960.00	473438.00
24	Providing and Fixing of 12mm Glass Door with all fixtures and fitting in Black matt Powder coating fixed on floor spring complete with U profile on the edge complete as per Architects design and instruction from Engineer - in- charge	14.86	sqm	9872.75	146709.07
25	Providing and Fixing 35mm Th. Flush Door Solid double core type both face waterproof ply vennered & 1.5mm th. laminate shall be pasted on both side with adhesive as specified by the manufactures, The laminate shall be as per approved shade and texture of Make inc. fo SS hinges with nessacry screws and Anodixed aluminum fixtures and gastenings for all floor	22.30	sqm	2300.00	51290.00
26	Providing and fixing window having extruded aluminium Powder Coated (wooden pattern or as per selection by architect) section frame main outer size 63.50 x 38.10 x1.95 mm (of Jindal section no.4605, @ Wt. 1.094Kg/mt) horizontal Two track member size 61.85 mm x 31.75 mm x 1.20 mm (of jindal section no:8687, @ Wt. 0.695 Kg/mt.) vertical member of size 61.85 mm x 31.75 mm x 130 mm (of jindal section no:8758 @ wt. of 0.659 kg/mt) with sliding shutters of horizontal member size 40 mm x18 mm x 1.29 mm ( of jindal section no:8949, @ Wt. of .456 Kg/mt) vertical member of size 40 mm x 18 mm x 1.29 mm (of jindal section no:8947, @ Wt. of 0.456 Kg/mt/section 8948, @ Wt. of 0.457 Kg/mt) with 5 mm thick tranparent bronze colour tinted float glass with powder coated aluminium fittings and fixtures and transparent silicon sealant glass fixing to frame as per details etc. complete for window	153.00	sqm	2012.70	307943.10
27	Supply and Installation of Sudan Wood Pool of required shape and size with polish at any level complete as per architect selection design and drawings and instrction from Engineer-in-Charge	69.00	Pc	17000.00	1173000.00

28	Providing & laying granite slab 18mm thick in flooring, treads of steps and landing laid on bed of 20mm thick cement mortar 1:6 (1 Cement : 6 coarse sand) laid and finished with flush pointing in white or colour cement including rubbing and polishing complete including specialised work for exposed stone work, chamfering, grooving, dhar polished as per Architects design and instruction from Engineer-in- charge.	250.00	sqm	2404.00	601000.00
29	Pro. And fixing single layer water proof gypsum board 12.5 mm thick sections using water proof board of size 1220 mm x 1830 mm x 8.0 mm suspended by GI suspender channel of size 25 mm x 3 mm with intermediate channel of size 18 mm x 40mm x 0.8 mm at 1220 mm center to center ceiling section of size 40 mm x 35 mm x 0.55 mm at 457 mm c/c and perimeter channel A of size 20 mm x 27 mm x 30 mm x 0.5 mm at edges & drops incl.paper tap sand sofit cleat, anchor fastener, scotch bolt connecting cleat,joining compound top coat on ceiling incl.making necy.opening for light fitting,diffuser etc. comp. as per detail drawing as directed	464.51	sqm	600.94	279142.64
30	Providing and laying polished Kota stone slab flooring over 20mm (Average) thick base of cement mortar 1:6 (1-cement : 6coarse sand) or L.M. 1:1.5 (1-Lime putty :1.5 - coarse sand) laid over and jointed with grey cement slurry mixed with pigment to match the shade of slab including rubbing and polishing etc. complete. (A) 25mm thick	650.32	sqm	1047.38	681132.16
31	Providing and laying Vitrified tiles 8 to 10mm thick , 24" x 24" in skirting risers of steps and dedo on 10mm thick cement plaster 1:3 (1-cement : 3-coarse sand) and jointed with white cement slurry	222.97	sqm	1071.00	238800.87
