# VEER NARMAD SOUTH GUJRAT UNIVERSITY

## STANDARD BIDDING DOCUMENT PROCUREMENT

## OF CIVIL WORKS

# COMPLETE BIDDING DOCUMENT

## Name of work : - RENOVATION OF EXAM & ASSESSMENT BUILDING

## AT

## VEER NARMAD SOUTH GUJARAT UNIVERSITY

## SURAT

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# INVITATION FOR BID

# (IFB)

# VEER NARMAD SOUTH GUJARAT UNIVERSITY
# UDHNA - MAGDALLA ROAD, SURAT.

## E-TENDER NOTICE

Tenders for the works given below are invited from the Experienced Government registered contractors. Tenders are invited for the following works through online process on **https:// tender.nprocure.com**

**1. TENDER FOR RENOVATION OF EXAM & ASSESSMENT BUILDING (PM-USHA SCHEME)**

| | | | |
|---|---|---|---|
| 1.) | Estimated Amount (Rs.) | : | 1,47,96,420=49 (Excluding GST) |
| 2.) | Earnest Money Deposit (Rs.) | : | 1,48,500=00 |
| 3.) | Tender Fee (Rs.) | : | 4,248=00 (3,600.00 Tender Fee + 648.00 GST) |
| 4.) | Time Limit | : | 11 Months |
| 5.) | Registration Class | : | "C" Class & Above |

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

| | | |
|---|---|---|
| 1 | Date & Time of Downloading of tender documents | Dt. 01-11-2026 to Dt.16-11-2026 up to 18.00 hrs. |
| 2 | Last Date & Time of online Submission of offer form / price bid | Dt. 16-11-2026 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. | Dt.16-11-2026 to Dt. 27-11-2026 on working days. |
| 4 | Opening of offer form / price bid (on line) | Dt.30-11-2026 up to 11.00 hrs. onwards if possible. |

Note : Tender Fee will be accepted in DD only & for Bid Security (EMD) in form of DD / FDR / Bank Guarantee. 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.

**UNIVERSITY ENGINEER**
**VEER NARMAD SOUTH GUJARAT UNIVERSITY**

**NATIONAL COMPETITIVE BIDDING**

# E-TENDER NOTICE

1. The Veer Narmad South Gujrat University,Surat invites bids for the construction of works detailed in the table. The bidders may submit bids for any or all of the following works.

## TABLE

| Package No. | Name of work | Approximate value of Works (Rs.) | Bid security (EMD) (Rs.) | Cost of document | Period of completion | Class of Registration/ Category of contactor if required |
|---|---|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| **1** | **Renovation of Exam & Assessment Building at Veer Narmad South Gujarat University, Udhna-Magdalla Road, Surat.** | 1,47,96,420=49 (Excluding GST) | 1,48,500=00 | 4,248=00 (3,600.00 Tender Fee + 648.00 GST) | **11 Months** | **"C" Class & Above** |

2. Prospective / Interested bidder may download the Bid Documents from website https://www.tender.nprocure.com free of cost till the Time and Date as mentioned on online NIT at website https://www.tender.nprocure.com.
3. However, Bidder who is submitting the Bid Online will have to pay the Bid Document Fee / Tender Fee through Demand Draft only of any Schedule Bank payable at Veer Narmad South Gujrat University, Surat and in favour of '**Registrar, Veer Narmad South Gujarat University, Surat'.** Once the Bid is received online, Bid Document / Tender Fee will not be refundable.
   The Demand Draft for Bid Document / Tender fee and FDR / Bank Guarantee against Bid Security / EMD shall be submitted in electronic format through online (by scanning) while uploading the bid, this submission shall mean that bid document / tender fee and Bid Security / EMD has been received. Accordingly, the offer of only those shall be opened whose Bid Document / Tender Fee and Bid Security / EMD have been received electronically. However, for the purpose of realization of Demand Draft, and FDR / Bank Guarantee bidder shall send the same in original through R.P.A.D. so as to reach to Registrar, Veer Narmad South Gujarat University, Surat within 7 Days from the last day of bid submission.
   Penetrative action for not submitting Demand Draft / FDR / Bank Guarantee in original to Executive Engineer / Tender Inviting Authority by bidder shall be initiated.
4. Bids received online, will be opened on the time, date and place as specified in the online NIT at website https://www.tender.nprocure.com in the presence of the bidders or their authorized representatives, who wish to remain present.
   If the office happens to be closed on the day of opening of the bids as specified, the bids will be opened on the next working day at the same time and venue.
5. A pre bid meeting will be held on at the office of Registrar, Vnsgu , Udhna Magdalla Road, Surat to clarify the issues and to answer questions on any matter that may be raised at that stage as stated in clause 9.2 of 'instructions to Bidders' of the bidding documents. if required.
6. #Bid Security (EMD) is equal to 1% of Estimated Amount put to bid / tender and should be rounded off to the next thousand rupees.
7. Other Information is as under:

A. Agencies can prepare and edit their offers a number of times before the end of the tender submission date and time. After the tender submission date and time, the bidder cannot modify / edit / withdraw their submitted offer in any case. No written or online request in this regard shall be granted.

B. Offers in physical form will not be accepted in any case.

C. Demand Draft purchased by the other then bidder and issued after the last date of submission of Bids, will not be considered or accepted.

D. The cost incurred by the contractor for this offer for clarification or attending discussion,

conferences or site visits will not be reimbursed by the Employer or Engineer-in-Charge.

E. Conditional tender shall not be accepted.

F. Any changes, addition, alternation made in the prescribed form attached with tender are liable to be rejected.

G. Any change in format or conditional Bank Guarantee will not be accepted and the bidder will be considered non-responsive.

H. All the bidders are instructed to fill in information strictly in accordance with the format given in the checklist /qualification document / tender document.

I. It is mandatory for the bidders to supply each and every information as asked strictly in electronic format at appropriate places only.

J. Blank / insufficient information shall be treated as nil information and shall result in disqualification.

K. Even if the bidder has been qualified in a similar or larger size of project in the past, it shall not be deemed to be a ground / reason for not giving required information for this work / bid.

L. Information supplied for earlier projects shall not be considered while evaluation of this bid. The Government will not ask for any other information, unless it is found absolutely necessary by the competent authority.

M. If found necessary, the contractor will be intimated for negotiation,

# **For the works costing up to 7.5 crore (ROAD), 7.0 crore (BUILDING & BRIDGE) kindly refer to SSR-10-2015-17-C dated 03-02-2017**

For the works costing under 7.5 crore for Road Works and 7.0 crore for Building and Bridge Works following documents shall be submitted in electronic format only through online by scanning and the (i) Bid Document Fee / Tender Fee (ii) Bid Security / EMD should be sent in original to the Tender opening authority through RPAD, so as to reach the Registrar, VNSGU, Surat within 7 days from last day of submission of Bid.

(i) Bid Document Fee / Tender Fee
(ii) Bid Security / EMD or Valid EMD Exemption Certificate of Appropriate Class of Registration of Approved Contractors
(iii) Registration Certificate of Appropriate Class- "C" Class & Above.
(iv) GST Number
(v) Pan Card Number
(vi) Work Experience
(i) Civil Construction Work RCC Frame Structure (40 percentage of estimated cost with considering estimated cost of Rs. 1,47,96,420=49) (Valid Form 3(a) must be scanned)
(vii) Annual Turn Over Certificate
1. Achieved a minimum annual financial turnover completed in all classes of civil construction work in any one year over the last Five financial years of the Annual Value of contract / contracts. Annual Turn Over of any one of the last five financial years. i.e. from 2021-22 to 2025-26 updated to current financial year shall be Value of minimum Rs. 74,00,002=00 (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) | 2026-27 | 1.0 |
| 2 | -1 | 2025-26 | 1.1 |
| 3 | -2 | 2024-25 | 1.21 |
| 4 | -3 | 2023-24 | 1.33 |
| 5 | -4 | 2022-23 | 1.46 |
| 6 | -5 | 2021-22 | 1.61 |

(viii) Declaration of Litigation History

**SET OF DOCUMENTS TO QUALIFY THE APPLICANT / CONTRACTOR :**

**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. | **VEER NARMAD SOUTH GUJARAT UNIVERSITY** reserves the right to accept or reject any one or all of the offers / tenders without giving any reasons thereof. |
| G. | **VEER NARMAD SOUTH GUJARAT UNIVERSITY** reserves the right to restrict the list of qualified applicants to any number deemed suitable by it. Decision of the **VEER NARMAD SOUTH GUJARAT UNIVERSITY** 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 "Project Management Consultancy" 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**

**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**

## MEMORANDUM :

| | | | |
|---|---|---|---|
| (1) | **General Description of the Work** | : | **Renovation of Exam & Assessment Building at Veer Narmad South Gujarat University,** Udhna-Magdalla Road, Surat. |
| (2) | **Estimated Cost** | : | **Rs.** 1,47,96,420=49 |
| (3) | **Earnest Money Deposit** | : | **Rs. 1,48,500=00** |
| **(4)** | **Security Deposit** | | |
| | **(i) Initial Security Deposit** | : | **5% of the Tender Value** |
| | **(ii) To be deducted from R. A. Bills** | : | **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** | : | 11 months, including monsoon. |
| (6) | **Defect Liability Period** | : | For original building works the defect liability period will be 4 Year or elapse of 04 monsoon period following date of possession of building taken over by user agency following the certified date of completion, whichever is later. For the purpose of deciding the monsoon period, the 30th September shall be treated as the date. |
| **(7)** | **Construction Cess will be deducted from the bill Amount** | **:-** | **1% OF TOTAL BILL AMOUNT** |
| **(8)** | **Water charges deducted from the bill amount** | **:-** | **1% of Bill Amount (Only applicable when water supply provide by University. Water charge not applicable in case of University not provide Water, in this circumstance contractor must be arrange sweet water.)** |
| **(9)** | **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-charg. All the charges for the Transport 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 R & B Department rules OR directed by Engineer-in-charrg. OR 1% charge deducted from the bill amount.** |
| **(10)** | **TAXES AND DUTIES** | **:-** | **The Tenderer must understand clearly the Rate / Price quoted with considering all Taxes. & Applicable GST paid separately by University. 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.** |

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

**ELIGIBILITY / TECHNICAL PROPOSAL**

Eligibility Criteria of **Renovation of Exam & Assessment Building** at VNSGU

**The Bidder must submit the following documents in Scene in E Format & Physical copy for minimum eligibility criteria.**

1. Registration Certificate – "C" Class & Above
2. PAN Number
3. GST Registration No.
4. Tender Fee – DD of 4,248=00 (3,600.00 Tender Fee + 648.00 GST)
5. EMD – DD / FDR / Bank Guarantee of Rs. 1,48,500=00
6. Experience Certificate :

   Experience in successfully completing or substantially completing at least one contract of Civil Construction Work RCC Frame Structure works of 40 % the value of proposed contract within the last five years. (with considering approximate Estimated cost of Rs. 1,47,96,420=49)
7. Annual Turn Over :
   1. Achieved a minimum annual financial turnover completed in all classes of civil construction work in any one year over the last Five financial years of the Annual Value of contract / contracts. Annual Turn Over of any one of the last five financial years. i.e. from 2021-22 to 2025-26 updated to current financial year shall be Value of minimum Rs. 74,00,002.00 (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) | 2026-27 | 1.0 |
| 2 | -1 | 2025-26 | 1.1 |
| 3 | -2 | 2024-25 | 1.21 |
| 4 | -3 | 2023-24 | 1.33 |
| 5 | -4 | 2022-23 | 1.46 |
| 6 | -5 | 2021-22 | 1.61 |

8. Declaration of Litigation History

Date : **Seal & Signature of the Contractor**

## SECTION - 1

# INSTRUCTIONS TO BIDDERS

# (ITB)

# Instructions to Bidders

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## A. GENERAL

**SCOPE OF TENDER :**

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

| Sr. No. | Name of the Work | Total estimated cost including Steel & Cement Rs. | Period of completion |
|---|---|---|---|
| 01. | **Renovation of Exam & Assessment Building at Veer Narmad South Gujarat University,** Udhna-Magdalla Road, Surat. RCC, Brick Masonary, Cement Plaster, Finishing Item, Plumbing, Sanatory, Electrification. Fire Fighting System, RCC frame Structure, Building construction related all Items. | 1,47,96,420=49 | **11 Months** |

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

### 1. Scope of Bid

1.1 The Employer (Named in Appendix to ITB) invites bids for the Construction of works (as defined in these documents and referred to as 'the works") detailed in the table given in IFB. The bidders may submit bids for any or all of the works detailed in the table given in IFB.

1.2 The successful bidder will be expected to complete the works by the intended completion date specified in the Contract data.

1.3 Throughout these bidding documents, the terms 'bid' and 'tender' and their derivatives (bidder/ tenderer, bid / tender, bidding/ tendering, etc.) are synonymous.

### 2. Source of Funds

2.1 The expenditure on this project will be met from the budget of Govt. of Gujarat / Govt. of India for centrally sponsored projects.

### 3. Eligible Bidders

3.1 This Invitation for Bids is open to all eligible bidders.

3.2 All bidders shall provide in Section 2, Forms of Bid and Qualification Information, a statement that the Bidder is neither associated, nor has been associated, directly or indirectly, with the consultant or any other entity that has prepared the design, specifications, and other documents for the Project or being proposed as Project Manager for the Contract. A firm that has been engaged by the Employer to provide consulting services for the preparation or supervision of the works, and any of its affiliates, shall not be eligible to bid.

## 4. Qualification of the Bidder

4.1 All bidders shall provide in Section 2, Forms of Bid and Qualification Information, a preliminary description of the proposed work method and schedule, including drawings and charts, as necessary. The proposed methodology should include a program of construction backed with equipment planning and deployment duly supported with broad calculations and quality assurance procedures proposed to be adopted justifying their capability of execution and completion of work as per technical specifications, within stipulated period of completion.

4.2 Deleted

4.3 Deleted

4.4 Deleted

**#4.5 QUALIFICATION CRITERIA:**
**(Applicable for the works which require Post Qualification)**

**4.5.1** Qualification will be based on Applicant's meeting all the following minimum pass/ fail criteria regarding the Applicant's general and particular experience, personnel and equipment capabilities and financial positions, as demonstrated by the applicant's responses in the forms attached to the letter of application ( specified requirement for joint ventures are given under para 4.6 below ) Subcontractors experience and resources shall not be taken in to account in determining the applicants compliance with the qualifying criteria

To qualify for more than one contract, the applicant must demonstrate having experience and resources sufficient to meet the aggregate of the qualification criteria for each contract given in paragraphs 4.5.4, 4.5.5 and 4.5.9 below

**4.5.2 Base year and Escalation**

The base year shall be taken as Current financial year

Following enhancement factors will be used for the costs of works executed and the financial figure to a common base value for works completed in India.

| Year | Financial Year | Multiplying factor |
|---|---|---|
| Base year of inviting tender | 2026-2027 | 1.00 |
| -1 | 2025-2026 | 1.10 |
| -2 | 2024-2025 | 1.21 |
| -3 | 2023-2024 | 1.33 |
| -4 | 2022-2023 | 1.46 |
| -5 | 2021-2022 | 1.61 |

Applicant should indicate actual figures of costs and amount for the works executed by them without accounting for the above-mentioned factors.

In case the financial figures and value of completed works are in foreign currency the above enhanced multiplying factors will not be applied. Instead, the current market exchange rate (State Bank of India BC Selling rate as on the last date of submission of the bid) will be applied for the purpose of conversion of the amount in foreign currency into India rupees.

**4.5.3. General Experience.**

The Applicant shall meet with the following minimum criteria:

(a) Achieved a minimum annual financial turnover (defined as billing for works in progress and completed in all classes of civil construction works only) in any one year, over the last five years (2021-22 to 2025-26) of the annual value of contract / contracts applied for.

(b) Experience in successfully completing or substantially completing at least one contract of Civil Construction Work RCC Frame Structure works of 40% the value of proposed contract within the last five years. (with considering approximate Estimated cost of Rs. 1,47,96,420=49)

The works may have been executed by the applicant as prime contractor or as a member of a joint venture or as a nominated sub-contractor. As subcontractor, he should have acquired the experience of execution of all major items of works under the proposed contract. In case a project has been executed by a joint venture, weight towards experience of the project would be given to each joint venture in proportion to their financial participation in the joint venture.

Substantially completed works means those works which are at least 90 % completed as on the date of submission (i.e. gross value of work done up to the last date of submission is 90 % or more of the original contract price) and continuing satisfactorily.

For these, a certificate from the employers shall be submitted along with the application incorporating clearly the name of the work, contract value, billing amount, date of commencement of works, satisfactory performance of the contractor and any other relevant information.

**4.5.4 ~~Personnel Capabilities.~~**

~~Availability for his work of personnel with adequate experience as required; as per Appendix.~~

**~~4.5.5 Equipment Capabilities~~**

~~Based on the studies carried out by the Engineer, the minimum suggested major equipment to attain the completion of works in accordance with the prescribed construction schedule are shown in the Appendix.~~

~~The bidders should, however, undertake their own studies and furnish with their bid, a detailed construction planning and methodology supported with layout and necessary drawings and calculations to allow the employer to review their proposals. The numbers, types and capacities of each plant/equipment shall be shown in the proposals along with the cycle time for each operation for the given production capacity to match the requirements.~~

**~~4.5.6 Financial Position~~**

~~The Applicant should give undertaking that he has access to, or has available, liquid assets (aggregate of working capital, cash in hand and uncommitted bank guarantees) and / or credit facilities up to 25 percent of the value of the contract / contracts applied.~~

4.5.7 The audited balance sheets for the last five years should be submitted, which must demonstrate the soundness of the applicant's financial position, showing long – term profitability including an estimated financial projection for the next two years If necessary, the employer will make inquiries with the applicant's bankers.

### 4.5.8 Litigation History

The Applicant should provide accurate information on any litigation or arbitration resulting from contracts completed or under execution by him over the last five years. A consistent history of awards against the Applicant or any partner of a joint venture may result in failure of the applicant.

### 4.5.9 Disqualification

Even though the applicants meet the above criteria, they are subject to be disqualified if they have:

Made misleading or false representation in the forms, statements submitted, and / or Record of poor performance such as abandoning the work, rescinding of contract for which the reasons are attributable to the non – performance of the contractor; consistent history of litigation awarded against the applicant or financial failure due to bankruptcy. The rescinding of contract of a joint venture on account of reasons other than non – performance, such as Most Experienced partner of joint venture pulling out, court directions leading to breaking up of a joint venture before the start of work, which are not attributable to the poor performance of the contractor will, however, not affect the qualification of the individual partners.

### #4.6 JOINT VENTURE: (Maximum 3 Members i.e. 1 Lead & 2 Others) (Applicable only for estimated project cost of 50 Crore and above)

**4.6.1.** Joint ventures must comply with the following requirement:

(a) Following are the minimum qualification requirements:

(i) The lead partner shall meet not less than 50 percent of all criteria given in para

**4.5.1** & 4.5.6 above. The joint venture must collectively satisfy the criteria of para

4.5.3 & 4.5.6 above. The experience of the other joint venture partners shall be considered if it is not less than 30 percent of the qualifying criteria in para 4.5.3 & 4.5.6 above.

(ii) Individually each member must satisfy the requirements of para 4.5.7 & 4.5.8 above.

(b) Bid shall be signed so as to legally bind all partners, jointly and severally, and shall be submitted with a copy of the joint venture agreement providing the joint and several liabilities with respect to the contract.

**4.6.2.** Qualification of a joint venture does not necessarily qualify any of its partners individually or as a partner in any other joint venture. In case dissolution of a joint venture, each one of the constituent firms may qualify if they meet all the qualification requirements, subject to the written approval of the Employer.

~~**4.7. Bid Capacity. (if required)**~~

~~Applicants who meet the minimum qualification criteria will be qualified only if their available bid capacity at the expected time of bidding is more than the total estimated cost of the works. The available bid capacity will be calculated as under:~~

~~**Assessed Available Bid Capacity = (2*A*N-B), where**~~

~~A = Maximum value of work executed in any one year during the last five years (updated to the price level of the year indicated in appendix) taking into account the completed as well as works in Progress.~~

~~B = Value at current price level of the existing commitments and ongoing works to be completed during the next ; and~~

~~N = Number of years prescribed for completion of the works for which the bids are invited.~~

~~**Note :- In Case of joint venture, the available bid capacity will be applied for each partner to the extent of his proposed participation in the execution of the work.**~~

**4.8 Even though the bidders meet the above qualifying criteria, they are subject to be disqualified if they have:**

- Made misleading or false representation in the forms, statements and Attachments the submitted in proof the qualification requirements; and / or
- Record of poor performance such as abandoning the works, not properly completing the contract, inordinate delay in completion, litigation history, or financial failures etc.; and/ or
- Participated in the previous bidding for the same work and had quoted unreasonably high bid prices and could not furnish rational justification to the employer.