32	Constructing a cooking platform 60 cm. width and 70 cm high resting on B.B.Masonry walls 23 cm.thick in C.M.(1:6) with (ii) Fixing black kadappa stone 30mm thick laid on precast R.C.C. (1:2:4) slab with plastering on exposed faces of wall in C.M. (1:4) etc complete.	21.00	Rmt	2629.76	55224.96
33	Wall painting (two coats) with plastic emulsion paint of approved brand and manufacture on undecorated wall surface to give an even shade including throughly brushing the surface free from mortar droppings and other foreign matter and sand papered smooth.	100.00	sqm	78.60	7860.00
34	Providing and fixing of Cement sheet board on wall with all material and labour with all lift and lead complete as per architectural drawings	139.41	sqm	6458.40	900365.54
35	<b>ELECTRICAL WORK</b> : Point wiring for Light / Bell with 2-1.5 sq.mm & earth wire of 1.5 sq.mm (Green) both are of ISI marked 1.1 KV grade FRLS PVC insulated multi strand copper wires up to 10 mtr length , in below type of pipe erected with 6A Modular type switch / bell push & accessories and earth continuity of following type, erected on PVC / Metallic/Wooden box, single mounting base frame covered with textured/metallic/white front plate modules erected on / in wall / ceiling as per pipe erected, with necessary Lamp holder/ceiling rose / H.D.Connector as directed. (a) with medium class Rigid PVC pipe and accessories erected flushed on wall/ceiling complete	36.00	Pt.	467.63	16834.68
36	SETC of Secondary Light Point Note:- Maximum up to 6 mtrs length, excess will be considered as Mains for Secondary Point. (f) with medium class Rigid PVC pipe and accessories erected concealed in wall/ceiling complete	71.00	Pt.	165.64	11760.44

37	Point wiring for FAN with 2-1.5 sq.mm & earth wire of 1.5 sq.mm (Green) both are of .ISI marked 1.1 KV Grade FRLS PVC insulated multi strand copper wires up to 10 mtr length, in below type of pipe erected with 6A Modular type switch and hum free EME four or more step type electronic fan regulator with separately mounted and accessories with earth continuity of following type erected on PVC / Metallic/Wooden box, single mounting base frame covered with textured/metallic/white front plate modules erected on / in wall / ceiling as per pipe erected. with necessary ceiling rose / H.D.Connector as directed. (a) with medium class Rigid PVC pipe and accessories erected flushed on wall/ceiling complete	12.00	Pt.	669.63	8035.56
38	Point wiring for Individual Plug with & earth wire of 1.5 sq.mm (Green) both are of ISI marked 1.1 KV grade FRLS PVC insulated multi strand copper wires up to 10 mtr length, in below type of pipe erected complete with Modular type switch & 5 pin Plug erected on PVC / Metallic/Wooden box covered with appropriate front plate modules erected on / in wall / ceiling as per pipe erected with following type of accessories. [I] For 6A Plug and 6 a switch with 2-1.5 sq.mm Cu. Wire from nearby switchboard/mcb db board (a) with medium class Rigid PVC pipe and accessories erected flushed on wall/ceiling complete	20.00	Pt.	496.92	9938.40
39	Do as above [II] For 16A Plug and 16 amp switch with 2-2.5 sq.mm Cu. Wire from mcb db board. (a) with medium class Rigid PVC pipe and accessories erected flushed on wall/ceiling complete	6.00	Pt.	749.42	4496.52
40	Point wiring for on board Looped Plug with 6A Modular type switch & 5 pin socket erected on PVC / Metallic/Wooden box, single mounting base frame covered with textured / metallic/white front plate modules erected on / in wall / ceiling with following type accessories	18.00	Pt.	268.66	4835.88