## 5. One bid per bidder

5.1. Each bidder shall submit only one bid for one package. A bidder who submits or participates in more than one bid (other than as a subcontractor or in cases of alternatives that have been permitted or requested) will cause all the proposals with the bidder's participation to be disqualified.

## 6. Cost of Bidding

6.1. The bidder shall bear all costs associated with the preparation and submission of his Bid, and the Employer will in no case be responsible and liable for those costs.

## 7. Site Visit

7.1. The Bidder, at the Bidder's own responsibility and risk is encouraged to visit and examine the Site of work and its surrounding and obtain all information that may be necessary for preparing the Bid and entering into a contract for construction of the Works.

The costs of visiting the site shall be at the Bidder's own expense.

## B. BIDDING DOCUMENTS

### 8. Content of Bidding Documents

8.1 The set of bidding documents comprises the documents listed below and addenda issued in accordance with Clause 10:

| Section | Particulars | Volume No. |
|---|---|---|
| - | Invitation for Bids | I |
| 1 | Instructions to Bidders | |
| 2 | Qualification Information, and other forms | |
| 3 | Conditions of Contract | |
| 4 | Contract Data | |
| 5 | Technical Specifications | II |
| 6 | Form of Bid | III |
| 7 | Bill of Quantities | |
| 8 | Securities and other forms | |
| 9 | Drawings | IV |
| 10 | Documents to be furnished by bidder | V |

8.2. Volumes I, II, III and IV are available online and documents to be furnished by the bidder in compliance to section 2 will be prepared by him and furnished as Volume- V in two parts (refer clause 12).

8.3. The bidder is expected to examine carefully all instructions, conditions of contract, contract data, forms, terms, technical specifications, bill of quantities, forms, Annexes and drawings in the Bid Document. Failure to comply with the requirements of Bid Documents shall be at the bidder's own risk. **Pursuant to clause 26 here of**, bids which are not substantially responsive to the requirements of the Bid Documents shall be rejected.

### 9. Clarification Bidding Documents

9.1 A prospective bidder requiring any clarification of the bidding documents may notify the Employer in writing or through E-mail at the Employer's address indicated in the invitation to bid. The Employer will respond to any request for clarification which he received earlier than 15 days prior to the deadline for submission of bids. Employer's response will be published on website including a description of the enquiry but without identifying its source.

### 9.2. Pre-bid meeting

9.2.1. The bidder or his official representative is invited to attend a pre-bid meeting which will take place at the address, venue, time and date as indicated in the appendix.

9.2.2. The purpose of the meeting will be to clarify issues and to answer questions on any matter that may be raised at that stage.

9.2.3. The bidder shall be required to submit any questions in writing or e-mail to reach the Employer not later than 03 days before the meeting.

9.2.4 Minutes of the meeting, including the question raised (Without identifying the source of enquiry) and the responses given will be published without delay on the tender website i.e. www.tender.nprocure.com. Any modification of the bidding documents listed in sub-Clause 8.1 which may become necessary as a result of the pre-bid meeting shall be made by the Employer exclusively through the issue of an Addendum pursuant to Clause 10 and not through the minutes of the pre-bid meeting.

9.2.5. Non-attendance at the pre-bid meeting will not be a cause for disqualification of a bidder.

## 10. Amendment of Bidding Documents

10.1 Before the deadline for submission of bids, the Employer may modify the bidding documents by issuing addenda.

10.2. Any addendum thus issued shall be part of the bidding documents. The Employer will assume no responsibility for the same.

10.3. To give prospective bidders reasonable time in which to take an addendum into account in preparing their bids, the Employer may, at his discretion, extend as necessary the deadline for submission of bids, in accordance with Sub-Clause 20.2 below.

## B. PREPARATION OF BIDS

### 11. Language of the Bid

11.1 All documents relating to the bid shall be in the English language.

### 12. Documents Comprising the Bid

12.1. The bid be submitted by the bidder as Volume V of the bid document (refer Clause8.1) shall be in two separate parts:

**<u>Part I</u> shall be named "Technical Bid" and shall comprise**

(i) Bid Security in the form specified in Section 8

(ii) Qualification Information and supporting documents as specified in Section 2

(iii) Certificates, undertakings, affidavits as specified in Section 2

(iv) Any other information pursuant to Clause 4.5 of these instructions

(v) Undertaking that the bid shall remain valid for the period specified in Clause 15.1

**Part II shall be named "Financial Bid" and shall comprise**

(i) Form of Bid as specified in Section 6

(ii) Priced Bill of Quantities for items specified in Section 7

12.2. The Bidder shall submit the details / information pertaining to each part i.e. technical as well as financial and must be submitted online only.

12.3. Following documents will be deemed to be part of the bid.

| Section | Particulars | Volume No. |
|---|---|---|
| | **Invitation for Bids (IFB)** | |
| 1 | Instruction to Bidders | Volume I |
| 3 | Conditions of Contract | |
| 4 | Contract Data | |
| 5 | Specifications | Volume II |
| 9 | Drawings | Volume IV |

### 13. Bid Prices

13.1 The Contract shall be for the whole works as described in Sub-Clause 1.1, based on the priced Bill of Quantities submitted by the Bidder.

13.2 The bidder shall fill in rates and prices and line item total (both in figures and words) for all items of the Works described in the Bill of Quantities along with total bid price

(Both in figures and words). Items for which no rate or price is entered by the bidder will not be paid for by the Bill of Quantities.

13.3 All duties, taxes, and other levies except GST payable by the contractor under the contract, or for any other cause shall be included in the rates, prices and total Bid Price submitted by the Bidder. (GST will be paid extra)

13.4 Deleted

**13.5** The rates and prices quoted by the bidder are subject to adjustment during the performance of the Contract in accordance with the provisions of Clause 47 of the Condition of Contract **(Irrespective of the time limit and Bid Amount)**

## 14. Currencies of Bid and Payment

14.1 The unit rates and the prices quoted by the bidder shall be entirely in Indian Rupees. All payments shall be made in Indian Rupees.

## 15. Bid Validity

15.1 Bids shall remain valid for a period of not less than 90 days after the deadline date forbid submission specified in Clause 20.

15.2 In exceptional circumstances, prior to expiry of the original time limit, the Employer may request that the bidders may extend the period of validity for a specified period. A bidder may refuse the request without forfeiting his bid security. A bidder agreeing to the request will not be required or permitted to modify his bid, but will be required to extend the validity of his security for a period of the extension, and in compliance with Clause 16 in all respects.

## #16. Bid Security

16.1. The Bidder shall furnish, as part of his Bid, a Bid security in the amount as shown in column 4 of the table of IFB for this particular work. This Bid security shall be in favor of of Employer as named in Appendix and may be in one of the following forms;

a. Bank Guarantee from any scheduled Indian bank, in the format given in Volume III. **(Bank Guarantee is applicable only for Bid Estimated Amount of 01 Crore and above) and Bank** Guarantee of Schedule and Private Banks shall be considered as per GoG Finance Department's Circular No. FD/MSM/e- file/4/2025/2712/D.M.O. Date 01/04/2026 or as per their latest amendment.

b. Fixed Deposit Receipt issued by any Scheduled Indian Bank or a foreign Bank approved by the Reserve Bank of India.

**OR**

# A Valid Bid Security / EMD Exemption Certificate issued by (1) Road & Building Department or (2) Narmada Water Resources, Water Supply and Kalpsar Department of Govt of Gujarat. **Exemption Certificate is applicable only when Registration Certificate of Appropriate Class and Category of Approved Contractors is required as eligible criteria of bidder.**

16.2. Bank guarantees (and other instruments having fixed validity) issued as surety for the bid shall be valid for 45 days beyond the validity of the bid i.e. total validity of 90+45 = 135 Days

16.3. Any bid not accompanied by an acceptable Bid Security and not secured as indicated in Sub-Clauses 16.1 and 16.2 above shall be rejected by the Employer as non-responsive.

16.4. The Bid Security of unsuccessful bidders will be returned within 28 days of the end of the bid validity period specified in Sub-Clause 15.1

16.5 The Bid Security of the successful bidder will be discharged when the bidder has signed the Agreement and furnished the required Performance Security.

16.6. The bid Security may be forfeited

(a) If the Bidder withdraws the bid after Bid opening during the period of Bid validity.
(b) If the Bidder does not accept the correction of the Bid Price, if any or
(c) In the case of a successful Bidders, if the Bidder fails the specified time limit to
  (i) Sign the Agreement; or
  (ii) Furnish the requirement Performance Security.
(d) #If found necessary, the bidder will be intimated for negotiation, He will be intimated maximum three times within the validity period for negotiation, If contractor does not respond in time, his Bid Security (EMD) will be forfeited and his tender will be rejected. Punitive action will be taken on such contractors. (As per GoGR&B Dept's Gr. No. S/22/2017/6369/D, Dt.08/06/2018)

## 17. Alternative Proposals by Bidders.

17.1. Bidders shall submit offers that fully comply with the requirements of the bidding documents, including the conditions of contract (including mobilization advance or time for completion), basic technical design as indicated in the drawing and specifications. Conditional offers or alternative offers will not be considered further in the process of tender evaluation.

## 18. Format and Signing of Bid

18.1. The Bidder shall prepare documents comprising the bid as described in Clause 12 of these Instructions to bidder as the "Technical Bid "and "Financial Bid" in separate parts to be uploaded.

## D. SUBMISSION OF BIDS

**19. Deleted**

**20. Deadline for Submission of the Bids**

20.1 Complete Bids must be received online by the Employer at the tender website specified above not later than the date indicated in appendix.

20.2 The Employer may extend the deadline for submission of bids by issuing an amendment in accordance with Clause 10, in which case all right and obligation of the Employer and the bidders previously subject to the original deadline will then be subject to the new deadline.

**21 Deleted**

**22 <u>Modification and Withdrawal of Bids</u>**

22.1 Bidders may modify or withdraw their bids online before the deadline prescribed in Clause 20 or pursuant to Clause 23.

22.2 Deleted

22.3. No bid shall be modified or withdrawn after the deadline for submission of Bid.

22.4. Withdrawal or modification of a bid between the deadline for submission of bids and the expiration of the original period of bid validity specified in Clause 15.1 above or as extended pursuant to Clause 15.2 may result in the forfeiture of the Bid security pursuant to Clause 16.

# E BID OPENING AND EVALUATION

## 23 Bid Opening

23.1 The Employer will open all the Bids received including modifications made pursuant to Clause 22, in the presence of the Bidders or their representatives who choose to attend at time, date and the place specified in Appendix in the manner specified in Clauses 20 and 23.3, In the event of the specified date of Bid opening being declared holiday for the Employer, the Bids will be opened at the appointed time and location on the next working day.

23.2. Deleted.

23.3. The "Technical Bid" shall be opened. The amount, form and validity of the bid security furnished with each bid will be announced. If the bid security furnished doesnot conform to the amount and validity period as specified in the invitation for bid (ref. Column 4 and paragraph 3), and has not been furnished in the form specified in Clause 16, the technical bid will not be opened.

23.4. (i) Subject to confirmation of the bid security by the issuing Bank, the bids accompanied with valid bid security will be taken up for evaluation with respect to the Qualification information and other information furnished in part I of the bid pursuant to Clause 12.1.

(ii) If required, the bidder will be asked in writing to clarify his Qualification Documents with respect to any required clarification.

(iii) The bidders will respond in not more than 7 days of issue of the clarification letter.

(iv) Immediately (usually within 3 or 4 days), on receipt of these clarification the Evaluation Committee will finalize the list of responsive bidders whose financial bids are eligible for consideration.

23.5. Deleted

23.6 At the time of opening of "Financial Bid", the names of the bidders were found responsive in accordance with Clause 23.4(iv) will be announced. The bids of only these bidders will be opened. The responsive Bidders' names, the Bid prices, the total amount of each bid, any discount and such other details as the Employer may consider appropriate, will be announced by the Employer at the opening.

23.7 the time of opening of "Financial Bid", the names of the bidders were found responsive in accordance with Clause 23.4(iv) will be announced. The bids of only these bidders will be opened. The responsive Bidders' names, the Bid prices, the total amount of each bid, any discount, and such other details as the Employer may consider appropriate, will be announced by the Employer at the opening.

23.8 In case bids are invited for more than one package, the order for opening of the "Financial Bid" shall be in order of Estimated amount of Bids from highest to lowest.

23.9 The Employer shall prepare minutes of the Bid opening, including the information disclosed to those present in accordance with Sub-Clause 23.6.

## 24 Process to be Confidential

24.1 Information relating to the examination, clarification, evaluation, and comparison of Bids and recommendations for the award of a contract shall not be disclosed to Bidders or any other persons not officially concerned with such process until the award to the successful Bidder has been announced. Any effort by Bidder to influence the Employer's processing of Bids or award decisions may result in the rejection of his Bid.

## 25. Clarification of Financial Bids

25.1. To assist in the examination, evaluation, and comparison of Bids, the Employer may, at his discretion, ask any Bidder for clarification of his Bid, including breakdowns of unit rates. The request for clarification and the response shall be in writing or by e- mail, but no change in the price or substances of the Bid shall be sought, offered, or permitted except as required to confirm the correction of arithmetic errors discovered by the Employer in the evaluation of the Bids.

25.2 Subject to sub-clause 25.1, no Bidder shall contact the Employer on any matter relating to his Bid opening to the contract is awarded. If the Bidder wishes to bring additional information to the notice of the Employer, it should do so in writing.

25.3. Any effort by the Bidder to influence the Employer in the Employer's bid evaluation, bid comparison or contract award decision may result in the rejection of the Bidders' bid.

## 26. Examinations of Bids and Determination of Responsiveness

26.1 During the detail evaluation of "Technical Bid", the Employer will determine whether each Bid (a) meets the eligibility criteria defined in Clause 3 and 4; (b) has been properly signed; (c) is accompanied by the required securities and; (d) is substantially responsive to the requirements of the Bidding document. During the detailed evaluation of the "Financial Bid", the responsiveness of the bids will be further determined with respect to the remaining bid conditions, i.e., priced bill of quantities, technical specifications, and drawings.

26.2 A substantially responsive "Financial Bid" is one which confirms all the terms, conditions and specifications of bidding documents, without material deviation or reservation. A material deviation or reservation is one (a) which affects in any substantial way the scope, quality, or performance of the Works; (b) which limits in any substantial way, inconsistent with the Bidding documents, the Employer's rights or the Bidder's obligations under the Contract; or (c) whose rectification would affect unfairly the competitive position of other Bidders presenting substantially responsive Bids.

26.3 If a "Financial Bid" is not substantially responsive, it will be rejected by the Employer, and may not subsequently be made responsive by correction or withdrawal of the non-conforming deviation or reservation.

**27. Deleted**

**28. Deleted**

**29. Evaluation and Comparison of Financial Bids**

29.1. The Employer will evaluate and compare only the Bids determined to be substantially responsive in accordance with Sub-Clause 26.2.

29.2. Deleted.

29.3. The Employer reserves the right to accept or reject any variation or deviation. Variation and deviations and other factors, which are in excess of the requirements of the Bidding documents or otherwise result in unsolicited benefits for the Employer, shall not be taken in to account in Bid evaluation.

29.4. The estimated effect of the price adjustment conditions under Clause 47 of the Conditions of Contact, during the period of implementation of the Contract, will not be taken in to account in Bid evaluation.

29.5. If the Bid of the successful Bidder is seriously unbalanced in relation to the Engineer's estimate of the cost of work to be performed under the contract the Employer may require the Bidder to produce detailed consistency of those prices with the construction methods and schedule proposed. After evaluation of the price analyses, the Employer may require that the amount of the performance security set forth in Clause 34 be increased at the expense of the successful /bidder to a level sufficient to protect the Employer against financial loss in the event of default of the successful Bidder under the Contract.

29.6. A bid which contains several items in the bill of Quantities which are unrealistically priced low and which cannot be substantiated satisfactorily by the bidder may be rejected as non-responsive.

**30. Deleted**

## F. AWARD OF CONTRACT

### 31. Award Criteria

31.1. Subject to Clause 32, the Employer will award the contract to the Bidder whose Bid has been determined.

(i) to be substantially responsive to the Bidding documents and who has offered the lowest evaluated Bid Price; and

(ii) to be within the available bid capacity adjusted to account for his bid price which is the lowest evaluation in any of the packages opened earlier than the one consideration.

In no case, the contract shall be awarded to any bidder whose available bid capacity is less than the evaluated bid price, even if the said bid is the lowest evaluated bid. The contract will in such cases be awarded to the next lowest bidder at his evaluation bid price.

### 32. Employer's Right to Accept any Bid and to Reject any or all Bids

32.1. Notwithstanding Clause 31, the Employer reserves the right to accept or reject any Bid, and to cancel the Bidding process and reject all Bids, at any time prior to the award of contract, without thereby incurring any liability to the affected bidder or Bidder or any obligation to inform the affected Bidder or Bidders of the grounds for the Employer's action.

### 33. Notification of Award and Signing of Agreement

33.1. The Bidder whose Bid has been accepted will be notified of the award by the Employer prior to expiration of the Bid validity period by cable, telex or facsimile confirmed by registered letter. This letter (hereinafter and in the condition of contract called the "Letter of Acceptance") will state the sum that the Employer will pay the Contractor in consideration of the execution, completion, and maintenance of the Works by the Contractor as prescribed by the Contract (hereinafter and in the Contract called the "Contract Price").

33.2 The notification of award will constitute the formation of the contract, subject only to the furnishing of a performance security in accordance with the provisions of Clause.

33.3. The Agreement will incorporate all agreements between the Employer and the successful Bidder. It will be signed by the Employer and to the successful Bidder, within 28 days following the notification of award along with the Letter of Acceptance. Within 21 days of receipt, the successful Bidder will sign the Agreement and deliver it to the Employer.

33.4. Upon the furnishing by the successful Bidder of the Performance Security, the Employer will promptly notify the other Bidders that their Bids have been unsuccessful.

### 34. Performance Security / Security Deposit

34.1. (A) Within 10 (Ten) days of receipt of Letter of Acceptance, the successful Bidder shall furnish to the Employer an irrevocable and unconditional guarantee from a Bank in the form set forth in Section 8 (the "Performance Security") for an amount equal to 5% (five percent) of its Contract Price. In case of bids mentioned below, the successful Bidder, along with the Performance Security,

shall also furnish to the Authority an irrevocable and unconditional guarantee from a Bank in the same form given at Section 8 towards an Additional Performance Security (The "Additional Performance Security") for an amount calculated as under:

(a) If the Contract Price offered by the Selected Bidder is lower than 10% but up to 20% of the Estimated Project Cost, then the Additional Performance Security shall be calculated @ 20% of the difference in the (i) Estimated Project Cost (as mentioned in Bid Document) - Minus 10% of the Estimated Project Cost and (ii) Contract Price offered by the selected Bidder.

(b) If the Contract Price offered by the Selected Bidder is lower than 20% of the Estimated Project Cost, then the Additional Performance Security shall be calculated @ 30% of the difference in the (i) Estimated Project Cost (as mentioned in Bid Document) - Minus 10% of the Estimated Project Cost and (ii) Contract Price offered by the selected Bidder.

(c) This Additional Performance Security shall be treated as part of the Performance Security.

(B) The Performance Security shall be valid beyond 60(sixty) days of the Defects Liability Period and the Additional Performance Security shall be valid beyond 28 (twenty-eight) days of Project Completion Date.

34.2. If the performance security is provided by the successful Bidder in the form of a Bank Guarantee, it shall be issued either (a) at the Bidder's option, by a Nationalized/ Scheduled Indian bank or (b) by a foreign bank located in India and acceptable to the Employer. As per GoG Finance Department's Circular No. FD/MSM/e-file/4/2025/2712/D.M.O. Date 01/04/2026 or as per their latest amendment.

34.3. Failure of the successful Bidder to comply with the requirement of Sub-Clause 34.1 shall constitute sufficient grounds for cancellation of the award and forfeiture of the Bid Security.

## 35 Advance Payment and Security

35.1 The Employer will provide an Advance payment on the Contract Price as stipulated in the Conditions of Contract, subject to maximum amount, as stated in the Contract Data.

## 36. Deleted

## 37. Corrupt of Fraudulent Practices

37.1 The Employer will reject a proposal if it determines that the Bidder recommended for award has engaged in corrupt or fraudulent practices in completing for the contract in question and will declare the firm ineligible, either indefinitely or for a stated period of time, to be awarded a contract with National Highways Authority of India/ State PWD and any other agencies, if it at any time determines that the firm has engaged in corrupt or fraudulent practices in completing for the contractor, or in execution.

37.2 Furthermore, Bidders shall be aware of the provision stated in Sub- Clause 59.2 of the Conditions of Contract.

# PPENDIX TO ITB

**Clause Reference With respect to Section –I**

| | | |
|---|---|---|
| 1. | The Name of the Employer is Vnsgu, surat | [ Cl.1.1] |
| 2. | The last five years.<br>2025 – 2026<br>2024 – 2025<br>2023 – 2024<br>2021 – 2022<br>2020 – 2021 | |
| 3. | This Annual Financial Turnover Amount is Rs. 74,00,002.00 | [Cl.4.5.3 (a)] |
| 4. | Value of Work is Up to Rs. 1,47,96,420=49 | |
| 5. | Deleted | |
| 6. | ~~Liquid assets and / or availability of credit facilities~~ Rs. | [Cl.4.5.6 ] |
| 7. | Price level of the financial year 2026-2027 | [Cl. 4.5.2] |
| 8. | The pre-bid meeting will take place at Office of the VNSGU. if required | [Cl. 9.2.1] |
| 9. | The technical Bid will be opened at the office of the VNSGU, Surat. on dt as per Tender Notice detail (if possible) | |
| 10. | Address of the Employer: Registrar, Veer Narmad South Gujarat University, Udhna-Magdalla Road, Surat | |
| 11. | Deleted | |
| 12. | The bid should be submitted latest by As stated on online NIT | [Cl. 20.1 & 20.2] |
| 13. | The bid will be opened at Registrar, VNSGU, Surat As stated on online NIT | [Cl. 23.1 ] |
| 14. | The Bank Draft in favor of Registrar , Vnsgu surat | |
| 15. | Deleted | |
| 16. | Escalation factors (for the cost of works executed and financial figure to a common base value) for works completed | [Cl.4.5.2] |

| **Year** | **Financial Year** | **Multiplying factor** |
|---|---|---|
| Base year of inviting tender | 2026-2027 | 1.00 |
| -1 | 2025-2026 | 1.10 |
| -2 | 2024-2025 | 1.21 |
| -3 | 2023-2024 | 1.33 |
| -4 | 2022-2023 | 1.46 |
| -5 | 2021-2022 | 1.61 |

## #LIST OF KEY PLANT & EQUIPMENT TO BE DEPLOYED ON CONTRACT WORK

## [Reference CL. 4.5.5]

**The contractors shall also give a list of machineries in his possession and which they propose to use on the work.**

| Sr. No. | Plant or Machinery | Location | Age of Machinery (maximum 15 years) | Make | Capacity | Approximate Value | Remark |
|---|---|---|---|---|---|---|---|
| **1** | **2(a)** | **2(b)** | **3** | **4** | **5** | **6** | **7** |

**Indicative list of minimum plant & equipment to be deployed on contract work**

| Sr. No. | Type of Equipment | Minimum numbers of machinery requirement to tender |
|---|---|---|
| 1 | Tipper Trucks | 6 |
| 2 | Motor Grader | 1 |
| 3 | Dozer | 1 |
| 4 | Front and Loader | 2 |
| 5 | Smooth Wheeled Roller | 2 |
| 6 | Water Tanker | 2 |
| 7 | Tandem Roller | 1 |
| 8 | Concrete Mixers with integral Wight batching facility | 2 |

# List of Key Personnel to be deployed on Contract Work

## (Reference Cl. 4.5.4)

**# Employment of a qualified site Engineer by the Contractor.**

The Contractor shall employ full-time technically qualified staff during the execution of this work as under: -

1. Two graduate Civil Engineers and three diploma Civil Engineers when cost of the work to be executed is more than Rs.50 lakhs.
2. One graduate & two Diploma, Civil Engineers when the cost of the work to be executed is more than Rs.15 lakhs but less than Rs.50 lakhs.
3. Minimum Two Diploma Civil Engineer when the cost of work is less than Rs.15 lakhs but more than Rs.5 lakhs.
4. Minimum One Diploma Civil Engineers for the work when the cost of work to be executed is less than Rs. 5 lakhs. The Engineer so employed for the Government work must have sufficient experience to handle the work independently. Such an Engineer shall have to stay at the site of work and he shall not be entrusted with other duty except this work.

   In case the contractor or partner of the contractor firm is a Civil Graduate Engineer, Employment of a separate Engineer will not be necessary provided that the Engineer partner himself attends the execution of the work on the site.

   Within 15 days of issue of work-order the Contractor will have to furnish to the Deputy Executive Engineer-in-charge of the work the Name, Qualifications, copy of marksheet, Colour Photograph and the appointment order issued such engineers engaged for this contract work. If 15 days after issue of work order such designated Site Engineers do not resume or do not remain present on site of work, the recovery at the rate of Rs.15,000-00 per month per Engineer will be made from the bills/deposit/dues of the contractor. Such recovery shall be non-refundable.

## SECTION - 2

# QUALIFICATION INFORMATION

## QUALIFICATION INFORMATION

The information to be filled in by the Bidder in the following pages will be used for the purpose of post qualification as provided for in Clause 4 of the Instruction to Bidders. This information will not be incorporated in the Contract.

### 1. For Individual Bidders

1.1 Constitution or legal status of Bidder (Attach Copy)

Place of registration _____

Principal place of business _____

Power of attorney of signatory of Bid

(Attach)

1.2 Total value of Civil engineering constructions 2021-2022

Work performed in the last five years (in Rs. Lakhs) 2022-2023
2023-2024
2024-2025
2025-2026

~~1.3.1 Work performed by contractor.~~

| ~~Project Name~~ | ~~Name of the Employer~~ | ~~Description of work~~ | ~~Contract No.~~ | ~~Value of contract (Rs. Crore)~~ | ~~Date of issue of work order~~ | ~~Stipulated period of completion~~ | ~~Actual date of completion*~~ | ~~Remark explaining reasons for delay & work Completed~~ |
|---|---|---|---|---|---|---|---|---|
| | | | | | | | | |

~~*Attach certificate(s) from the Engineer(s)in-charge~~
~~** Immediately preceding the financial year in which bids are received.~~

#1.3.2 Quantities of work executed as prime contractor.

| Year | Name of the work | Name of the Employer | Quantity of work performed (Cum/MT) | | | | Remarks* (indicate contract Ref) |
|---|---|---|---|---|---|---|---|
| | | | Cement Concrete (Including RCC & PCC) | Masonry | Earth Works | Bituminous Work | |
| 2021-2022 | | | | | | | |
| 2022-2023 | | | | | | | |
| 2023-2024 | | | | | | | |
| 2024-2025 | | | | | | | |
| 2025-2026 | | | | | | | |

1.4 Information on Bid Capacity (works for which bids have been submitted and works which are yet to be completed) as on the date of this bid. Bid Capacity Calculation Certificate : Bid Capacity Calculation sheet provide by the Bidder (Certified by the CA if possible not mendetory)

(A) Existing commitments and on-going works:

| Description of works | Place & State | Contract No. | Name & Address of Employer | Value Contract (Rs. Cr) | Stipulated Period of Completion | Value of Works* remaining to be completed (Rs. Cr) | Anticipated of completion |
|---|---|---|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
| | | | | | | | |

*Attach certificate (s) from the Engineer(s) in-charge
** Immediately preceding the financial year in which bids are received.

1.5 Availability of key items of Contractors Equipment for carrying out the works (Ref. Clause 4.5.5). The Bidder should list all the information requested below.

| Item of Equipment | Requirement | | Availability Proposals | | | Remarks (from whom to be purchased |
|---|---|---|---|---|---|---|
| | NO | Capacity | Owned/ Leased to be procured | Nos/. Capacity | Age/ Conditions | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |

1.6 Qualifications and experience of key personnel required for administration and execution of the contract. Attach biographical data. Refer also to Sub Clause 9.1 of the Conditions of Contract.

| Position | Name | Qualification | Year of Experience (General) | Year of experience in the proposed position |
|---|---|---|---|---|
| Project Manager | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| Etc. | | | | |

1.7 Proposed sub-contract and firms involved

| Sections of the works | Value of Sub-Contractor | Sub-Contractor (Name & Address) | Experience in similar work |
|---|---|---|---|
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |

Attach copies of certificates on possession of valid license for executing water supply/ sanitary work/ building electrification works.

1.8 Financial reports for the last five years: balance sheets, profit and loss statements, auditors' reports (in case of companies/corporations), etc. List them below and attach copies.

1.9 Evidence of access to financial resources to meet the qualification requirements: cash in hand, lines of credit, etc. List them below and attach copied documents.

1.10 Name, address, and telephone, telex, and fax numbers of the Bidders bankers who may provide references if contacted by the Employer.

1.11 Information on Litigation history in which the Bidder is involved.

| Other Party (ies) | Employer | Cause of Dispute | Amount Involved | Remarks showing Present Status |
|---|---|---|---|---|
| | | | | |

~~1.12. Statement of compliance under the requirements of Sub Clause 3.2 of the instruction to Bidders. (Name of Consultant engaged for project preparations is * )~~

_____

_____

~~1.13 Proposed work method and schedule. The Bidder should attach descriptions, drawings and charts as necessary to comply with the requirements of the Bidding documents. (Refer ITB Clause 4.1)~~

~~1.14 Programme~~

~~**2. Deleted**~~

~~**3. Additional Requirements**~~

~~3.1 Bidders should provide any additional information required to fulfill the requirements of Clause 4 of the Instructions to the Bidders, if applicable.~~

~~i. Affidavit~~
~~ii. Undertaking~~

~~* Fill the name of Consultant~~

## SAMPLE FORMAT FOR EVIDENCE OF ACCESS TO OR AVAILABILITY OF CREDIT FACILITIES

(CLAUSE 4.5.6 OF ITB) BANK CERTIFICATE

This is to certify that M/s._____is a reputed company with a good financial standing.

If the contract for the work, namely_____is awarded to the above firm, we shall be able to provide overdraft/credit facilities to the extent of Rs._____to meet their working capital requirements for executing the above during the contract period.

_____

(Signature)

Name of Bank

Senior Bank Manager

Address of the Bank

# AFFIDAVIT

1. I, the undersigned, do hereby certify that all the statements made in the required attachments are true and correct.

2. The undersigned also hereby certifies that neither our firm M/s. _____ have not abandoned any work of Government of Gujarat/Government of India/any Board or Corporation under Government of Gujarat/Government of India nor any contract awarded to us for such works have been rescinded, during last five years prior to the date of this bid.

3. The undersigned hereby authorize(s) and request (s) any bank, person, firm or corporation to furnish pertinent information deemed necessary and requested by the Department to verify this statement or regarding any (our) competence and general reputation.

4. The Undersigned understands and agrees that further qualifying information may be requested, and agrees to furnish any such information at the request of the Department/ Project implementing agency.

_____

(Signed by an Authorized Officer of the Firm)

_____

Title of Officer

_____

Name of Firm

_____

Date

# UNDERTAKING

I, the undersigned do hereby undertake.....that our firm M/s .....would invest a minimum cash up to 25% of the value of the work during implementation of the contract.

_____

(Signed by an Authorized officer of the firm)

_____

Title of officer

_____

Name of firm

_____

DATE

## SECTION - 3

# CONDITIONS OF CONTRACT

# Conditions of Contract

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# CONDITIONS OF CONTRACT

## A. GENERAL.

### 1. Definitions

1.1 Terms which are defined in the Contract Data are not also defined in the Conditions of Contract but keep their defined meaning.

**Bill of Quantities** means the priced and completed Bill of Quantities forming part of the Bid

**Compensation Events** are those defined in Clause 44 hereunder

The **Completion Date** is the date of completion of the Works as certified by the Engineer in accordance with Sub Clause 55.1

The Contract is the contract between the Employer and Contractor to execute, complete and maintain the Works **till the completion of Defects Liability Period.** It consists of the documents listed in Clause 2.3 below.

The **Contract data** defines the documents and other information which comprise the Contract.

The **Contractor** is a person or corporate body whose Bid to carry out the Work has been accepted by the Employer.

The **Contractor's Bid** is the completed Bidding document submitted by the Contractor to the Employer and includes Technical and Financial Bids.

The **Contract Price** is the price stated in the Letter of Acceptance and thereafter as adjusted in accordance with the provisions of the Contract.

**Days** are calendar days: **months** are calendar months.

The **Defects Liability Period** is the period named in the Contract Data and calculated from the Completion Date.

The **Employer** is the party who will employ the Contractor to carry out the Works.

**The Engineer** is the person named in the Contract Data (or any other competent person appointed and notified to the contractor to act in replacement of the Engineer) who is responsible for supervising the Contractor, administering the Contract, certifying payments due to the Contractor, issuing and valuing Variations to the Contract, awarding extensions of time, and valuing the Compensations Events.

**Equipment** is Contractor's machinery and vehicles brought temporarily to the site to construct the Works.

The **Initial Contract Price** is the Contract Price listed in the Employer's Letter of Acceptance.

The **Intended Completion Date** is the date on which it is intended that the Contractor shall complete the Works. The Intended Completion Date is specified in the Contract Data. The Intended Completion Date may be revised only by the Engineer by issuing an extension of time.

**Materials** are all supplies, including consumables, used by the contractor for incorporation in the works.

**Plant** is any integral part of the work which is to have mechanical, electrical, electronic or chemical or biological functions.

The **Site** is the area defined as such in the Contract Data.

**Site Investigation Reports** are those which were included in the Bidding documents and are factual interpretive reports about the surface and subsurface conditions at the site.

**Specifications** means the Specifications of the works included in the Contract and any modification or addition made or approved by the Engineer.

The **Start Date** is given in the Contract Data. It is the date when the Contractor shall commence execution of the works. It does not necessarily coincide with any of the Site Possession Dates.

A **Subcontractor** is a person or corporate body who has a Contract with the Contractor to carry out a part of the work in the Contract which includes work on the Site.

**Temporary Works** are works designed, constructed, installed, and removed by the Contractor which are needed for construction or installation of the Works.

A **Variation** is an instruction given by the Engineer, which varies the Works.

The **Works** are what the Contract requires the Contractor to construct, install, and turn over to the Employer, as defined in the Contract Data.

## 2. Interpretation

2.1 In interpreting these Conditions of Contract, singular also means plural, male also means female or neuter and the other way around. Heading have no significance. Words have their normal meaning under the language of the Contract unless specifically defined. The Engineer will provide instructions clarifying queries about Conditions of Contract.

2.2 If sectional completion is specified in the Contract Data, references in the Conditions of Contract to the Works, the Completion date, and Intended Completion Date apply to any Section of the Works (other than references to the Completion Date and Intended Completion date for the whole works)

2.3 The documents forming the Contract shall be interpreted in the following order of priority

(1) Agreement
(2) Letter of Acceptance, notice to proceed with works
(3) Contractor's Bid
(4) Contract Data

(5) Conditions of Contract including Conditions of Contract
(6) Specifications
(7) Drawings
(8) Bills of quantities and
(9) Any other document listed in the Contract Data as forming part of the Contract.

**3. Language and Law**

3.1 The language of the Contract and the law governing the Contract are stated in the Contract Data.

**4. Engineers Decisions**

4.1 Except where otherwise specifically stated, the Engineer will decide contractual matters between the Employer and the Contractor in the role representing the Employer.

**5. Delegation**

5.1 The Engineer may delegate any of his duties and responsibilities to other people after notifying the Contractor and may cancel any delegation after notifying the Contractor.

**6. Communications**

6.1 Communications between parties which are referred to in the conditions are effective only when in writing. A notice shall be effective only when it is delivered (in terms of Indian Contract Act).

**7. Sub-Contracting**

**7.1** The Contractor may subcontract any portion of work, up to a limit specified in contract data, with the approval of the engineer but may not assign the Contract without the approval of the Employer in writing. Sub contracting shall not alter the Contractor's obligations. **Sub-contracting of supply or specific items of work is not allowed.**

7.2 The sub-contractor must be registered in appropriate class and category for the part of work to be subcontracted.

**8. Other Contractors**

8.1 The Contractor shall cooperate and share the Site with other contractors, public authorities, utilities and the Employer between the dates given in the Schedule of other Contractor. The Contractors shall as refer to in the Contract Data, also provide facilities and services for them as described in the Schedule. The employer may modify the schedule of other contractors and shall notify the contractor of any such modifications.

## 9. Personnel

9.1 The Contractor shall employ the key personnel named in the Schedule of Key Personnel as referred to in the Contract Data to carry out the functions stated in the Schedule or other personnel approved by the Engineer. The Engineer will approve any proposed replacement of key personnel only if their qualifications, abilities, and relevant experience are substantially equal to or better than those of the personnel listed in the Schedule.

9.2 If the engineer asks the Contractor to remove a person who is a member of the Contractor Staff or his work force stating the reasons the Contractor shall ensure that the person leaves the Site within seven days and has no further connection with the work in the Contract.

## 10 Employer's and Contractors Risks

10.1 The Employer carries the risk which these Contract states are Employer's risks, and the Contractor carries the risks which these Contracts states are Contractors risk.

## 11 Employer's Risks

11.1 The employer is responsible for the excepted risks which are (a) in so far as they directly affect the execution of the Works, the risks of war, hostilities, invasion, act of foreign enemies, rebellion, revolution, insurrection or military or usurped power, civil war, riot commotion or disorder (unless restricted to the Contractor's employees), and contamination from any nuclear fuel or nuclear waste or radioactive toxic explosive.

## 12 Contractor's Risks

12.1 All risks of loss of or damages to physical property and of personal injury and death which arise during and in consequence of the performance of the Contract other than the excepted risks are the responsibility of the Contractor.

## 13 Insurance

13.1 The Contractor shall provide, in the joint names of the Employer and the Contractor, insurance cover from the Start date to the end of the Defects Liability Period, in the amounts and deductibles stated in the Contract data for the following events which are due to the Contractor's risks:

(a) Loss of or damage to the works, Plant and materials,

(b) Loss of or damage to Equipment

(c) Loss of or damages of property (expect the Works, Plant, Materials and Equipment) in connection with the Contract; and

(d) Personal injury or death.

13.2 Policies and certificates for insurance shall be delivered by the Contractor to the Engineer for the Engineer's approval before the Start Date. All such insurance shall provide for compensation to be payable in the types and proportions of currencies required to rectify the loss or damage incurred.

13.3 If the Contractor does not provide any of the policies and certificates required, the Employer may affect the insurance which the Contractor should have provided and recover the premiums the Employer has paid from payments otherwise due to the Contractor or, if no payment is due, the payment of the premiums shall be a debt due.

13.4 Alterations to the terms of an insurance shall not be made without the approval of the Engineer.

13.5 Both parties shall comply with any conditions of the insurance policies.

## 14 Site Investigation Report

14.1 The Contractor in preparing the Bid shall rely on any site Investigation reports referred to in the Contract Data, supplemented by any information available to the Bidder.

## 15 Queries about the Contract data

15.1 The engineer will clarify queries on the Contract Data

## 16 Contractor to Construct the Works

16.1 The Contractor shall construct and install the works in accordance with the specification and Drawings.

## 17 The Works to be completed by the Intended Completion Date

17.1 The Contractor may commence execution of the Works on the Start Date and shall carry out the Works in accordance with the programme submitted by the Contractor, as updated with the approval of the Engineer, and complete them by the Intended Completion date

## 18 Approval by the Engineer

18.1 The Contractor shall submit Specifications and Drawings showing theproposed Temporary works to the Engineer, who is to approve them if they comply with the Specifications and drawings.

18.2 The Contractor shall be responsible for design of temporary works.

18.3 The Engineer's approval shall not alter the contractor responsibility for design of the Temporary works.

18.4 The Contractor shall obtain approval of third parties to the design of the Temporary works where required.

18.5 All Drawings prepared by the Contractors for the execution of the temporary or permanent work are subject to prior approval by the Engineer before their use.

## 19 Safety

19.1 The Contractor shall be responsible for the safety of all activities on the Site.

## 20 Discoveries

20.1 Anything of historical or other interest or of significant value unexpectedly discovered on the site is the property of the Employer. The contractor is to

notify the engineer of such discoveries and carry out the Engineer's instructions for dealing with them.

## 21 Possession of the Site

21.1 The Employer shall give possession of all parts of the site to the Contractor. If possession of a part is not given by the date stated in the Contract Data the Employer is deemed to have delayed the start of the relevant activities and this will be a Compensation Event.

21.2 If within 25% of the time limit of the project, 80% of possession of the site is not handed over to the Contractor, then contractor/ Employer may fore-close the contract. Contractor/Employer has to foreclose the work within 30 days after lapse of 25%-time limit and after 30 days foreclosure option will be closed.

## 22 Access to the Site

22.1 The Contractor shall allow the Engineer and any person authorized by the Engineer access to the Site, to any place where work in connection with the Contract is being carried out or is intended to be carried out and to any place where materials or plants are being manufactured/ fabricated/ assembled for the works.

## 23 Instructions

23.1 The Contractor shall carry out all instructions of the Engineer pertaining to works which comply with the applicable laws where the site is located.

23.2 The Contractor shall permit the Employer to inspect the Contractor's accounts and records relating to the performance of the Contractor and to have them audited by auditors appointed by the Employer, if so required by the Employer.

## 24 Disputes

24.1 If the Contractor is of the view that a decision taken by the Engineer was either outside the authority given to the Engineer by the Contract or that the decision was wrongly taken, the decision shall be referred to #**Superintending Engineer**(Higher Authority)within 14 days of the notification of the Engineer's decision. If the issue is not resolved, any party can refer the matter for conciliation within 15 days from the decision given bythe #Superintending Engineer.