41	Providing following type of Modular Type Accessories mounted with PVC / metallic/Wooden box, single mounting base frame covered with textured / metallic/white front plate , modules erected with necessary connections as per site situation directed by Engineer In charge. - Cat III (3) Two Pin/RJ-11 Telephone Socket [A] For One Gang	2.00	Each	179.78	359.56
42	(4) TV Co-axial Socket outlet	2.00	Each	179.78	359.56
43	(7) Blank Plate Single	15.00	Each	28.28	424.20
44	(8) Computer RJ-45 socket	2.00	Each	179.78	359.56
45	(9) 16 Amp. SP one way switch	6.00	Each	202.00	1212.00
46	(10) 6/16Amp. Universal socket	18.00	Each	224.22	4035.96
47	Supplying & erecting 20 Amp 10 KA 'C Curve' single pole MCB with 20 Amp. Plug socket, company fabricated powder coated sheet steel enclosure erected as directed with connection. [A] Metal Clad Socket with metal clad top. Cat. III	18.00	Each	615.00	11070.00
48	Providing and erecting ISI mark Medium class RIGID PVC PIPES of following size complete to be erected on/in wall or ceiling erected with necessary PVC fittings & Junction boxes fixed with adhesive solution & Clamps with following dia of pipes, in approved manner as directed (a)20 mm	30.00	Mtr.	26.26	787.80
49	Do as above (b) 25 mm	300.00	Mtr.	36.36	10908.00
50	Do as above (c) 32 mm	200.00	Mtr.	60.60	12120.00
51	SETC of PVC Corrugated Flexible Conduit with required nos. of coupling, PVC bushes, Check-nuts etc. complete of following sizes. (1) 20 mm	50.00	Mtr.	18.18	909.00
52	(2) 25 mm	50.00	Mtr.	23.23	1161.50

53	Providing and erecting Mains with 1.1 KV grade FRLS PVC insulated ISI marked stranded Copper conductor wire in following type of pipe to be erected concealed in /flushed on wall/ceiling, with 1.5 sq. mm copper conductor FRLS PVC insulated stranded wire of green colour for earth continuity of following size (A) with medium class Rigid PVC pipe and accessories (a) 2 wire 1.5 sq. mm	330.00	Mtr.	68.68	22664.40
54	(b) 2 wire 2.5 sq. mm	200.00	Mtr.	90.90	18180.00
55	providing and erecting Mains with 1.1 KV grade FRLS PVC insulated ISI marked stranded Copper conductor wire in following type of pipe to be erected in / on wall / ceiling with 2.5 sq. mm copper conductor FRLS PVC insulated stranded wire of green colour for earth continuity of following size (A) with medium class Rigid PVC pipe and accessories (a) 2 wire 4 sq. mm	200.00	Mtr.	124.23	24846.00
56	(b) 2 wire 6 sq. mm	50.00	Mtr.	163.62	8181.00
57	(h) 4 wire 6 sq. mm	250.00	Mtr.	291.89	72972.50
58	(i) 4 wire 10 sq. mm (use earth wire of 4 sq.mm )	300.00	Mtr.	476.72	143016.00
59	SETC of Main Distribution (MDF) indoor type, back mounted frame. (a) Suitable for 10 pair	50.00	Mtr.	1119.08	55954.00
60	Providing and erecting Sheet Steel powder coated MCB distribution board flush / surface mounted fitted with busbar, neutral link, earth bar and DIN rail, Conforms to IS 8623-1 & 3, IEC 61439-1 & 3 without MCB to house appropriate nos. of MCBs.(The DBs should be used of same company of MCB to be used) suitable for (A) single phase incoming and horizontal single phase outgoing (a) single door (IP-30) (i) 4 way	1.00	Each	414.00	414.00
61	(ii) 6 way	1.00	Each	679.00	679.00
62	(iii) 8 way	1.00	Each	821.00	821.00
63	(B) three phase incoming and single phase horizontal type outgoing Per phase isolation type (PPI) (a) single door (i) 4 way	2.00	Each	1962.00	3924.00
64	(ii) 6 way	2.00	Each	2233.00	4466.00
65	(iii) 8 way	2.00	Each	2856.00	5712.00