24.2

(a) For the work up to Rs.100 Cr., if any of the parties is not satisfied with the decision of the #Superintending Engineer, both the parties have to refer to the Chief Engineer concern for the conciliation process.

(b) For the work more than Rs.100 Cr., if any of the parties is not satisfied with the decision of the #Superintending Engineer, both the parties have to refer to the #Secretary, Roads & Building Department, Government of Gujarat for the conciliation process.

If the dispute is not resolved through the conciliation process, he may refer the dispute to Gujarat Public Works Contract Dispute Arbitration Tribunal. If the Contractor fails to refer a claim / dispute to the Higher Authority within 14 days of the notification of the Engineer's decision, the Contractor shall not be entitled to any additional payment/claim if he doesn't follow the above sequence in stipulated time and he should not stop the work.

## 25 Procedure for Disputers

25.1 The arbitration shall be conducted in accordance with the arbitration procedure stated in the Special Conditions of Contract.

## 26 Deleted

## B. TIME CONTROL

### 27 Programme

27.1 Within the time stated in the Contract Data the Contractor shall submit to the Engineer for approval a Programme showing the general methods, arrangements orders, and timing for all the activities in the works along with monthly cash flow forecast.

27.2 An update of the Programme shall be a programme showing the actual progress achieved on each activity and the effect of the progress achieved on the timing of the remaining work including any changes to the sequence of the activities.

27.3 The Contractor shall submit to the Engineer, for approval an updated programme at intervals no longer than the period stated in the Contract data. If the Contractor does not submit an updated programme within this period, the Engineer may withhold the amount stated in the Contract data from the next payment after the date on which the overdue programme has been submitted.

27.4 The Engineer's approval of the programme shall not alter the Contractor's obligations. The Contractor may revise the programme and submit it to the Engineer again at any time. A revised programme is to show the effect of Variations and Compensations events.

### 28 Extension of the Intended Completion Date

28.1 The Engineer shall extend the Intended Completion Date if a compensation Event occurs or a Variation is issued which makes it impossible forcompletion to be achieved by the Intended Completion Date without the Contractor taking steps to accelerate the remaining work and which would cause the Contractor to incur additional cost.

28.2 The Engineer shall decide whether and by how much to extend the Intended Completion Date within 35 days of the Contractor asking the Engineer for a decision upon the effect of a compensation event or Variation and submitting full supporting information. If the Contractor has failed to give early warning of a delay or has failed to cooperate in dealing with a delay, the delay by this failure shall not be considered in assessing the new Intended Completion Date.

28.3 The Engineer shall within 14 days of receiving full justification from the contractor for extension of Intended Completion Date refer to the Employer his decision. The employer shall in not more than 21 days communicate to the engineer the acceptance or otherwise of the Engineer's decision. If the employer fails to give his acceptance, the Engineer shall not grant the extension and the contractor may refer the matter under Clause 24.1

### 29 Deleted

### 30 Delays Ordered by the Engineer

30.1 The Engineer may instruct the Contractor to delay the start or progress of any activity within the works.

**31. Management Meetings**

31.1 Either the Engineer or the Contractor may require the other to attend a management meeting. The business of a management meeting shall be to review the plans for remaining work and to deal with matters raised in accordance with the early warning procedure.

31.2 The Engineer shall record the business of management meetings and is to provide copies of his record to those attending the meeting and to the Employer. The responsibility of the parties for actions to be taken is to be decided by the Engineer either at the management meeting or after the management meeting and stated in writing to all who attended the meeting.

**32. Early Warning**

32.1 The Contractor is to warn the Engineer at the earliest opportunity of specific likely future events or circumstances that may adversely affect the quality of the work, increase the Contract price or delay the execution of works. The Engineer may require the contractor to provide an estimate of the expected effect of the future event or circumstance on the contract price and completion date. The estimate is to be provided by the Contractor as soon as reasonably possible.

32.2 The Contractor shall cooperate with the Engineer in making and considering proposals for how the effect of such an event or circumstance can be avoided or reduced by anyone involved in the work and in carrying out any resulting instruction of the Engineer.

## B. QUALITY CONTROL

### # 33. Identifying Defects/ Defect liability period

33.1 : Defect liability period : The contractor shall be responsible to make good and remedy at his own expense any defect which may develop or may be noticed before the period mentioned hereunder from the certified date of completion. The Engineer in charge shall give the contractor a notice in writing about the defects and the contractor shall make good the same within 15 days of receipt of the notice. In the case of failure on the part of the contractor, the Engineer- in-charge may rectify or remove or re-execute the work at the risk & cost of the contractor. The Engineer-in-charge shall be entitled to appropriate the whole or any part of the amount of security deposit towards the expenses, if any, Incurred by him in rectification, removal or re-execution. The Defects Liability period shall be as under….

~~(a) For all works costing up to Rs. 50,000 (amount put to tender), the period shall be 3 Months from the certified date of completion.~~

~~(b) For all works costing more than Rs. 50,000 and up to Rs. 1 crore (amount put tender), the period shall be 12 (Twelve) months from the certified date of completion or one monsoon, whichever is later.~~

~~(c) For major projects costing more than Rs. 1 crore, the period shall be 36 Months from the certified date of completion which should include three monsoons.~~

(d) For original building works the defect liability period will be 4 years or elapse of 4 monsoon period following date of possession of building taken over by user agency following the certified date of completion, whichever is later.
For the purpose of deciding the monsoon period, the 30th September shall be treated as the last date.
Modified vide R & B D Circular No. PAC-11-102008-2076-N dated 31/8/2009, PRCH/102013(2976) 2759-N, Dated 27/05/2013 and Circular No.TNC/10/2016/Clause 17A (Correction/(1)C Dated 12/05/2016]

33.2 Free maintenance guarantee period for works of Road/Bridge construction

(a) For resurfacing work of road free maintenance guarantee period one year from the date of completion.

(b) In case of widening of the road/strengthening of the road/bridge, the contractor shall have to give four years free maintenance guarantee from the certified date of completion. During this period the contractor shall visit the site every six months along with the concerned Section Officer / Deputy Executive Engineer and will examine the work already carried out in this contract like road work, jungle cutting, side shoulders, side gutter, road furniture, patta etc. and will prepare Km. wise inspection report duly signed by all concerned and any defect observed shall be done within 15 days by the contractor at his risk and cost as per the direction of Engineer in charge. The contractor needs to do videography of these visits andrequire to submit at the time of release of FMG. If B.T. the surface during the maintenance period of 4 years is worn out then agency shall have to provide renewal coating as per tender item as directed by the Engineer-in- charge. The amount equivalent to 5% of each running bill shall be withheld and will be released after the free maintenance guarantee period (i.e. 4 years) is over.

However, this amount shall be released against fixed deposit or bank guarantee pledged in the name of Executive Engineer after completion certificate of work is issued.

(1) The flakiness and elongation index (combined) for coarse aggregates under no circumstances shall exceed the allowable limit set forth in the relevant clause for the material in question.

(2) 2% of the amount eligible for the payment of bituminous items shall be withheld till the miscellaneous items like earthwork in embankment / cutting for side shoulders, side gutters, kilometer / indicator / guard stones, sign boards etc. are completed in all respect by the contractor. After completion of the miscellaneous items, the above said 2% withheld amount shall be released.

(Govt. of Gujarat's G.R. No.: TNC-10-2013-3(Part-3)/C, Dtd. 13/12/2013).

(3) Videography for the surface under Maintenance Guarantee is to be done as per Govt. letter No.: SSR/10/2015-16/26/C, Dtd. 26/11/15 for the work costing more than Rs. 5.00 Crore.

(4) Setting up of adequate laboratory & deployment of quality engineers.

The contractor shall have to set up the laboratory with adequate equipment. Till the setting up of adequate laboratory is completed & reported of this to the engineer (subject to due verification by engineer's representative) by contractor in writing, Rs.2,00,000/- shall be withheld. The qualified quality Engineer shall be deployed exclusively for this contract by the contractors. If quality Engineer is not deployed by contractor within one month after the date of work order, the amount equivalent to Rs.20,000 per month shall be recovered till the actual deployment of quality engineer. The amount so recovered towards the deployment of quality engineers shall not be refunded.

(5) Asphalt work will have to be cross checked as per G.R. No.: RGN/60/2006/35/C, dtd.31/05/07 before final bill is paid.

(6) Maintenance during Construction Period

During the Construction Period, the Contractor shall maintain, at his own risk and cost, the existing lane(s) of the road so that the traffic worthiness and safety thereof are at no time materially inferior as compared to their condition 10 (ten) days prior to the date of the Agreement, and shall undertake the necessary repair and maintenance works for this purpose; provided that the Contractor may, at his cost, interrupt and divert the flow of traffic if such interruption and diversion is necessary for the efficient progress of works and conforms to Good Industry Practice; provided

further that such interruption and diversion shall be undertaken by the Contractor only with the prior written approval of the Executive Engineer which approval shall not be unreasonably withheld. For the avoidance of doubt, it is agreed that the Contractor shall at all times be responsible for ensuring safe operation of the road.

33.1 The Engineer shall check the Contractor's work and notify the Contractor of any defects that are found. Such checking shall not affect the Contractor's responsibilities the Engineer may instruct the Contractor to search for a Defect and to uncover and test any work that the Engineer considers may have a Defect.

## 34. Tests

34.1 If the engineer instructs the Contractor to carry out a test not specified in the Specification to check whether any work has a Defect and the test shows that it does, the Contractor shall pay for the test and any samples. If there is no defect the test shall be a Compensation Event.

~~34.2 #1% of the amount of **work done** should be deducted from R.A. Bill of the contractor for testing the quality of material workmanship, irrespective of actual charges.~~

34.3 Agency has to establish testing laboratory on site for the various test to be carried out in the work for this purpose agency shall construct a pukka laboratory building with all facility on site at location specified by the engineer in charge.

## 35. Correction of defects

35.1 The engineer shall give notice to the Contractor of any defects before the end of the defects Liability Period, which begins at Completion and is defined in the contract data. The Defects Liability Period shall be extended for as long as Defects remain to be corrected.

35.2 Every time notice of a Defect is given, the Contractor shall correct the notified defect within the length of time specified by the Engineer's notice.

## 36. Uncorrected Defects

36.1 If the Contractor has not corrected a defect within the time specified in the Engineer's notice, the Engineer will assess the cost of having the Defect corrected, and the Contractor will pay this amount.

# D. COST CONTROL

## 37. Bill of Quantities

37.1 The bill of Quantities shall contain items for the constructions, installation, testing and commissioning work to be done by the Contractor.

37.2 The bill of Quantities is used to calculate the Contract price. The Contractor is paid for the quantity of the work done at the rate in the Bill of Quantities for each item.

## 38. Change in the Quantities

38.1 The Engineer shall have power to make any alterations in or addition to the original specifications , drawings, designs and instructions that may appear to him to be necessary or advisable during the progress of the work and the contractor shall be bound to carry out the work in accordance with any instruction in this connection which may be given to him in writing signed by the Engineer and such alteration shall not invalidate the contract and any additional work which the contractor may be directed to do in the manner above specified as part of the work shall be carried out by the contractor on the same conditions in all respects on which he agreed to do the main work and at the same rate as are specified in the tender for the main work.

Except that when the quantity of any item exceeds the quantity as in the tender by more than 130%, the contractor will be paid for the quantity in excess of 130%, at the rate entered in the SOR of the year during which the excess in quantity is first executed.

## 39. Variations

39.1 All Variations shall be included in updated programmes produced by the Contractor.

## 40. Payments for Variations

40.1 If the additional or altered work includes any class of work for which no rate is specified in this contract, then such class of work shall be carried out as under.

(i) At the rate derived from the item within the contract which is comparable to the one involving additional or altered class of work; where there are more than one comparable items, the item of the contract which is nearest in comparison with regard to class or classes of the work involved shall be selected and the decision of the Superintending Engineer as to the nearest comparable item shall be final and binding on the contractor.

(ii) If the rate cannot be derived in accordance with (i) above, such class of works shall be carried out at the rate entered in the Schedule of Rates of the division for the year in which the tender was received, increased or decreased by the percentage by which the tender amount is more or less as compared to the amount arrived at the

rates in the "Schedule of Rates" of the Division in the year in which the tender was received. If the Schedule of rates of the Division does not contain all the items, the percentage increase or decrease of the tender shall be calculated considering such items which were included in the "Scheduled Rates" of the division for the year and for materials consumed on such item the rate to be charged would be the basic rate taken into account for fixing the rate in S.O.R. referred to above.

(iii) If it is not possible to arrive at the rate from (i) and (ii) above, such class of work shall be carried out at the rate decided by the competent authorities on the basis of detailed rate analysis after hearing the contractor before a Committee of two Superintending Engineers stationed at the same place or the nearest place.

40.2 If the additional or altered work, for which no rate is entered in the "Schedule of Rates" of the Division is ordered to be carried out before the rate is agreed upon, then the contractor shall within seven days of the date of receipt by him of the order to carry out the work, inform the Engineer-in-charge of the rate, which it is his intention to charge for such class of work and if the Engineer in charge does not agree to this rates, he shall by notice in writing be at liberty to cancel his order to carry out such class of work and arrange to carry it out in such manner as he may consider it advisable, provided always that if the contractor shall commence work or incur any expenditure in regard thereof before the rates shall have been determined as lastly herein before mentioned, then in such cases he shall only be entitled to be paid in respect of the work carried out or expenditure incurred by him prior to the date of the determination of the rate as aforesaid according to such rate or rates as shall be fixed by the Engineer-in-charge. In the event of the dispute, the decision of the Superintending Engineer of the Circle shall be final.

Where, however, the work is to be executed according to the designs, drawings and specifications recommended by the contractor and accepted by the competent authority, the alternation above referred to shall be within the scope of such designs, drawings and specifications appended to the tenders.

The time limit for the completion of the work shall be extended in the proportion that the increase in the cost occasioned by alterations bears to the cost of the original work and the certificate of the Engineer-in-charge as to such proportion shall be final and conclusive.

## 41. Cash Flow Forecasts

41.1 When the programme is updated, the contractor is to provide the engineer with an updated cash flow forecast.

## 42. Payment certificates.

42.1 The Contractor shall submit to the Engineer monthly statements of the estimated value of the work completed less the cumulative amount certified previously.

42.2 The Engineer shall check the Contractor's monthly statement within 14 days and certify the amount to be paid to the Contractor after taking in to account any credit or debit for the month in question in respect of materials for the works in the relevant amounts and under conditions set forth in sub-clause

32.3 of the Contract Data (secured Advance).

42.3 The value of work executed shall be determined by the Engineer.

42.4 The value of work executed shall comprise the value of the quantities of the items in the Bill of Quantities completed.

42.5 The value of work executed shall include the valuation of variations and compensation events.

42.6 The Engineer may exclude any item certified in a previous certificate or reduce the proportion of any item previously certified in any certificate in the light of later information

**43. Payments**

43.1 Payments shall be adjusted for deductions for advance payments, retention, other recoveries in terms of the contract and taxes at source, as applicable under the law. The Employer shall pay the Contractor the amounts certified by the Engineer within 28 days of the date of each certificate.

43.2 Payment of GST (prevailing rates) on the amount payable under the contract to the Contractor will be made by the Employer. Hence, it is the responsibility of the contractor to pay the GST to the concerned Authority.

43.3 Items of the works for which no rate or price has been entered in will not be paid by the Employer and shall be deemed covered by other rates and prices in the Contract.

**44. Compensation events**

44.1 The following are compensation Events unless they are caused by the Contractor:

(a) The Employer does not give access to a part of the Site by the site Possession date stated in Contract data to the Contractor

44.2 In case of compensation event occurs and it prevents the work being completed beyond the Intended Completion Date then Authority will approve EOT with eligible contractual price escalation.

**45. Tax**

45.1 The rates quoted by the Contractor must be inclusive of all taxes prevailing on due date of bid submission except GST. However, any subsequent changes in the tax structure by Government after due date of bid submission will be compensated (+/-) on availability or submission of actual documentation. Contractor will have to intimate Engineer regarding changes occurred in the tax structure after bid submission. If the contractor fails to provide such information and if any financial obligation may arise due to change in tax structure, same will be recovered from the contractor.

45.2 GST will be paid separately on the bills. Hence, it is the responsibility of the contractor to pay the GST to the concerned Authority.

**46. Currencies**.

46.1 All payment shall be made in Indian Rupees.

## 47. Price Adjustment (applicable only after permission of University Authority)

47.1 Contract price shall be adjusted for increase or decrease in rates and price of labour, materials, fuels and lubricants in accordance with the following principles and procedures and as per formula given in the contract data:

(a) The price adjustment shall apply for the work done from the start date given in the contract data up to end of the initial intended completion date or extensions granted by the Engineer and shall not apply to the work carried out beyond the stipulated time for reasons attributable to the contractor.
(b) The price adjustment shall be determined during each month from the formula given in the contract data.
(c) Following expressions and meanings during to the work done during each month
R = Total value of work done during the month. It would include the amount of secured advance granted, if any, during the month less the amount of secured advance recovered, if any during the month. It will exclude value for works executed under variations for which price adjustment will be worked separately based on the terms mutually agreed.

47.2 To the extent that full compensation for any rise or fall in costs to the contractor is not covered by the provisions of this or other clause in the contract, the unit rates and prices included in the contract shall be deemed to include amounts to cover the contingency of such other rise or fall in costs.

## 48. Retention

48.1 The Employer shall retain from each payment due to Contractor the proportion stated in the Contract Data until Completion of the whole of the Works.

48.2 On Completion of the whole of the Works half the total amount retained is repaid to the Contractor and half when the Defects Liability Period has passed and the Engineer has certified that all Defects notified by the Engineer to the Contractor before the end of this period have been corrected.

48.3 On completion of the whole works, the contractor may substitute retention money with an "on demand" Bank guarantee.

In case, Contractor requests for refund of the Retention Money deducted by the Employer under the provision of this clause, Employer shall consider the said request of the Contractor provided that the refund hereunder shall be made in tranches of not less than 1% (One Percent) of the Contract Price and Contractor furnishes an irrevocable and unconditional Bank guarantee for an equal amount substantially in the format of Bank Guarantee for Performance Guarantee enclosed with SBD and valid up to 60 day beyond the scheduled / extended Defects Liability Period. On completion of the whole works, the contractor has however an option to submit a fresh irrevocable and unconditional Bank Guarantee for an amount equal to 5% of the total value of work executed substantially in the format of Bank Guarantee for Performance Guarantee enclosed with SBD and valid up to 60 days beyond the Defect Liability Period and yet refund the Retention Money Bank Guarantee submitted for refund of Retention Money.

## 49. Liquidated Damages

49.1 The Contractor shall pay liquidated damages to the Employer at the rate per day stated in the Contract Data for each day that the Completion Date is later than the Intended Completion Date (for the whole works or the milestone as stated in the contract data). The total amount of liquidated damages shall not exceed the amount defined in the Contract Data. The Employer may deduct liquidated damages from payment due to the Contractor. Payment of liquidated damages does not affect the Contractor's liabilities.

49.2 If the Intended Completion Date is extended after liquidated damages have been paid, the Engineer shall correct any overpayment of liquidated damages by the Contractor by adjusting the next payment certificate. The Contractor shall not be entitled for any interest on the over payment calculated from the date of payment to the date of repayment.

49.3 If the contractor fails to comply with the time for completion as stipulated in the tender, then the contractor shall pay to the employer the relevant sum stated in the Contract Data as Liquidated damages for such default and not as penalty for everyday or part of day which shall elapse between relevant time for completion and the date stated in the taking over certificate of the whole of the works on the relevant section, subject to the limit stated in the contract data.

The employer may, without prejudice to any other method of recovery deduct the amount of such damages from any monies due or to become due to the contractor. The payment or deduction of such damages shall not relieve the contractor from his obligation to complete the works on from any other of his obligations and liabilities under the contract.

49.4 If, before the Time for Completion of the whole of the Works or, if applicable any Section, a Taking Over Certificate has been issued for any part of the Works or of a Section, the liquidated damages for delay in completion of the remainder of the Works or of that Section shall, for any period of delay after the date stated in such Taking-Over-Certificate, and in the absence of alternative provisions in the Contract, be reduced in the proportion which the value of the part so certified bears to the value of the whole of the Works or Section, as applicable. The provisions of this Sub-clause shall only apply to the rate of liquidated damages and shall not affect the limit thereof.

## 50 Deleted

## 51. Advance Payment. (applicable only after permission of University Authority)

51.1 The Employer shall make advance payment (not to be paid less than two installments except in special circumstances for which the reason to be Recorded in writing) to the Contractor of the amounts stated in the Contract Date by the date stated in the Contract Date, against provision by the Contactor of an Unconditional Bank Guarantee in a form and by a bank acceptable to the Employer in amounts and currencies equal to be at least 110% of the advance

payment. The guarantee shall remain effective until the advance payment has been repaid, but the amount of the guarantee shall be progressively reduced by the amounts repaid by the Contractor. The Mobilization advance would be deemed as interest bearing advance at an interest rate of 10 % to be compounded, quarterly.

51.2 The Contractor is to use the advance payment only to pay for Equipment, plant and Mobilization expenses required specifically for execution of the Works. The Contractor shall demonstrate that advance payment has been used in this way by supplying copies of invoices or other documents to the engineer. The Equipment advance would be deemed as interest bearing advance at an interest rate of 10% to be compounded, quarterly.

51.3 The advance payment shall be repaid by deduction proportionate amount from payments otherwise due to the Contractor, following the schedule of completed percentages of the Works on a payment basis. No account shall be taken of the advance payment or its repayment in assessing valuations of work done, variations, price adjustments, Compensation Events, or Liquidated damages.

51.4 Deleted

**52. Securities**

52.1 The performance Security (including additional security for unbalanced bids) shall be provided to the Employer no later than the date specified in the Letter of Acceptance and shall be issued in an amount and form and by a bank or surety acceptable to the Employer, and denominated in Indian Rupees. The performance Security shall be valid until a date 60 days from the date of expiry of Defects Liability Period and the additional security for unbalanced bids shall be valid until a date 28 days from the date of issue of the certificate of completion.

**53. Deleted**

**54. Cost of Repairs**.

54.1 Loss or damage to the Works or Materials to be incorporated in the Works between the Start date and the end of Defects Correction periods shall be remedied by the Contractor at the Contractor's cost if the loss or damages arises from the Contractor's acts or omissions.

## E. FINISHING THE CONTRACT

### 55. Completion

55.1 The Contractor shall request the Engineer to issue a Certificate of Completion of the works and the Engineer will do so upon deciding that the work is completed.

### 56. Taking Over

56.1 The Employer shall take over the Site and the Works within seven days of the Engineer issuing a certificate of Completion.

### 57. Final Account

57.1 The Contractor shall supply to the Engineer a detailed final account of the total amount that the Contractor considers payable as full and final settlement of all claims under the Contract for items before the end of the Defects Liability Period. The Engineer shall issue a Defect Liability Certificate and certify any final payment that is due to the Contractor within 56 days of receiving the Contractor's account if it is correct and complete. If it is not, the Engineer shall issue within 56 days a schedule that states the scope of the corrections or additions that are necessary. If the Final Account is still unsatisfactory after it has been resubmitted, the Engineer shall decide on the amount payable to the Contractor and issue a payment certificate, within 56 days of receiving the Contractor's revised account.

57.2 If reversal in characteristic of tender (L1 becoming L2) on account of excesses and savings in final account is observed, the Engineer/Employer shall be at liberty to restrict the final payment of BOQ items to the lowest amount evaluated of the bids considering the final quantities and the rates quoted including the rebates if any. Payment of variation items shall however be made at the rates approved by the Employer, within 90 days from the physical completion of work.

### 58. Operating and Maintenance Manuals

58.1 If "as built" drawings and/or operating and maintenance manuals are required, the Contractor shall supply them by the dates stated in the Contract data.

58.2 If the Contractor does not supply the Drawings and/or manuals by the dates stated in the Contract data, or they do not receive the Engineer's approval, the Engineer shall withhold the amount stated in the Contract Data from payments due to the Contractor.

### 59. Termination

59.1 The Employer or the Contractor may terminate the Contract if the other party causes a fundamental breach of the Contract.

59.2 Fundamental breaches of Contract include, but shall not be limited to the following:

1. The contractor stops work for 28 days when no stoppage of work is shown on the current programme and the stoppage has not been authorized by the Engineer

2. The Engineer instructs the Contractor to delay the progress of the Works and the instructions is not withdrawn within 28 days;

3. The Employer or the Contractor is made bankrupt or goes into liquidation other than for a reconstructions or amalgamation

4. A payment certified by the Engineer is not paid by the Employer to the Contractor within 56 days of the date of the Engineer's certificate

5. The Engineer gives Notice that failure to correct a particular Defect is a fundamental breach of Contract and the Contractor fails to correct it within a reasonable period of time determined by the Engineer;

6. The Contractor does not maintain a security which is required;

7. The Contractor has delayed the completion of works by the number of days for which the maximum amount of liquidated damages can be paid as defined in the Contract data; and

8. If the Contractor, in the judgment of the Employer has engaged in corrupt or fraudulent practices in competing for or in executing the Contract.

For the purpose of this paragraph: "corrupt practice" means the offering, giving, receiving or soliciting of anything of value to influence the action of a public official in the procurement process or in contract execution. "Fraudulent practice" means a misrepresentation of facts in order to influence a procurement process or the execution of a contract to the detriment of the borrower, and includes collusive practice among Bidders (prior to or after bid submission) designed to establish bid prices at artificial non-competitive levels and to deprive the Borrower of the benefits of free and open competition.

59.3 When either party to the Contract gives notice of a breach of contract to the Engineer for a cause other than those listed under Sub Clause 59.2 above, the Engineer shall decide whether the breach is fundamental or not.

59.4 Notwithstanding the above, the employer may terminate the Contract for convenience.

**60. Payment upon Termination**

60.1 If the Contract is terminated because of a fundamental breach of Contract by the Contractor, the Engineer shall issue a Certificate for the value of the work done less advance payments received up to the date of the issue of the certificate, less other recoveries due in terms of the contract, less taxes due to deducted at source as per applicable law and less the percentage to apply to the work not completed as indicated in the Contract data. Additional Liquidated Damages shall not apply. If the total amount due to the Employer exceeds any payment due to the Contractor the difference shall be a debt payable to the Employer.

60.2 If the Contract is terminated at the Employer's convenience or because of a fundamental breach of Contract by the Employer, the Engineer shall issue a certificate for the value of the work done, the cost of balance material brought by the contractor and available at site, the reasonable cost of removal of equipment, repatriation of the Contractor's personnel employed solely on the works, and the Contractor's cost of protecting and securing the Works and less advance payment received up to the date of the certificate, less other recoveries due in terms of the contract and less taxes due to deducted at source as per applicable law.

## 61. Property

61.1 All materials on the Site, Plant Equipment's, Temporary Works and Works are deemed to be property of the Employer, if the Contract is terminated because of a Contractor's default.

## 62. Release from Performance

62.1 If the Contract is frustrated by the outbreak of war of by any other event entirely outside the control of either the Employer or the Contractor the Engineer shall certify that the Contract has been frustrated. The Contractor shall make the Site safe and stop work as quickly as possible after receiving this certificate and shall be paid for all work carried out before receiving it and for any work carried out afterwards to which commitment was made.

## F. SPECIAL CONDITIONS OF CONTRACT

### 63. LABOUR

The Contractor shall, unless otherwise provided in the Contract, make his own arrangements for the engagement of all staff and labour, local or other, and for their payment of housing, feeding and transport.

The Contractor shall, if required by the Engineer, deliver to the Engineer a return in detail, in such form and at such intervals as the Engineer may prescribe, showing the staff and the numbers of the several classes of labour from time to time employed by the Contractor on the site and such other information as the Engineer may require.

### 64. COMPLIANCE WITH LABOUR REGULATIONS

During continuance of the contact, the Contractor and his sub- contractor shall abide at all times by all existing labour enactments and rules made thereunder, regulations, notification and bye laws of the State or central Government or local authority and any other labour law (including rules), regulations, bye laws that may be passed or notifications that may be issued under any labour law in future either by the State or the Central Government or the local authority. Salient features of some of the major labour laws that are applicable to the construction industry are given below. The Contractor shall keep the Employer indemnified in case any action is taken against the Employer by the competent authority on account of contravention of any of the provisions of any Act or rules made thereunder, regulations or notifications including amendments. If the Employer is caused to pay or reimburse, such amounts as may be necessary to cause or observe, or for observance of the provisions stipulated in the notifications/bye laws/Acts/Rules/regulations including amendments, if any, on the part of the Contractor, the Engineer/employer shall have the right to deduct any money due to the Contractor including his amount of performance security. The Employer/Engineer shall also have the right to recover from the Contractor any sum required or estimated to be required for making good the loss or damage suffered by the Employer.

The employees of the Contractor and the Sub-Contractor in no case shall be treated as the employees of the Employer at any point to time.

SALIENT FEATURES OF SOME MAJOR LABOUR AND OTHER LAWS APPLICABLE TO ESTABLISHMENTS ENGAGED IN BUILDING AND OTHER CONSTRUCTIONS WORK

A) **Workmen Compensation Act 1923** :- The Act provides for compensation in case of injury by accident arising out of and during the course of employment.

B) **Payment of Gratuity Act. 1972** :- Gratuity is payable to an employee under the Act on satisfaction of certain conditions on separation if an employee has completed 5 years service or more on death, the rate of 15 days wages for every completed year of service. The Act is applicable to all establishments employing 10 or more employees.

C) **Employees P.F. and Miscellaneous Provision Act 1952:-** The Act Provides for monthly contributions by the employer plus workers @ 10% or 8.33% The benefits payable under the Act are :

1. Pension or family pension on retirement or death, as the case may be.
2. Deposit linked insurance on the death in harness of the worker.
3. Payment of P.F. accumulation on retirement/death etc.

D) **Maternity Benefit Act 1951** :- The Act provides for leave and some other benefits to women employees in case of confinement or miscarriage etc.

E) **Contract Labour (Regulation & Abolition) Act 1970** : The Act provides for certain welfare measures to be provided by the Contractor to contract labour and in case the Contractor fails to provide, the same are required to be provided, by the Principal Employer by Law. The principal Employer is required to take Certificate of Registration and the Contractor is required to take license from the designated Officer. The Act is applicable to the establishments or Contractor of Principal Employer, if they employ 20 or more contract labour.

F) **Minimum Wages Act 1948 :-** The Employer is supposed to pay not less than the Minimum Wages fixed by appropriate Government as per provisions of the Act, if the employment is a scheduled employment. Construction of Building, Roads, Runways are scheduled employment.

G) **Payments of wages Act 1936:-** It lays down as to by what date the wages are to be paid, when it will be paid and what deductions can be made from the wages of the workers.

H) **Equal remunerations Act 1979 :-** The Act provides for payment of equalwages for work of equal nature to Male and Female workers and for not making discrimination against female employees in the matter of transfer, training and promotions etc.

I) **Payments of Bonus Act 1965** :- The Act is applicable to all establishments employing 20 or more employees. The Act provides for payments of annual bonus subject to a minimum of 8.33% of wages and maximum of 20 % of wages to employees drawing Rs. 3500/- per month or less. The bonus to be paid to employees getting Rs, 2500/- per month or above Rs. 3500/- per month shall be worked out by taking wages as Rs. 2500/- per month only. The Act does not apply to certain establishments. The newly set-up establishments are exempted for five years in certain circumstances. Some of the State Governments have

reduced the employment size from 20 to 10 for the purpose of applicability of this Act.

J) **Industrial Disputes Act 1947** :- The Act lays down the machinery and procedure for resolutions of Industrial disputes, in what situations a strike or lock-out becomes illegal and what are the requirements for laying off or retrenching the employees or closing down the establishment.

K) **Industrial employment (standing Orders) Act 1946 :-** It is applicable to all establishments employing 100 or more workmen (employment size reduced by some of the State and Central Government to 50). The Act provides for laying down rules governing the conditions of employment by the Employer on matters provided in the Act and get the same certified by the designated Authority.

L) **Trade Unions Act 1926:-** The Act lays the procedure for registration of trade unions of workmen and employers. The Trade Unions registered under the Act have given certain immunities from civil and criminal liabilities.

M) **Child Labour (Prohibition & Regulation Act 1986 :-** The Act prohibits employment of children below 14 years of age in certain occupations and process and provides for regulation of employment of children in all other occupations and processes. Employment of Child labour is prohibited in Building and Construction Industry.

N) **Inter – State Migrant workmen's (Regulation of Employment & Conditions of service) Act 1979:-** The Act is applicable to an establishment which employs 5 or more inter-state migrant workmen through an intermediary (who has recruited workmen in one state for employment in the establishment situated in another state).The inter-state migrant workmen, is an establishment to which this Act becomes applicable, are required to be provided certain facilities such as housing, medical aid, traveling expenses from home upto the establishment and back, etc.

O) **The Building and Other Construction workers (Regulation of employment and Conditions of Service) Act 1996 and the Cess Act of 1996:-** All the establishments who carry on any building or other constructions work and employ 10 or more workers are covered under this Act.

All such establishments are required to pay cess at the rate not exceeding 2% of the cost of construction as may be modified by the government. The Employer of the establishment is required to provide safety measures at the Building or construction work and other welfare measures, such as canteens, First Aid facilities, Ambulance, Housing accommodations for workers near the workplace etc. The Employer to whom the Act applies has to obtain a registration certificate from the Registering Officers appointed by the Government.

P) **Factories Act 1948 :-** The Act lays down the procedure for approval of plans before setting up a factory, health and safety provisions, welfare provisions, working hours, annual earned leave and rendering information regarding accidents or dangerous occurrences to designated authorities. It is applicable to premises employing 10 persons or more with aid of power or 20 or more persons without the aid of power engaged in the manufacturing process.

Q) **Royalty charges-**The contractor shall pay the royalty to the competent authority as per rule. The **royalty** charges paid shall be borne by the contractor and shall not be reimbursed by the Employer.

R) **Following Pollution control Acts and amendments made thereof from time to time shall be applicable**.

1. Water (Preservation and control of Pollution) Act, 1974
2. Air (Prevention and Control of Pollution Act 1981
3. Environmental (Protection) Act 1986

The contractor must commit to adopting Environmental management plan for best energy use, waste management, the reduction of pollution as in EMS (Environmental Management system)ISO-14001- 2015

## 65. ARBITRATION (GCC Clause 24)

The procedure for arbitration will be as follows: -

24.1 If the Contractor is of the view that a decision taken by the Engineer was either outside the authority given to the Engineer by the Contract or that the decision was wrongly taken, the decision shall be referred to #**Vice chancellor** within 14 days of the notification of the Engineer's decision. If the issue is not resolved, any party can refer the matter for conciliation within 15 days from the decision given by the #Vice chancellor.

24.2

(a) For the work up to Rs.100 Cr., if any of the parties is not satisfied with the decision of the #vice chancellor, both the parties have to refer to the #Chief Engineer concerned for the conciliation process.

(b) For the work more than Rs.100 Cr., if any of the parties is not satisfied with the decision of the Vice chancellor, both parties have to refer to the #Board of the management, Vnsgu, surat for the conciliation process.

If the dispute is not resolved through the conciliation process, contractor may refer the dispute to Gujarat Public Works Contract Dispute Arbitration Tribunal. If the Contractor fails to refer a claim / dispute to the Higher Authority within 14 days of the notification of the Engineer's decision, the Contractor shall not be entitled to any additional payment/claim if he doesn't follow the above sequence in stipulated time. However, during such period, he would not stop the work in any case.

# SECTION - 4

# CONTRACT DATA

## #CONTRACT DATA

**Clause Reference With respect To section 3**

**Item marked "N/A" do not apply to this Contract.**

1. The Employers is [CL.1.1]
   Name: Veer Narmad South Gujrat University
   Address: Udhna Magdalla Road, Surat
   Name of authorized Representative (will be intimated later)
2. The Engineer is Registrar, Vnsgu, Surat Name of Authorized Representative: Registrar, Vnsgu, Surat
3. The Defects Liability Period is 4 years or elapse of 4 monsoon period from the date of completion. [CL.1.1&33]
4. The Start Date shall be **1st** days for the date of issue of the Notice to proceed with the work. [CL.1.1]
5. The Intended Completion Date for the whole of the works is 11 (Eleven) Months after start of work with the following milestones: [CL.1.1,17&2]
   Milestone dates:
   Physical works to be completed Period from the start date [CL.2.2& 49.1]
   -
6. The Site is located at VNSGU Campus, Surat [CL.1.1]
7. The name and identification number of the Contract is: - [CL.1.1]
8. The works consist of Building repair, renovation, Upgradation work with items as per B.O.Q. The works shall, inter alia, include the following, as Specified or as directed: [CL.1.1]

   ~~**(A) Road Works**~~

   ~~Site clearance; setting - out and layout; widening of existing carriageway and strengthening including camber corrections; construction of new road/ Parallel service road; bituminous pavements remodeling/construction of Junctions, intersections, bus bays, lay-bays; supplying and placing of drainage Channels, flumes, guard posts and guard other related items; construction/extension of cross drainage works, bridge, approaches and other related stones; protective works for roads/bridge; all aspects of quality assurance of variouscomponents of the works; rectification of The defects in the completed works during the Defects Liability Period; submission of "As- built" drawings and any other related documents; and other item of work as may be required to be carried out for completing the work in accordance with the drawings and the provisions of the contract and to ensure safety.~~

~~(B) Bridge Works~~

~~Site clearance; setting out, provision of foundations, piers abutments and bearing; prestressed/reinforced cement concrete superstructure; wearing coat, hand railings, expansion joints, approach slabs, drainages spouts/ downtake pipes, arrangements for fixing light posts, water mains, utilities etc; provision of suitably designed protective works; providing wing/return walls; provision of road markings, road signs etc.; all aspects of quality assurance; clearing the site and handing over the works on completion; rectification of the defects during the Defects Liability Period and submission of "As-built" drawings and other related documents; and other items of work as may be required to be carried out for completing the works in accordance with the drawings and the provisions of the contract and to Insure safety~~

~~(C)~~ **Other Items**

Any Other Items as required to fulfill all contractual obligations as per the Bid documents. [CL.1.1]

09. The following documents also form part of the Contract:
_____As per clause 2-3- **Addendum / Corrigendum / undertaking given by contractor (if any)** [CL.2.3(9)]

10. The law which applies to the Contract is the law of Union of India [CL.3.1]

11. The language of the Contract documents is English [CL.3.1]

12. Limit of subcontracting 25% of the Initial Contract Price [CL.7.1]

13. The Schedule of Other Contractors [CL.8]

14. The Schedule of Key Personnel As per Annex – II to Section I [CL.9]

15. The minimum insurance cover for physical property, injury and death is Rs. 5 lakhs per occurrence with the number of occurrences limited to four. After each occurrence, the contractor will pay an additional premium necessary to make insurance valid for four occurrences always. [CL13]

16. Site Investigation report [CL.14]
17. The Site Possession dates shall be 1st day of work order [CL.21]
18. The period for submission of programme for approval of the engineer shall be 21 days from the issue of Letter of Acceptance. [CL. 27.1]

19. The period between program updates will be 135 days. [CL.27.3]
20. The amount to be withheld for late submission of an updated programme shall be Rs 1.00 lakhs
21. The following events shall also be Compensation Events Substantially adverse ground conditions encountered during the course of execution of work not provided for in the bidding document.
    a. Removal of underground utilities detected subsequently
    b. Significant changes in classification of soil requiring additional mobilization by the contractor, e.g. ordinary soil to rock excavation,
    c. Removal of unsuitable material like marsh, debris dumps, etc.

not caused by the contr

actor. [CL. 27.3]

[CL. 44]

d. Artesian conditions
e. Seepage, erosion landslide
f. River training requiring protection of permanent work
g. Presence of historical, archeological or religious structures, monuments interfering with the works
h. Restriction of access to ground imposed by civil, judicial, or military authority

22. The currency of the Contract is Indian Rupees [CL. 46]

23. **The formula (e) for adjustment of prices are as under:** [CL.47]

- If any of the commodities like Cement, Steel or Bitumen are not found applicable in a work, the weight component of that commodities {i.e. 'Cement' (Pc), 'Steel' (Ps) or 'Bitumen' (Pb) as indicated in SBD for the purpose of Price Adjustment} shall be clubbed with the weight component of 'Other Material' (Pm), such that the gross % weight of the components shall remain as 100% .

R = value of work as defined in Clause 47.1 of Conditions of Contract

**Adjustment for labour component**

(i) Price adjustment for increase or decrease in the cost due to labour shall be paid in accordance with the following formula:

$V_L = 0.85 \times (P_l/100) \times R \times (L_i - L_0)/L_0$

$V_L$ = Increase or decrease in the cost of work during the month under consideration due to changes in rates for local labour

$L_0$ = The consumer price index for industrial workers for the State on 28 days preceding the scheduled date of opening of technical Bids as published by Labour Bureau, Ministry of Labour, Government of India

$L_i$ = The consumer price index for industrial workers for the State for the month under consideration as published by the Labour Bureau, Ministry of Labour, Government of India.

$P_l$ = Percentage of labor component of the work.

**Adjustment for cement component.**

(ii) Prices adjustment for increase or decrease in the cost of cement procured by the contractor

$V_c = 0.85 \times (P_c/100) \times R \times (C_i - C_0)/C_0$

$V_c$ = Increase or decrease in the cost of work during the month under consideration due to changes in rates for cement.