66	Providing & erecting Approved make Ceiling Fan with double ball bearing ISI mark with Condenser 230 volt A.C.50 Hz 1200 mm sweep complete having 3 blades aluminium body and blade sets having ornamental design shanks , canopy erected with earthing. [ Make shall be approved by Engineer in Charge]	20.00	Each	2484.60	49692.00
67	Providing Fan clamp of 30 x 5 mm flat of required length & 10 mm M.S. Bolt & Nuts erected with necessary hook of 10 mm M.S. Round Bar.	20.00	Each	116.15	2323.00
68	Supplying and erecting 19 / 20 mm. nominal bore Medium Class M.S. Pipe down rod erected duly painted for fan complete with proper insulation without leakage and earthing.	20.00	Mtr.	126.25	2525.00
69	SETC of suitable M.S. louver shutter of the Exhaust fan	4.00	Each	434.30	1737.20
70	Supplying & erecting single phase approved make industrial exhaust fan suitable for medium duty ring mounted low noise operation suitable for medium duty having following dia size and maximum speed in RPM [E] 450 mm dia 1400 RPM	8.00	Each	4600.00	36800.00
71	Supplying and erecting led lamps with following wattage capacity of 220 to 240 voltage, minimum 15000 burning hours life, 500 V in built-surge protection,Polycarbonate diffuser, mounting suitable for E14 / E27 / B22 lamp holders, pf >= 0.5 (iv) 16 to 20 watts CAT III	100.00	Each	335.00	33500.00
72	(v) 21 to 30 watts CAT III	11.00	Each	525.00	5775.00

73	Supplying and erecting LED street light / Flood light fittings with High power White LEDs wattage of 3 Watt and above assembled on single MCPCB, efficiency more than 130 lm/w and corrosion free High pressure die cast aluminium housing with smooth finish powder coated and heat sink extruded aluminium with diffuser and Polycarbonate optics/ lenses with company mark/name engraved or embossed 160 to 270 V, Power Factor more than 0.95, THD < 10 %, CCT 3000 K to 5700K, Uniformity ratio >0.45, Luminaire efficacy > 100 lumens/watt . LED driver efficiency > 85 %.( fittings required LM-79 & LM-80 certificates)(NOTE: Below description have shown ranges of Wattage capacity of LED fittings.The Engineer incharge may select any wattage capacity between the ranges shown.) (iii) above 24 to 36 watts CAT III	4.00	Each	2840.00	11360.00
74	Miniature circuit breaker single pole 6A to 32A suitable to operate on 240 V A.C. system C Curve and having breaking capacity 10 KA to be erected in existing box. confirming to IS 8828/1996 with ISI Mark Cat. III	30.00	Each	131.30	3939.00
75	Providing & erecting 240 V MCB double pole switch for motor & inductive load (C Curve) having 10 KA breaking capacity & confirms to	1.00	Each	328.25	328.25
76	Providing & erecting 415 V MCB Four Pole for Motor & Inductive Load (C Curve) having 10KA breaking capacity & confirms to IS :8828 in	1.00	Each	681.75	681.75
77	Providing & erecting 415 V MCB Four Pole for Motor & Inductive Load (C Curve) having 10KA breaking capacity & confirms to IS :8828 in existing box having following capacity (b)63 Amp. Cat. III	14.00	Each	868.60	12160.40
78	Providing and erecting Sheet Steel powder coated MCB distribution board flush / surface mounted fitted with busbar, neutral link, earth bar and DIN rail, Conforms to IS 8623-1 & 3, IEC 61439-1 & 3 without MCB to house appropriate nos. of MCBs.(The DBs should be used of same company of MCB to be used) suitable for (A) single phase incoming and horizontal single phase outgoing (i) 4 way	1.00	Each	418.14	418.14