$C_0$ = The all India wholesale price index for Ordinary Portland Cement on 28 days preceding thescheduled date of opening of technical bid as published by the **Office of the Economic Adviser, Department for Promotion of Industry and Internal Trade, Ministry of Commerce & Industry.**

$C_i$ = The all India average wholesale price index for Ordinary Portland Cement for the month under consideration as published by **Office of the Economic Adviser, Department for Promotion of Industry and Internal Trade, Ministry of Commerce & Industry.**

$P_c$ = Percentage of cement component of the work

**Adjustment for steel component**

(iii) Price adjustment for increase or decrease in the cost of steel procured by the contractor shall be paid in accordance with the following formula

$V_s = 0.85 \times (P_s/100) \times R \times (S_i - S_0)/S_0$

$V_s$= Increase or decrease in the cost of work during the month under consideration due to changes in the rates for steel

So= The all India wholesale price index for steel **(Mild Steel - Long Products Rebars)** on 28 days preceding the date of opening of Bids as published by the **Office of the Economic Adviser, Department for Promotion of Industry and Internal Trade, Ministry of Commerce & Industry.**

$S_i$= The all India average wholesale price index for steel **(Mild Steel - Long Products Rebars)** for the month under consideration as published by **Office of the Economic Adviser, Department for Promotion of Industry and Internal Trade, Ministry of Commerce & Industry.**

$P_s$ = Percentage of steel component of the work

Note : For the application of this clause, the index of **Mild Steel- Long products Rebars** has been chosen to represent the steel group.

**Adjustments of bitumen component**

(iv) Price adjustment for increase in the cost of bitumen shall be paid in accordance with the following formula

$V_b = 0.85 \times (P_b/100) \times R \times (B_i - B_0)/B_0$

$V_b$ = Increase or decrease in the cost of work during the month under consideration due to changes in rates for bitumen.

$B_o$ = The official retail price of bitumen at the IOC depot at the nearest centre on the day 28 days prior to the scheduled date of opening of technical bid.

$B_i$ = The official retail price of bitumen of IOC depot at the nearest centre for the $15^{th}$ day of the month under consideration.

$P_b$ = Percentage of bitumen component of the work

**Adjustment of POL (fuel and lubricant) component**

(iii) Price adjustment for increase or decrease in cost of POL (fuel and lubricant) shall be paid in accordance with the following formula

$V_f = 0.85 \times (P_f/100) \times R \times (F_i - F_0)/F_0$

$V_f$ = Increase or decrease in the cost of work during the month under consideration due to changes in rates for fuel and lubricants.

$F_o$ = The official retail price of High Speed Diesel (HSD) at the existing consumer pumps of IOC at the nearest centre on the day 28 prior to the date of opening of Bids.

$F_i$ = The official retail price of HSD at the existing consumer pumps of IOC at the nearest centre for the 15th day of the month of the under consideration.

$P_f$ = Percentage of fuel and lubricants component of the work

Note: For the application of this clause, the price of High-Speed diesel Oil has been chosen to represent the fuel and lubricants group.

**Adjustment for Construction Machinery**

(iv) Price adjustment for increase or decrease in the cost of plant and Machinery spare procured by the Contractor shall be paid in accordance with the following formula

$V_p = 0.85 \times (P_p/100) \times R \times (P_i - P_0)/P_0$

$V_p$= Increase or decrease in the cost of work during the month under consideration due to changes in rates for plant and machinery spares

$P_0$ = The all India wholesale price index for **manufacturer of machinery for mining, quarrying and Construction** for the month under consideration as published **Office of the Economic Adviser, Department for Promotion of Industry and Internal Trade, Ministry of Commerce & Industry.**

$P_i$ = The all India average wholesale price index for **manufacturer of machinery for mining, quarrying and Construction** for the month under consideration as published **Office of the Economic Adviser, Department for Promotion of Industry and Internal Trade, Ministry of Commerce & Industry.**

$P_p$ = Percentage of plant and machinery spares component of the work.

Note: For the application of this clause, index of Heavy Machinery and parts has been chosen to represent the Plant and Machinery Spares group

**Adjustment of other materials Component N.A (or Aprroval of university Authority)**

(iii) Price adjustment for increase or decrease in cost of local materials other than cement, steel, bitumen and POL procured by the contractor shall be paid in accordance with the following formula

$V_m = 0.85x (P_m/100) \times R \times (M_i - M_0)/M_0$

$V_m$ = Increase or decrease in the cost of work during the month under consideration due to change in rates for local materials other than cement, steel, bitumen and POL.

$M_0$ = The All Indian wholesale price index (all commodities) on 28 days preceding the scheduled date of opening of technical Bids, aspublished by the **Office of the Economic Adviser, Department for Promotion of Industry and Internal Trade, Ministry of Commerce & Industry.**

$M_i$= The All India wholesale price index (all commodities) for the month under consideration as published by the **Office of the Economic Adviser, Department for Promotion of Industry and Internal Trade, Ministry of Commerce & Industry.**

$P_m$ = Percentage of local material components (other than cement, steel, bitumen and POL) of the work.

The following percentage will govern the price adjustment for the entire contract:

| | | |
|---|---|---|
| 1. | Labour - | $P_l$ = 22.29 % |
| 2. | Cement – | $P_c$ = 9.15 % |
| 3. | Steel - | $P_s$ = 22.16 % |
| 4. | Bitumen - | $P_b$ = 0.00 % |
| 5. | POL – | $P_f$ = 1.07 % |
| 6. | Plant & Machinery Spares - | $P_p$ = 11.15 % |
| 7. | Other Materials - | $P_m$ = 34.18 % |
| | Total | 100 % |

24. The proportion of payments retained (retention money) shall be 6% {CL. 48} from each bill subject to a maximum of 5% of final contract price.

25. Amount of Liquidated damages for completion of works — For Whole of work {CL.49} delay in $(1/2000)^{th}$ of the Initial contract price, rounded off to the nearest Thousand, per day. For sectional Completion (wherever specified In item 6 of Contract data) $(1/2000)^{th}$ of initial contract price for #5 km Section, rounded off to the nearest thousand per day.

| | | | |
|---|---|---|---|
| 26. | Maximum limit of liquidated damages For delay in completion work | 10 percent of the Initial Contract Price rounded off to the nearest thousand | {CL. 49} |

27. The amount of the advance payment are: {CL. 51 & 52}( N.A )nor as per Approval of University Authority.

| #**Nature of Advances** | | **Amount (Rs.) Conditions to Be fulfilled** |
|---|---|---|
| • Mobilization unconditional | 10% of the contract Price | On submission of Bank Guarantee. (to be drawn before the end of 20% of the contract period). The contractor may furnish four bank guarantees of 2.5 % of each valid for the full period. |
| • Equipment | 90% for new and 50% of depreciated value for old equipment. Total amount will be subject to a maximum of 5% of the Contract Price | After equipment is brought to site (provided the Engineer is satisfied That the equipment is required for performance of the contract) and on submission of unconditional Bank Guarantee for amount of advance |
| • Secured Advance for Non-persishable material Brought to site | **Deleted** | |

(The advance payment will be paid to the Contractor no later than 28 days after fulfillment of the above conditions).

28. Deleted

29. The securities shall be for the following minimum amounts equivalent {CL. 52} As a percentage of the Contract Price:

    Performance Security for 5 percent of contract price plus Rs. …….. (to be decided after evaluation of the bid) as additional security in terms of ITB Clause 29.5 The standard form of Performance security acceptable to the Employer shall be an unconditional Bank Guarantee of the type as presented in Section 8 of the Bidding Documents.

30. The Schedule of Operating and maintenance Manuals…..N/A. {CL. 58}

31. The date by which "as– built" drawings (in scale as directed) in 2 sets {CL. 58} are required within 28 days of the issue of certificate of completion of the whole or section of the work, as the case may be.

32. The amount to be withheld for failing to supply "as built" drawings {CL. 58} by the Date required is Rs..... Lakhs.

33. The following events shall also be fundamentals breach of contract: {CL.59.2} "The Contractor has contravened Sub- clause 7.1 and Clause 9 of GCC"

34. The percentage to apply the value of the work not completed representing {Cl 60} the Employer's additional cost for completing the Works shall be 20 per cent.

## SECTION - 5

# TECHNICAL SPECIFICATION

## SECTION - 6

# FORM OF BID

**FORM OF BID**

Description of the Works:

---

---

---

--------- BID

To :

Address :

1. We offer to execute the Works described above and remedy any defects therein in conformity with the conditions of Contract, specification, drawings, Bill of Quantities and Addenda for the sum (s) of

   _____

   _____

   ( )

2. We undertake, if our Bid is accepted, to commence the Works as soon as is reasonably possible after the receipt of the Engineer's notice to commence, and to complete the whole of the Works in the Contact within the time stated in the document.

3. We agree to abide by this Bid for the period of 120 Days from the date fixed for receiving the same, and it shall remain binding upon it and may be accepted at any time before the expiration of that period.

4. Unless and until a formal Agreement is prepared and executed this Bid, together with your written acceptance thereof, shall constitute a binding contract betweenus.

5. We understand that you are not bound to accept the lowest or any tender you may receive.

   Dated this ---------- day of 20

   Signature ---------- in the capacity of ----------

   ------- duly authorized to sign bids for and on behalf of ----------

   ----------

   _____

   (in block capitals or typed)

Address

Witness

Address

Occupation

## SECTION - 7

# BILL OF QUANTITIES

## BILL OF QUANTITIES

### Preamble

1. The bill of Quantities shall be read in conjunction with the Instructions to Bidder, Conditions of Contract, Technical Specifications and Drawings.

2. The quantities given in the Bill of Quantities are estimated and provisional, and are given to provide a common basis for bidding. The basis of payment will be the actual quantities of work ordered and carried out, as measured by the Contractor and verified by the Engineer and valued at the rates and prices tendered in the priced Bill of Quantities, where applicable, and otherwise at such rates and prices as the Engineer may fix within the terms of the Contract.

3. The rates and prices tendered in the priced Bill of Quantities shall, except in so far as it is otherwise provided under the Contract, include all construction alplant, layout, supervision, materials, erection, maintenance, insurance, profit, taxes and duties, together with all general risks, liabilities and obligations set out or implied in the Contract.

4. The rates and prices shall be quoted entirely in Indian Currency.

5. A rate or prices shall be entered against each item in the Bill Quantities, whether quantities are stated or not. The cost of Items against which Contractor has failed to enter a rate or price shall be deemed to be covered by other rates and prices entered in the Bill of Quantities (in case of Item rate contract).

6. The whole cost of complying with the provisions of the Contract shall be included in the items provided in the priced Bill of Quantities, and where no Items are provided the cost shall be deemed to be distributed among the rates and prices entered for the related items of Work.

7. General direction and descriptions of work and materials are not necessarily repeated or summarized in the Bill of Quantities. References to the relevant sections of the contract documentation shall be made before entering rates or prices against each item in the Bill of Quantities.

8. The method of completed work of payment shall be in accordance with the specification for Road and Bridge works. For building works specifications for building are to be followed.

9. Errors will be corrected by the Employer for any arithmetic errors pursuant to **Clause 29** of the Instructions to Bidder.

10. Rock is defined as all materials which, in the opinion of the Engineer, required blasting, or the use of metal wedges and sledgehammers, or the use of compressed air drilling for its removal, and which cannot be extracted by ripping with a tractor of at least 150 kw with a single rear mounted heavy duty ripper.

**BILL OF QUANTITIES**

**(A) For Item Rate Tender (For above INR 50 Cr.):**

| Item No | Description of Item (with brief specification and reference to book of specifications) | Quantity | Unit | Rate | | Amount |
|---|---|---|---|---|---|---|
| | | | | In figures | In Words | |
| | | | | | | |

(A) Total Tendered Amount

(B) Rebate on above tendered amount (if any) % (in figure) …… (in words)……

…... (C)Net Tendered Amount (A-B) (in figure) …… (in words)……

| | |
|---|---|
| 1 | The Contractor shall exhibit a board with detailed specification and details of work as directed by the Engineer-In-Charge for which no extra payment shall be made. |
| 2 | The labour cess will be deducted as per prevailing rules i.e. 1% of the work done. |
| 3 | GST and Income tax TDS will be deducted at a source while making payments of bills |
| 4 | In all R.C.C. Items in Rate Analysis Standard Cement Consumption has been taken as per Govt. G.R.: PRC-10/2017 Cement Consumption/16/C Date:11/05/2017 as stated in S.O.R. therefore in R.C.C. items where there is a change as per actual mix design the cost of difference of cement consumption have been deducted from the rate of original item at the rate of input rate mentioned in all the tender. |

## SECTION - 8

# SECURITIES AND OTHER FORMS

**BID SECURITY (BANK GUARANTEE)**

WHEREAS, ---------- (name of Bidder) (hereinafter called the "The Bidder") has submitted his bid Dated ---------- (Date) for the construction of ---------- (Name of Contractor hereinafter called "the Bid")

KNOW ALL PEOPLE by these presents that We ----------
(name of Bank) of----------(name of country) having our registered office at ----------( hereinafter called "the bank") are bound unto ----------(name of Employer) (hereinafter called "The Employer") in the sum of *
for which payment well and truly to be made to the said Employer the Bank itself, his successors and assigns by these presents.

SEALED with the Common Seal of the said Bank this ---------- day of---------20

THE CONDITIONS of these obligations are:

(1) If after Bid opening the Bidder withdraws his bid during the period of Bid validity specified in the Form of Bid;

**Or**

(2) If the Bidder has been notified of the acceptance of his bid by the Employer during the period of Bid Validity:

A Fails or refuses to execute the Form of Agreement in accordance with the Instructions to Bidders, if required; or

B. Fails or refuse to furnish the Performance Security, in accordance with the Instructions to Bidders; or

C. does not accept the correction of the Bid Price pursuant to Clause 27 (Correction of Errors)

We undertake to pay to the Employer up to the above amount upon receipt of his first written demand, without the employer having to substantiate his demand, provided that in his demand the Employer will note that the amount claimed by him is due to him owing to the occurrence of one or any of the three conditions, specifying the occurred conditions or conditions.

This Guarantee will remain in force up to and including the date **

days after the deadline for submission of Bids as such the deadline is stated in the Instructions to Bidders or as it may be extended by the Employer, notice of which extension (s) to the Bank is hereby waived. Any demand in respect of this guarantee should reach the Bank not later than the above date

DATE ---------- SIGNATURE----------

WITNESS ---------- SEAL ----------

(Signature, name and address)

* The Bidder should insert the amount of the guarantee in words and figures denominated in Indian Rupees. This figure should be the same as shown in Clause 16.1(Bid Security) of the Instructions to Bidders.

****45 days** after the **end of the validity period** of the Bid. Date should be inserted by the Employer before the Bidding documents are issued.

**PERFORMANCE SECURITY**

TO,
- ---------- (Name of Employer)
- ---------- (Address of Employer)
---

WHEREAS ---------- (name and address of contractor) (hereafter called "the Contractor") has undertaken, in pursuance of Contracts No. ---------- dates ---------- to execute ---------- (name of Contract and brief description of Works) (hereinafter called "The Contract")

AND WHEREAS it has been stipulated by you in the said Contract that the Contractor shall furnish you with a Bank Guarantee by a recognized bank for the sum specified therein as security for compliance with his obligation in accordance with the Contract.

AND WHEREAS we have agreed to give the Contractors such a bank Guarantee:

NOW THEREFORE we hereby affirm that we are the Guarantor and responsible to you on behalf of the Contractor, up to a total of ---------- (amount of guarantee)* ---------- (in words), such sum being payable in types and proportions of currencies in which the Contract prices is payable, and we undertake to pay you, upon your first written demand and without cavil or argument, any sum or sums within the limits of ---------- (amount of guarantee) as aforesaid without your needing to prove or to show grounds or reasons for your demand for the sum specified therein.

We hereby waive the necessity of your demanding the said debt from the contractor before presenting is with the demand.

We further agree that no change or addition to or other modification of the terms of the Contract to of the Works to be performed thereunder or of any of the Contract documents which may be made between your and the Contractor shall in any way release us from any liability under this guarantee, and we hereby waive notice of any such charge, addition or modifications.

This guarantee shall be valid until 60 days from the date of expiring of the Defect Liabilities period.

Signature and Seal of the guarantor ----------

Name of Bank ----------

Address ----------
Date ----------

*An amount shall be inserted by the Guarantor, representing the percentage the Contract price specified in the Contract denominated in Indian Rupees.

**ADDITIONAL PERFORMANCE SECURITY**

[Clause 34.1. (A)]

TO,

- ---------- (Name of Employer)
- ---------- (Address of Employer)

---

WHEREAS ---------- (Name and address of contractor) (hereafter called "The Contractor") has undertaken, in pursuance of Contracts No. ---------- dates ---------- to execute ---------- --------- (Name of Contract and brief description of Works) (hereinafter called "The Contract")

AND WHEREAS it has been stipulated by you in the said Contract that the Contractor shall furnish you with a Bank Guarantee by a recognized bank for the sum specified therein as security for compliance with his obligation in accordance with the Contract.

AND WHEREAS we have agreed to give the Contractors such a bank Guarantee:

NOW THEREFORE we hereby affirm that we are the Guarantor and responsible to you on behalf of the Contractor, up to a total of ---------- (amount of guarantee) ---------- (in words), such sum being payable in types and proportions of currencies in which the Contract prices is payable, and we undertake to pay you, upon your first written demand and without cavil or argument, any sum or sums within the limits of ---------- (amount of guarantee) as aforesaid without your needing to prove or to show grounds or reasons for your demand for the sum specified therein.

We hereby waive the necessity of your demanding the said debt from the contractor before presenting is with the demand

We further agree that no change or addition to or other modification of the terms of the Contract to of the Works to be performed thereunder or of any of the Contract documents which may be made between your and the Contractor shall in any way release us from any liability under this guarantee, and we hereby waive notice of any such charge, addition or modifications.

This guarantee shall be valid until **28 days** from the project completion date.

Signature and Seal of the guarantor ----------

Name of Bank ----------

Address ----------

Date ----------

**BANK GUARANTEE FOR ADVANCE PAYMENT**

TO,

- ---------- (Name of Employer)

- ---------- (Address of Employer)

- ---------- (Name of Contractor)

Gentlemen:

In accordance with the provisions of the Conditions of Contract, sub-clause 51.1 ("Advance Payment") of the above mentioned Contract, ---------- (name and address of Contractor) (hereinafter called "the Contractor") shall deposit with (name of Employer) a bank guarantee his proper and faithful performance under the said Clause of the Contract in an amount of (amount of Guarantee)* - - ----------in words).

We, the---------- (bank of financial institution), as instructed by the Contractor, agree unconditionally and irrevocably to guarantee as primary obligator and not as Surety merely, the payment to ---------- (name of Employer) on his first demand without whatsoever right of obligation on our part and without his first claim to the Contractor, in the amount not exceeding --- ---------- (amount of guarantee)* - ---------- (in words)

We further agree that no change or addition to or other modifications of the terms of the Contractor or Works to be performed thereunder or of any of the Contract documents which may be made between ---------- (name of Employer) and the Contractor, shall in any way release us from any liability under this guarantee, and we hereby waive notice of any such change, addition or modifications. This guarantee shall remain valid and in full effect from the date of the advance payment under the Contract until ----------(name of employer) receives full repayment of the same amount from the contractor.

YOUR'S TRULY

Signature and Seal _____
Name of Bank/ Financial Institution _____ Address _____
Date _____

* An amount shall be inserted by that Bank or Financial Institution representing the amount of the Advance Payment, and denominated in Indian Rupees.

**Letter of Acceptance**

(Letter head paper of the Employer)

_____(date)

To,

_____(Name and address of the Contractor)

_____

_____

Dear Sirs,

This is to notify you that your Bid dated_____for execution of the_____(Name of the contract and identification number, as given in the Instructions to Bidders) for the Contract Price of Rupees _____ (_____) (amount in words and figures) as corrected and modified in accordance with the Instructions to Bidders* is hereby accepted by our agency.

You are requested to furnish performance security, in the form detailed in para 34.1 of ITB for an amount equivalent to Rs._____within **10 days** of the receipt of this letter of acceptance up to beyond **60 days** from the date of expiry of defects Liability period i.e. up to_____and the Additional Performance Security for an amount equivalent to Rs._____shall be valid beyond 28 (twenty-eight) days of Project Completion Date i.e. up to_____and sign the contract, failing which action as stated in Para 34.3 of ITB will be taken.

Yours Faithfully

Authorized Signature Name and title of Signatory Name of Employer

---

* Delete "Corrected and" or and modified if only one of these actions applies. Delete as corrected and modified in accordance with the Instructions to Bidders, if corrections or modifications have not been affected.

**Issue of Notice to proceed with the work**

(Letterhead of the Employer)

\- (date)

To,

_____(Name and address of the Contractor)

_____

_____

Dear Sirs,

Pursuant to your furnishing the requisite security in ITB Clause 34.1 and signing of the Contract for the construction of _____ at a bid Price of Rs. _____.

You are hereby instructed to proceed with the execution of the said works in accordance with the contract documents.

Yours faithfully

(Signature, name and title of signatory authorizedTo sign on behalf of Employer)

**AGREEMENT FORM**

This agreement, made on the _____ day of _____ between

_____ (name and address of Employer) (Hereinafter called "the Employer) and _____ (name and address of contractor) hereinafter called "the Contractor" of the other part.

Whereas the Employer is desirous that the Contractor execute

_____

Name and identification number of contract (hereinafter called "the works") and the employer has accepted the Bid by the Contractor for the execution and completion of such works and the remedying of any defects therein, at a cost of Rs.

_____

NOW THIS AGREEMENT WITNESSETH AS FOLLOWS

1. In this Agreement, words and expression shall have the same meanings as are respectively assigned to them in the conditions of contract hereinafter referred to and they shall be deemed to form and be read construed as part of this Agreement.

2. In Consideration of the payment to be made by the Employer to the contractor as hereinafter mentioned, the Contractor hereby covenants with the Employer to executive and complete the works and remedy any defects therein in conformity in all aspects with the provisions of the contracts.

3. The employer hereby covenants to pay the Contractor in consideration of the execution and completion of the works and the remedying the defects wherein contract price or such other sum as may become payable under the provisions of the Contract at the times and in the manner prescribed by the contract.

4. The Following documents shall be deemed to form and be ready and construed as part of this Agreement viz

   i) letter of Acceptance
   ii) Notice to proceed with the works:
   iii) Contractor's Bid
   iv) Conditions of contract: General and Special
   v) Contract Data

vi) Additional conditions

vii) Drawings

viii) Bill of Quantities and

ix) Any other documents listed in the Contract data as forming part of the Contract.

In witness whereof the parties there to have caused this Agreement to be executed the day and year first before written

The Common seal of Was hereunto affixed in the presence of :

Signed, sealed and Delivered by the said _____

---

In the presence of

Binding signature of Employer _____

Binding Signature of Contractor _____

# UNDERTAKING
**(For Investment)**

I, the undersigned do hereby undertake that our firm M/s…….. would invest a minimum cash up to **25%** of the value of the work during implementation of the contract.

_____

(Signed by an Authorized officer of the firm)

_____

Title of officer

_____

Name of firm

_____

DATE

# UNDERTAKING
**(For Validity)**

I, the undersigned do hereby undertake that our firm M/s …….
……..…….…….. agree to abide by this bid for a period days for date fixed for receiving the same and it shall be binding on us and may be accepted at any time before the expiration of that period.

_____

(Signed by an Authorized officer of the firm)

_____

Title of officer

_____

Name of firm

_____

DATE

## SECTION - 9

# DRAWINGS

# SECTION - 10

# DOCUMENTS TO BE FURNISHED BY BIDDER

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**M. 65.** **Low level enamel flushing tanks.**

**M. 66.** **Cast iron flushing cisterns.**

**M. 67.** **Flush cocks.**

**M. 68.** **Cast iron pipes & fittings.**

**M. 68.A.** **PVC pipes and fittings.**

**M. 69.** **Nahni traps.**

**M. 70.** **Gully traps.**

**M. 71.** **Glazed stoneware pipes & fittings.**

**M. 72.** **Wall peg rails.**

**M. 73.** **G. I. water spouts.**

**M. 74.** **Asbestos cement ( A.C. ) pipes.**

**M. 75.** **Crydon ball valves.**

**M. 76.** **Bitumen felt for waterproofing & damp proofing.**

**M. 77. Selected earth.**

**M. 78. Crack seal.**

**M. 79. Cast iron steps.**

**M. 80. Medium duty polyurethane sheets.**

**M. 81. AAC block building element.**

**M. 82. Molded panel door shutters.**

**M. 83. Pebbles.**

**M. 84. Ceramic tiles.**

**M. 85. Vitrified floor tiles.**

**M. 86. Concrete tiles.**

**M. 87. Assam pine wood.**

**M. 88. Stainless steel sink.**

**M. 89. Polycarbonate sheets.**

**M. 90. Stainless steel pipes & plates.**

**M. 91. PVC / Vinyl flooring.**

**M. 92. Aluminium composite panels.**

**M. 93. Acrylic emulsion paints.**

**M. 94. Exterior paints.**

**M. 95. Floor springs.**

**M. 96. Glass mosaic tiles.**

**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 effloresence 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 comparision with distilled water. Comparision 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 sufficeint cause for rejecttion of water under test.

1.3 Water for curing mortar, concrete or masonary 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 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 acceptaibility 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 properly such that it is neigher affected by the cement not 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 allowen 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 metnioned, 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 strenght of concerte.

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 brunt furnace residue which has been fused or ssintered 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 clead and free from clay, dirt, ash or other deleterious matter.

9.3 The average grading for cindar 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 shall 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 agrregate 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. Aggregrate 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 intermixng 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 Aggregrate 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, aggregrates 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 firee 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 then 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 Specificied variety such as Granite/Trap stone/Quarzite 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 viens, 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 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 form 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 hae 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 Indiand 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 flashinges 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 Asbests 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 got 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 provideds 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 handing 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 usefullness 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 clas 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 usefullness for the purpose for which it is required. The colour of the wood shall be uniform as far as possible. The scantalings, 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. desgnation 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, flates 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 ruest 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 mecanical 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 old 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 gluieg. 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 glasing 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. Georgain 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 Penels may be flat or curved. It shall be light in weight. It shall be colourless or coloured or opaaue as specified in the item. Colourless sheet shall be as transparent as the finest optical glass. Its light transmission rate shall be about 95%. Transparancy 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, translucemtn 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 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 and indicated. It shall be of high density and suitable for use as insulting material. The insulting 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 wood 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 bessian 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, hingers, 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.

ii] 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 meed with the following general requirements ---

i] Paint shall not show excessive setting in a freshly opened full can and shall easily be redispressed 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 uneveness and other imperfections.

Ready mixed paid 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 rpovided 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 atleast 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 : deterimental 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, depresssions 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 bad 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 atthe 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 sahll 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 sink, veneering, 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 of minus 2 mm. The provisions in respect of polishing as for polished kotah stone shall apply to plished 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 engles 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 bard, 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 thinest 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 relecting 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, conformint to I.S. 3462-

1966. The P.V.C. covering shall neither develop any toxic effect while put to use not 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 recomended 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 stright 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 accordances with the produre aid 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 be 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 effloresence 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 glasing 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 glavanised 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 form 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 leal 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 squarring 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 enamal 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 antisyphonage 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 & cylidical. They shall be free from crackes,laps,pinholes or other imporfection 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 lenght 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 or 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 | | Socet 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 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 rounde 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 servicability. The thickness of the base metal shall not be less than 6.5 mm. The surface shall be smooth and free form 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 accommdated. 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 throught 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 revelant 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 confor 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 temprature 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./cm2. 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./cm2 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 +_ 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 $1/3^{rd}$ the density of bricks and $1/4^{th}$ 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 1st 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./Cm2.

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 +- 0.3 %, maximum deviation in thickness +- 2.0 %, maximum wedging allowed +- 0.2%, maximum surface flatness shall be +- 0.2 %, water absorption capacity < 0.5 %, maximum Mhos hardness 8.0, flexural strength shall be of > 45 N/mm2, maximum Abrasion resistance < 144 mm3, maximum thermal expansion < 6 x $10^{-6}$, 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 ( g/cm3 ) 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, "Mozzaterra" 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./Cm2. 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 +- 1.0 mm. & tolerance allowed in thickness shall be + 5 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./Cm2.

: When dry : 120 Kg./Cm2.

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 cm2. 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 begin 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/m2. Its flexural modulus shall be 2,500 N/m2 and flexural yield strength shall be 100 N/mm2. It shall have an impact strength ( falling dart ) greater than 200 Nm. It shall have an indentation hardness – H358 10 of 98 N/mm2 and H358 60 to 93 N/mm2. 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./$mm^2$ as per ASTM D790.

The shear resistant shall be 2.60 kgf/$mm^2$ 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 +- 0.2 mm, in length shall be +- 4 mm, in thickness shall be +- 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 : $130^0$ - $0^0$ sweep, and valve 2 : to increase the closing speed between $130^0$ - $20^0$.

**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 sol 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 transferely 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 soild which generally require close application of icks 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 distintegrated rocks which contain silicions 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 congromerate 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 Magzine 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 explosice, 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 flooed 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 paralled 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 firs 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 access 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 our and stacking of useful Materials : and disposing of the excavated stuff up to 50 M leadloose 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 our 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 relavant 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 sense 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 (exclusing rock) in trenches, plinth, sides of foundations, etc. in layers not exceeding 20 CM depth, considating each deposited layer by ramming and watering.**

**1.0 Workmanship :**

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

1.2 Ass 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 allow3ed 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 soild 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 oridinary 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 21/2 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 sum 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 howe3ver 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. Chhajas.**

**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 coform 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 comlete 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 oridinary 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)<br>M-150 (1:2:4)<br>M-200 (1:1.1/2:3)<br>M-250 (1:1:2) | 300 Litres<br>220 Litres<br>160 Litres<br>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<br>32 Litres<br>30 Litres<br>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 beems, 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 not 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 interns of bags of 50 kg weight, the volue 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 bulkage 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 than no foreign Materials : get s 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-n-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 differents 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 form 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 scrubing 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 otherewise 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. Concerete 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 traffric, 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.<br>6-15 cmt.<br>51 and above. | 1<br>2<br>4+ one additional for each additional 50 m. on part thereof. | 16-30 cmt.<br>31-50 cmt. | 3<br>4 |

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/Cm2 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 then 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 withour 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 aleast 25 m. 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 conrners 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 through 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 concrets 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-simmilar 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 expanses 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 cost 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 chhajas 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 chhajas 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 chhajas 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 transpit 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 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 are 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. Langth 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 Jali 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 ofordinary concrete shall be followed except that the concrete mix shall be designed form 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 bein 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 works cube compressive strength of 150 mm. cubes of the mix expressed in Kg./Cmt.

2.2 The propotion 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.** | |
|---|---|---|
| | **Preliminar test Min.** | **Work test. Min.** |
| 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 aggregate 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 form 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, bulkage 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 bulkage 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 :

| Grade | Minimum cement content in Kg. |
|---|---|
| **M 100** | **250** |
| **M 150** | **300** |

| | |
|---|---|
| **M 200** | **350** |
| **M 250** | **410** |

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 $5^0$ C and not more than $40^0$ 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 $38^0$ 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 through 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./cm2 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 $75^0$ 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 payament :**

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 & payament :**

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 & payament :**

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.**

**ECTION – 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 proortion 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 masonary 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 Hall 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 speread 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 cover 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 sporit 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, pies, 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. Masonary work shall be kept moist on all the faces for a period of seven days. The top of masonary 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 masonary. Is masonary 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 masonary 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 masonary fully completed in foundation up to plinth. The limiting dimensions not exceeding those shown on the plains 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 masonary 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 masonary and pipes etc for concealed wiring.

(6) Forming chases of section not exceeding 350 sq.cm. in masonary.

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. Convertional 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 masonary 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 (I 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 ofitem No 6.12.(A) shall be followed except that the proportion of cement moratar shall be cement mortar is i.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.**

**6.0.02. (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 masonary work shall be carried out in time 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) convention bricks.**

**1.0 Materials & Workmanship :**

The relevant specification of item N o. 6.12 (A) and 6.0.0.2(A) shall be followed except that the masonary 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.**

**6.0.03. (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 masonary 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 masonary 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 (I cement: 1 fine sand) modular bricks.**

**1. Materials :**

Bricks shall conform to M-15 Cement moratar 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 masonary work shall be carried out above plinth level to floor tow level i.e. for ground floor,

2.2. The frames of doors, windows, cupboards etc. shall be housed into the birck 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 shal be sound and strong tied together with horizonetal 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 he 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 raceked 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 masonary 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 masonary item for storey immediately below the floor above which the parapet is built.

3.3 No deduction shall be made from quantity of birck work nor any extra payment made for embedding in masonary 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 dones not exceed 500 sq.cm.,

(2) Opening not exceed in 1000 sq.cm.

(3) Wall plate sand bed plates, bearing of slab, chhajas 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 massonary 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 masonary 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 masonary 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 masonary work.

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

**6.10.I. (A) Half Brick masonary 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 birck 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 hall be taken truly plumb. All course shall be laid truly horizontal and all vertical joist 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 masonary 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 masonary 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 planth.

**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 masonary 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 :**

Moduler bricks shall conform to M-15, watershall 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 masonary 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 masonary work shall be carried out in Lime mortar 1:1.5 (1lime 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 follwed.

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 :**

Bircks 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 masonary work shall be in proportion to I 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 very 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 masonary 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 conversional 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 masonary 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 tow 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 masonary 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** Dessing 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 masonary 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 masonary is required tobe left behind, the shall be racked back at an angle not steeper than 45· vertical toothed joints in masonary shall not be allowed. The work shall be carried out regularly and masonary 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 masonary 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 masonary. 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 masonary. The chips used shall not be more than 20% by volume of masonary. 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 masonary.

**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 quioins 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 inone plane. No quoins stone shall be samller than 0.025 mm. 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 racked 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 masonary for supporting scaffolding shall be filled and made good before plastering.

**2.8 Curing :**

Green work shall be protected form 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 masonary 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 masonary work in foundation and plinth shall be measured under this item. No deduction shall be made nor extra payment made for the follwing:

(a) Ends of joints, beams, posts, girders, rafters, purloins stussees. 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 form masonary)

(d) Drain holes and necesses for cement concrete blocks to embed hold fasts for doors windows.

(e) Building in the masonary iron fixtures pipes up to 300 mm. dia. Hold fasts of foors and windows.

(f) Forming cheses n masonary 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 masonary with hard stone of approved quality in foundations and plinth in cement mortar 1.5 (1 cement : 5 coarse snad) 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 moratar shall be in C.M.1.5 (I 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 masonary 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 masonary 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 form the faces and the side joints shall be so dressed to a depth of atleast 40 mm. back form the face, such that no portton of the dressed surface is more than 10 mm, form 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 with of 25 mm. along thd 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 masonary in a structure shall normally be raised up uniformly and regularly. However, if for any spcefic 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 masonary shall not be allowed. The work shall be carried up regularly and masonary 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 mre than 300 mm. Face stone shall be laid in alternate header and stretcher fashion. They shall be so areaged 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 the 150 mm. Each face stone shall be of the same height in any given course. The courses shall be built in perpendicular to the pressre which the masonary will bear. In case of battered walls (such asretining 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 mortsr, 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 any where in the masonary. 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 be filling of interstices between the hearting stones but the volume of chips shall be limited to 15% of the total volume of the masonary.

**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 atleast 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 atleast 400 mm. length. They shall be laid square or beds as stretchers and headers alternatively. The beds shall be rought, chisel dressed to a depth of atleast 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 thana 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 itme 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 masonary 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 (I cement : 4 coarses 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 masonary 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 (I cement : 4 coarses 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 masonary 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 (I cement : 3 coarses 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 masonary 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 masonary 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 in 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 concerte block masonary (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 prerecast 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 proportion 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 masonary 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 masonary 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 masonary for supporting shall be allowd.

2.5 **Coring :**

The curing of concrete block masonary 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 masonary 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 concerte block masonary 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 blood 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 levelant specification of item No 7.75 shall be followed except that the work shall be for prect.

**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 masonary block in superstructure with stone of approved quality in the moratar 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 durble. It shall be free form sking. 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 uniformaly 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 masonary 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, girdersd, rafters, purlins, corbles, 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 chhajas and like up to 10 cms. depth (bearing or floor and roof slabs shall be deducted from masonary).

(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 dela masonary 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 propotion of mortar shall abe 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. While stone bela masonary 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 masonary 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 propotion 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 rought 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 contrete work in foundation, footings, bases of columns and mass concrete.**

**1.0 Materials :**

1.1 The shttering 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 mm. | 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 paymet.

3.4 From work to secondary beams shall be measured up to the sides of main beams but no deduction shall be made form the from work of the main beam at the inter section point. No deduction shall be made form the from 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 concerte 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 before a unit of Sq.meter.**

**9.1 (C) Providing form work of ordinary timber plankings so as to give a rough finish incuding cenetering, 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 haunchinges, 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, bressumuers 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 haunchinges, 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 remoal 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, chhajas 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 centring,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 specificatioans of item No. 9.1. (A)shall abe 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) Vertial 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 haunchinges, cantilevers, girders, breassumers 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, chhajas, 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 tereatment.

**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 from 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 dovertaial joins. 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 masonary for 10 cm. on upper floors, the vertical posts shall be fixed in the floor or masonary by forming notches 10 mm deep. Slight adjustment of spacing as necessary shall be done to have the hold fasts in the joints of masonary course. The frame shall be erected in position and held plumb with strong support form north sides and built in masonary 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 farmes.

2.7. Mild steel hold fasts shall be protected with a coating of coal asphalt tar. The surface of frame abutting the masonary 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 aluminimum 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 ba 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 anodisesd aluminimum 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 clears size of the shutter inclose 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 aluminimum 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 aluminimum 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 woodsen beads or mouldings shape and size as approved with counter sunk screws of suiotable 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 extend 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 aluminimum 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 glaxed 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 glaxed 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 enameleld 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 1st 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 alluminium 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 angel to hold the gauze in two faces, the exposed edge of fillets shall be neatly rouded. 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 diameterI.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 pelment 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 rials 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 brackest 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 form 25 mm. thick planks. The planks shall be palned smooth. The planks shall be sued 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 battons 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 battons 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 vix. 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 found 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 fabrick 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 windown 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 entilators 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 baldes 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 foem shall abe 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 gussest 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 errection, 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 stiffners shall be machanised 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 reamered 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 reamering shall be free from burrs, and the holes should be clean and accurate. Holes for counter shunk 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 maybe 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 to-gether 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 be injure the assembled members firmly. In cutting out rivets, care shall be taken so as not be injure the assembled members, caulking or recuppying shall not be permitted.

For testing rivets, ahammer 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 inposition 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.

Tappered 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 milimetre 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, diapharam 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, errection, 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 purlisns, 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 oxyacehylane flame with specific prior approval. Gas welding shall not be permitted for structural steel work.

1.3. The work shall be done as shown is 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 to gether 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 passion.

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 collespsible 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 masonary 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 masonary 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 juctions 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 juctions.

**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 looking 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, nutts 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 locaks 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 comlete. (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 knows 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 comlete.

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 follwed.

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. Sleve 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 paid 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 Toping :**

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 power : 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 we 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 carbourundum stones of 60 grit size. The surface shall then be washed clean and grounted with a grout of cement or / and colouring matter in the same mix and proportion as the topping in order to fill any pin hoes 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 flowed.

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 flowed.

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 flowed.

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 flowed.

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 Tarrozzo 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 shad pigment with oridinary 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 nomina 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 Workmenship** :

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 slutty 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 confirm 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 spared 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 dedo 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 smoothened 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 handens.

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 fille3d. 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 acide 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 boarders 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 oridinary 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 send) 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 smoothened 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 send) 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 send) 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 beeding. 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 atleas two hours. Neat gray cement grount 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 shallnot 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 and not damaged in any way till the completion of the construction.

**3.0 Mode of measurements and payment :**

3.1 The wor4k 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 masonary wall, the joints shall be raked out to a depth of atleast 15 mm while the masonary is being land. 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 smoothened.

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 then 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 thinckness 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 tope 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 consistencyat 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 meting 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 slubs 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 spe3cified 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 squre 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 foe 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 Workmenship :**

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 jail 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 boarders, 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 confirm 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 line 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 gript 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 confirm 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 masonary offets 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 nomal 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 flushing 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 holt 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 note 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 boltd 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 over lapping 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 groud. 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 slops 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 holts 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. hookd bots 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 smoth 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 form 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 shallnot 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 shallbe 150 mm and the width of metre shall be equal 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 I vertical to 2.1/2 horizontal (Approx. $22^0$) 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 urlins, if these are of timber and square bead 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 anyedge 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 shallbe 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 accessores 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 m 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 fatter 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 over lap 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 peripendicular 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 prulin not exceed 225 mm.

1.4 Requisite slop3e 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 belaid 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 fixingt accessories such as drops 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 caves 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 tope 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 sand 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 strights, 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 bring 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.

2.19. 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. Overlaping 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 commending 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. Seubsequent strips shall also be laid in the same manner. Each strip shall overlap the preceeding 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 Waster 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 tope 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 labout 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 pipe3 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 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 $45^0$, 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 masonary : 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 $45^0$ 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 incrasing 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 800 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 relavant 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 paids 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 has 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 botton 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 adjutant 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 but 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, affloresdence 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 masonary 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 mattings 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 exceedings 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, sils, 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 **T**he 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 **T**he 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 **T**he 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 **T**he 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 staris up to two floor level insteas of plaster on walls.

1.2 The smooth concrete surface shall be suitably roughtend 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 racked 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 masonary. 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, jabms, 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 **T**he 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 paralled 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 :**

**T**he 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 masonary 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 masonary 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 masonary 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 uncourse stone masonary 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 masonary 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 masonary 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 masonary 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-l. Best quality of gum shall be used in the preparations of white wash. Ultramatine 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 ultramarie blue (Up to 3 gms. per Kg. of lime) shall also he 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 masonary 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 he 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 he 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 ceiiings, 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 form 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 litchen 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 jabms, 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. 18.11shall 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 slopping 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 roots.