79	<b>HVAC Works : INDOOR Split unit :</b> Providing and erecting Inverter based approved make split air-conditioning unit consisting of condensing unit with variable speed fan motor, inverter type hermetically sealed rotary compressor with accessories etc. duly connected separately erected evaporating unit and blower motor with its accessories by means of extra supplied proper insulated copper tubing, drain PVC pipes suitable for ( cost includes Eco Friendly green gas charging and 15A plug top & Remote Control & MS Stand) with necessary core cutting. (1)For 3 Star Rating of current year. (D) for 2.2 to 2.5 ton capacity- Premium Cat.	26.00	Each	105930.00	2754180.00
80	Copper Refrigerant Piping : NOTE:- 1)The Copper Piping & Piping Circuit should be with Minimum Number of joints, which shall be attained by : (1) Using One End Expanded Tubes (2) Bending the tubes instead of using elbow joints wherever 90 degree bending is required. (3) Piping should be routed at site in such a manner, that brazed joints in the refrigeration piping are kept to a minimum. (4) The makes of tube fittings shall be same as that of tubes. (5) The thickness of fittings used shall be same as that of the pipe. Supplying & erecting single phase approved make industrial exhaust fan suitable for medium duty ring mounted low noise operation suitable for medium duty having following dia size and maximum speed in RPM [E] 450 mm dia 1400 RPM CAT III	10.00	Each	4600.00	46000.00
81	Providing suitable M.S. louver shutter of the Exhaust fan.	10.00	Each	430.00	4300.00

82	Supplying & erecting electro galvanised G.I. wire micro mesh jali cover of grade 304 required size with suitable wooden frame duly fitted in wall outside of exhaust fan for insect protection.	3.00	Sqmtr	680.00	2040.00
83	Providing recess in wall or window frame suitable for erection of Exhaust fan complete with plastering and colour washing to match the colour of the wall or window complete with expanded metal in order to render the fitting in accessible and the room water-proof.	10.00	Each	220.00	2200.00
84	Providing window frame suitable for erection of Exhaust fan complete covering the remaining portion of window with 15 mm. thick plywood and colour washing to match the colour of the wall.	10.00	Each	200.00	2000.00
85	<b>PLUMBING &amp; SANITARY WORKS</b> : Supply installation, fixing and testing of PVC pipe 10 kgf/sqcm 110 mm dia	40.00	Rmt	245.00	9800.00
86	Supply installation, fixing and testing of Nahi trap	12.00	Each	70.00	840.00
87	Supply installation, fixing and testing of chromium plated brass bib tap 15 mm dia.	12.00	Each	468.00	5616.00
88	Concealed cock 15 mm Heavy duty with cap	2.00	Nos.	574.00	1148.00
89	Supply installation, fixing and testing of CPVC SDR 13.5 -15 mm	45.00	Rmt.	46.00	2070.00
90	Supply installation, fixing and testing of CPVC SDR 13.5 -32 mm diameter	120.00	Rmt.	149.00	17880.00
91	Providing and fixing kitchen ss sink glosy ASIS 304 grade x 1 mm thick with over all size 610 x 460 mm bowl size 560 x 410 x 200	2.00	Nos.	1800.00	3600.00
92	Supply installation, fixing and testing of CPVC SDR 13.5 -32 mm diameter	30.00	Rmt.	149.00	4470.00
93	Providing and fixing rubber plug for sink or wash basin	10.00	Nos.	19.20	192.00
94	Providing and fixing chromium plated bottle trap with necessary coupling of approved quality for wash basin	10.00	Each	318.00	3180.00
95	Flat back wash basin color glaxed 630 x 510 size	10.00	Each	1365.00	13650.00
96	Waste pipe for wash basin CP 40 mm dia	10.00	Each	82.00	820.00
97	Water cooler	2.00	Each	150000.00	300000.00
98	RO unit for kitchen	1.00	Each	200000.00	200000.00
<b>TOTAL AMOUNT</b>					<b>10569737.17</b>
<b>ADD : Applicable GST @ 18%</b>					<b>1902552.69</b>
<b>GROSS TOTAL AMOUNT :</b>					<b>12472289.86</b>