**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 slopping 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. 18.11and 18.13 shall be followed except that extra payment for white washing shall be made for ceiling and/or slopping 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 :s 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 l.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 appeals 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 sieveing 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 toform slurry to the consistency of good ready mix oil paint. The slurry shall be applied with brusheds 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 he 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 greascay, 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 he 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 Distempering 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 **Scaffo1ding :** 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 he distempered. A properly secured strong and well tied suspended platform (Joolas) may he 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 he used. The surface shall then he rubbed down again with a line grades and paper and made smooth. The surface affected by moulds, moss, fund, algee lichens, efforescence 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 whiting 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 after wards. 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. Distemper is not recommended to he 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 coal 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 he 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 he 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 aplashed upon. Such surfaces shall be cleaned of distemper aplashes 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 efforescences, mouldmoss, fungi, algee and litchens 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 works out to the nearest 0.01 sq.m. All work shall be measured in sq.metre. No deduction shall be made for reveaIs, jambs. soffits, sills etc. of these opening snor for finish around the ends of joints, beams, posts etc.

3.3. Deduction of openings exceeing 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 hut 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 treatged 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 hut if the width of the reveals is equal or more than that of untreated side neither deduction nor additions to he 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 measures.

3.5. In deduction shall be made for attachments such as casing, conduits, pipes, electric wiring and the Iike.

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 Distempering 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 w.ork of hem 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 f 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 distempering 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 distempering 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 distempering 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 roots 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 distempering 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 Distempering (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 hound 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 s possible no part of scaffolding shall rest against the surface to he distemper. A properly secured strong and well tied suspended platform (joola) may he 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 floor, for distempering to ceiling, proper stage scaffolding shall be erected where necessary.

2.2 **Preparation of surface :**

2.2.1 The undecorated surface to he distempered shall be thoughly 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 removes. Pitting in plaster shall be made good with plaster again with a tine grade sand paper and made smooth. A coat of distemper shal he 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, efforescence etc. shall be treated in accordance with I.S. 2395 (Part-I) 1966. Before applying distempering, any unevenness shall be made good by applying putty made of plaster of pairs mixed with water on entire surface including filling up the undulition 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 hound distemper is not recommended to he applied within six months ol the completion of wall plaster.

2.4 **Preparation of oil hound distemper :**

2.4.1 The distemper shall be diluter 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 consecutive 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 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.

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 he 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 he 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 he 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 softits 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. Distempering (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 Distempering (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 distempering 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 distempering 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 distempering 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 distempering aver and above two coats of distempering.

**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 distempering 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 distempering 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 distempering 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 distempering 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 l.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 he 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 used up within an hour of mixing as otherwise the mixture will set and thickness, 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 he exposed to a temperature of below $70^0$ C within 48 hours after application.

2.4.2 When weather conditions are such as to cause he 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 he started unit the proceeding coat has become sufficiently hard to resist marking by the brush being used. In hot dry weather. the proceeding coat shall be slightly moisture before applying the subsequent coat.

2.4.5 The finished surface shall be even and uniform in shade, without patches brush masks, 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 lamps shall be well brushed out.

2.4.7 Water proof cement **paint** shall hot he applied on surfaces already treated with white Wash colour wash, distemper dry or oil hound varnishes, paint etc. It shall not he 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 he damaged by the sprinkling of water say about 12 hours after the application.

2.6. Protection measures shall he 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 ot 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, l8.5l.

2.2 **The rate shall be for a unit of One sq. metre.**

**18.55 Extra over item 18.53 shall be f1lowed 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 throroughly 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 l.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 he done with water and not with turpentine The quantity of thinner to he 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 constitutle 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 coal shall not he 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 he 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 hem 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 he 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 hack 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 no 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 coal except the lat 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 pf 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 confirm to l.S : 102-1962.

1.2. The thinner (linsed oil) shall conform to l.S. 75-1973. If for any reason, thining 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 1orein matter sticking to it with wire brushes, steel wool, scrapers. and paper etc. This surface shall then he wiped finally with mineral turpentine which shall also remove grease and perspiration of hand marks. The surface shall then he 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 he 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 of 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 wail 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 again into a paint container. The primary coal 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, huts. 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 he 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

(a) Dimensions shall be measured to the nearest 0.01 metre.
(b) 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 coal 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 l.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 au 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 o 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 throughly, 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 smoothened with abrasive paper and projecting fibres shall be removed. Flat portions shall be smoothened off with abrasive paper used across the grain prior to painting and with the grain prior to staining or if the wood is to he left in its natural colour, wood work which is to he stained may he smoothened 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 outwith 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 1.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 ofpaint 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 he varnished shall be prepared to produce a smooth, dry neat surface the previous coat of paint or stair, if any shall be allowed to dry and rubbed down slightly wipped 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 he chosen. Explosure 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 he taken to avoid forming froth or air hubbies. Brushes and containers shall be kept scruplously 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 for frothing. It shall be allowed to 110w out while the next section is being laid in. Excess varnish then he scrapped out of the brush and the first section he crossed, recrossed and then laid off lightly. Two 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 flatted down before applying the finishing the finishing coat. If two coats are applied, su1Ticicnttime shall be allowed between two coats.

2.2.3 When flat varnish is used for finishing a preparatory coat of hard drying under coating of flatting varnish shall be first applied and shall be allowed to harden thoroughly. It shall then he 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 over alapping 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 he 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 aim 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 l.S. 348-1968.

**2,0. Workmanship :**

2.1. **Preparation of Surface :**

2.1.1. All uneverness 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 he 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 overlaping 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 he added which shall facilitate this operation. The surface shall be allowed to dry and the remaining coats applied in the same may. To finish off, the pad shall be covered with a fresh piece of clean fine cloth, slightly damped 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 surftice to give au 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 l.S. : 75-1967. Turpentine shall conform to l.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 on stearine adulterants shall be used. The polish shall be prepared from mixture of bees wax, linsed oil, turpentine, and varnishin 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. he well stirred.

2.2. **Preparation of surfaces :**

2.2.1 The surface to he 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 he rubbed down Lightly wiped off and allowed to dry. All dust and dirt, shall be removed from the surface to he 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 he 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 failing 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 in dry showing no sign stickness.

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 : I 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 five au even shade including cleaning of all dirt, dust and other foreign matter :**

**1.0 Materials :**

The coal tax shall conform to l.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 he taken off the fire and kerosene oil added to if slowly at the rate of I 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 he painted shall be allowed to dry sufficiently. Any exciting fungus or mould growth shall be. completely removed. All major cracks of 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, comas, 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 linished 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, hypens, and the like shall be deemed to he 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 on 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 form the Engineer-in-charge before starting the work. This however will not absolve the contractor from the responsibility of proper and safe demotion.

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 he adjoining property.

1.4. Wherever required, temporary enclosures or partitions shall also he provided. Necessary precautions, shall h 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 he damaged by dropping form a height or demolishing roof, masonry etc. shall be carefully dismantled firsi 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 h stacked as directed by the Engineer-in-charge.

1.8 On completion of work, the site shall be cleared of all debrit rubbish and cleaned as directed

**2.0. Mode of measurements and payment :**

2.1 Measurements of all work shall be taken be fore demolition or dismantling and no allowance for increase in hulk shall be allowed. The demolition of lime concrete shall be measured under this item. Speci1cation 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 0.0l 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 adjkJ1ging 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.l(i) shall be followed except that the unreinforced cement concrete work is to he demolished instead of lime concrete.

**2.0. Mode 0f measurements and payment :**

2.1. The relevant specification of item 20.L(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 he 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 hut 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 masonary 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 masonary in lime mortar is to he 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 masonary shall be measured in cubic metres. All copings, curbels, cornices and other protections 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 he 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 masonary 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.

23. 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 speci1icatons ol 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 : wit/i all lead and lift.**

**1.0. Workmanship :**

The relevant specifications 01' 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.l(i) shall be followed.

2.2. The weight of the member shall be computed from standard tables unless the actual weight can he readily determined.

2.3. Riveted works where rivets are required to he 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, archiraves, hold fasts and other attachments etc. are to he 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 he 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 disturnbed ground, stacking useful Materials : as directed and disposing all the unserviceable Materials : with all leads an d 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 sha11 be scraped thoroughly with handscraper 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 wipped 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 e reinforcement and up to 25 mm. clear round the reinforcement bar. This shall be done without any damage to adjoining protion 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 coare 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 laboaur 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 fillting solidly with hot mixtures of bitumen and clean dry sand (1:1 weight).**

**1.0.** **Materials :**

1.1 (1) Bitumen shall be 85/25 penitration

(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 penitration 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 siope 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 san : 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 2nd 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 mosic 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 Constucting, a chowkadi with C C over 12 cm. thick B B masonry in fornt 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 wll 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 reinforeced 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 aunit of onr 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 GM. (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. slabe 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 titles 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 pegs 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 pegs 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.

| Chemicals | Concentration |
|---|---|
| 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 the measured. The length and breadth shall be measured correct toa 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 sans 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 :

| Chemicals | Concentration |
|---|---|
| 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 perfary 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 appron 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 wars 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 is 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 drilleing 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 fight 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 he 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 sokid floors: where unavoidable, pipes may me 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 sleave 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 of 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 shalpe, 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 0.0.1 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, elblows, 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 (1cement : 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 sufficie3nt 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 charge in strata or undulating ground etc. when they maybe 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 cushioining 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 then 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 unpregnated 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. (A).(I). 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.**

**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 alone 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 of 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 cadt 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 done 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 laving 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 enamellaed flush bend including cutting holes in walls and making good the same and connecting the flush bend eith 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 vitreours 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-led. 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 1st 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 exluding 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 gulley 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. inpet 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 scres and washers.**

**1.0. Materials :**

1.1. The 600 mm. x 450 mm. size mirror shall be of superiror glass with edge rounded of 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. (A). (I). Providing and fixing brass screw down bib taps of following size. Polished bright : 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. (A).(II). Providing and fixing brass screw down bib taps of following size : polished bright : 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. (B). (I). Providing and fixing chromium plated brass screw down bib taps of following size : 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 of shall be for a unit One number.**

**23.92. (B). (I). Providing and laying chromium chromium plated brass screw down bib taps of following size : 20 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 measurement and payment :**

2.1. **The rate shall be for a unit of One number.**

**23.92. (C). (I). Providing and fixing gun metal screw down bib taps of the following size : 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. (C). (II). Providing and fixing gun metal screw down bib taps of the following size : 20 mm. dia.**

**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 world 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 trac 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 hack 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 01: urinal, unless otherwise directed. The wooden plugs shall be of 50 mm. x 50 mm. at base lapparing 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 miled 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—l063 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 nieces suitably fixed in floor in cement mortar 1:3 (1 cement. : 3 coarse sand) and joint finished with white cement. The earthware vitreous china shall discharge into 65 mini C.P. 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 0f 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 hail 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 hail 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 then 35 kg.**

**1.0 Materials :**

1.1 C.1. 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.l. manhole cover shall be of light duty and conform relevant l.S.

**2.0. Workmanship :**

2.1 The C.1. 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.l.1C 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 posses 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 unpregnated 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 tree 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. lazed 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 01 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 01 cement mortar ill proportion of one part of cement and one part of sharp sand. When the socket is fillet, a filled shall be formed round the joints with a trowel, forming an angle of 450 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 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, hut 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 bottaning 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. No1ling 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 find 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 fr 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 masonary 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-l,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 gulley 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:l0 (1 cement : 5 and : 10 graded brick bats aggregate, 40 mm. nominal size) foundation, 650 mm. square and l00 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 masonary chamber : After fixing and testing gulley and branch drain, a brick masonary 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 masonary 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 sopes) and jointing reinforced concrete light duty non-**

**pressure pipe I. S. class N.P 2 of the following internal diameters with coliars 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 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.

2.3. **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 forwarded 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 masonary 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 confirm 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 l 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 masonary 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/Cm2 in C.M.1:5 (1 cement : 5 coarse sand). The thickness of brick masonary 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 masonary 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 vetical1y 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 oft 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. masonary 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. masonary 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 l.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. masonary 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 l.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.1. 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 I20 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 0f 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 grounted with cement mortar 1:1 (1 cement : I 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-l. 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 mum, 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 masonary 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 etering 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 masonary road gully chamber 500 x 600 mm. including 600 mm. x 450 mm. C.1. horizontal gratings with frame complete.**

**1.0 Materials :**

1.1. Water shall conform to M-1. Cement shall conform toM-3. Sand shall confirm to M-6. Brick shall conform to M-15. C.1. 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 masonary 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 wails 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 masonary walk 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 masonary 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 masonary 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 ol item No. 24.40 shall be followed.

2.2. **The rate shall, be for a unit of One sq. metre.**

**24.44(1) Constructing brick masonary chamber for underground C.I. inspection chamber and bends with brick having crushing strength not less than 35 kg./Cm2 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 masonary 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 concerete 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 masonary walls shall be 7.5 cms.

2.4. Masonary 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 masonary chamber for underground C. I. inspection chamber and bends with brick having crushing strength not less than 35 Kg./Cm.2 in C.M.1:5 C.1. 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 CM.1:3 finished smooth with a finishing coat of neat cement on wails 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 masonary 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 2 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 masonary 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 perifary of the soak pit shall be provided with dry masonary wall with burnt bricks in 23 cms. Thick. The masonary 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 masonary 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.

## ADDITIONAL TECHNICAL SPECIFICATIONS :

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| **Additional** | **Providing & laying medium duty black colour polyurethane sheet on compacted soil with** |

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| **Specifications Item no. 01.** | **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 ).** |
| | **Materials :** |
| | The medi<br>um duty black polyurathane sheet shall be from "Om Agor Industrial Plastics Pvt. Ltd.", or "Profeel", "Ramplast" or as approved by the Architect or Engineer-in-Charge.<br><br>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.<br><br>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./cm2. 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./cm2 and 90 degree C respectively.<br><br>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.<br><br>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. |
| | **Workmanship :** |
| | The polyurathane sheet shall be laid on compacted soil having minimum 75 mm. wide overlaps at all the edges as directed by the Engineer-in-Charge. |
| | **Mode of measurements and payment :** |
| | 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**.** |
| **Additional Specifications Item no. 02.** | **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.** |
| | **Materials : Super Plasticising Admixture :** |
| | 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.<br><br>It shall meet the specifications mentioned in ASTMC 494 types F, BS 5075 Part 3, IS 9103 – 1979.<br><br>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 $25^0$ C. It shall have no chloride or nitrate content.<br><br>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. |

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| | 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.<br><br>It is typically used at the areas where there is highly congested reinforcement. |
| | **Workmanship :** |
| | It shall be added with gauging water to the concrete / mix during the mixing cycle. It shall never be added to the dry mix.<br><br>280 ml. of the plasticizer shall be added to a 50 kg. bag of cement. |
| | **Mode of measurement and payment :** |
| | The rate shall be unit of one litre. |
| **Additional Specifications Item no. 03.** | **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.** |
| | **Materials :** |
| | 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.<br>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.<br><br>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.<br><br>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.<br><br>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. |
| | **Workmanship :** |
| | 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.<br><br>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. |
| | **Mode of measurement and payment :** |
| | The rate shall be unit of one litre. |
| **Additional Specifications** | **Providing and mixing Fibre with cement concrete for r.c.c. works in dosages as recommended by the manufacturer's guide, etc. complete.** |

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| **Item no. 04.** | |
| | **Materials :** |
| | The fibre shall be "Recron 3S" by Reliance Industries Ltd., or its equivalent as approved by the Architect or Engineer-in-Charge.<br><br>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.<br><br>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.<br><br>It shall be mixed with cement concrete for all r.c.c. works. |
| | **Workmanship :** |
| | 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. |
| | **Mode of measurement and payment :** |
| | The rate shall be unit of one kg. |
| **Additional Specifications Item no. 05.** | **P & l 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 & plumb as directed and instructed by the manufacturer, etc. complete, on all floors.** |
| | **MATERIALS :** |
| | The pre-fabricated, autoclaved, cellular light weight concrete blocks - building elements shall be machine molded, made in a factory.<br><br>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.<br><br>The dimensions of CLC blocks shall be 625 mm. or 600 mm. lengths with +_ 5 mm. tolerances, 250 mm. height and 200 mm. thickness as specified. The CLC blocks shall be consistent and constant in dimensions, having minimum variations.<br><br>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 $1/3^{rd}$ the density of bricks and $1/4^{th}$ the density of R.C.C., resulting in the reduction of dead loads on the structure.<br><br>CLC blocks shall have compressive strength of 30 Kgs./ Cm2 for 200 mm. thick blocks. They shall have shear strength 1 kg./ Cm2, modulus of elasticity of $2.1 \times 10^4$ Kgs./ Cm2, and co-efficient of linear expansion shall be 0.000008 per $^0$C.<br><br>CLC blocks shall have thermal conductivity of 0.122 Kcal / hr. / M $^0$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.<br><br>CLC blocks shall be inorganic and providing 3 hours of fire resistance for 200 mm. thick walls.<br><br>CLC blocks shall be impervious to rot, insects and other pests. |

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| | CLC blocks shall be inert, non-toxic and recyclable, causing no air pollution and illnesses indoors because of not being a source off gassing.<br><br>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. |
| | **Workmanship :** |
| | 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.<br><br>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.<br><br>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.<br><br>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.<br><br>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. |
| | **Mode of measurements and payment :** |
| | 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. |
| **Additional Specifications Item no. 06.** | **Providing & fixing 32 mm. thick single / double door shutters, treated in vacuum pressure, chemically treated plant, with molded textured finished door skin.** |
| **1.0.** | **Materials :** |
| 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 |

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| | 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 stell 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. |
| **2.0.** | **Workmanship :** |
| 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. |
| **3.0.** | **Mode or measurement and payment :** |
| 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. |
| **Additional Specifications Item no. 07.** | **Providing and fixing ceiling – hung Series 600 toilet partitions & doors system,** 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. |
| **1.0.** | **Materials :** |
| 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 :<br>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 |

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| | – 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 :<br>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. |
| **2.0.** | **Workmanship :** |
| 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. |
| **3.0.** | **Mode or measurement and payment :** |
| 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. |
| **Additional Specifications Item no. 08.** | **Providing & fixing sliding windows using aluminium sections as per detail.** |
| **1.0.** | **Materials :** |
| 1.1. | Aluminium sections, fixtures & fittings shall conform to M-31. The glass shall conform to M-38. |
| **2.0.** | **Workmanship :** |
| 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 with 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. |
| **3.0.** | **Mode or measurement and payment :** |
| 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. |

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| **Additional Specifications Item no. 09.** | **Providing & fixing top-hung / casement windows using aluminium sections as per detail.** |
| **1.0.** | **Materials :** |
| 1.1. | Aluminium sections, fixtures & fittings shall conform to M-31. The glass shall conform to M-38. |
| **2.0.** | **Workmanship :** |
| 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 with 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. |
| **3.0.** | **Mode or measurement and payment :** |
| 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. |
| **Additional Specifications Item no. 10.** | **Glass Curtain Wall :**<br><br>**Providing & 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 & / 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 & 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.** |

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| **1.0.** | **Materials :** |
| **1.1.** | **References :**<br>A. ANSI/ASCE-7 - Minimum Design Loads for Buildings and Other Structures.<br>B. ANSI Z97.1 - Glazing Materials : Used in Buildings, Safety Performance Specifications and Methods of Test.<br>C. ASTM C1048 - Standard Specification for Heat-Treated Flat GlassKind HS, Kind FT Coated and Uncoated Glass<br>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.<br>E. ASTM E 330 - Standard Test Method for Structural Performance of Exterior Windows, Curtain Walls, and Doors by Uniform Static Air Pressure Difference.<br>F. ASTM E 331 - Standard Test Method for Water Penetration of Exterior Windows, Skylights, Doors, and Curtain Walls by Uniform Static Air Pressure Difference<br>G. CAN 2-12.1-79 National Standard.<br>H. CPSC 16 CRF Part 1201 II - Safety Standard for Architectural Glazing Materials : |
| **1.2.** | Spider/Stabilizing Grid Assembly Design Requirements :<br>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.<br>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.<br>3. System design shall be Glass Fin System.<br>4. Fittings shall be designed to give flush appearance to outward surface of glazing system.<br>5. The design of the fittings is the sole responsibility of InKan Ltd., or other approved suppliers.<br>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.<br>7. The system shall provide for unitized pre-fixing of all items to glass prior to erection. |
| **1.3.** | 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 : |

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| | Sealants related to curtain wall systems, including perimeter sealant. |
| **1.4.** | Structural Performance: Design and construct curtain wall system to withstand loading requirements not less than specified herein.<br><br>Wind Loads: Design and construct system based on ANSI/ASCE-7 criteria for wind load. |
| **1.5.** | Safety Factor for Design : 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.<br><br>Design ultimate load capacity of anchor components to withstand 2.0 times "Design Wind Load" without failure. |
| **1.6.** | Thermal and Differential Movement: 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.<br><br>Thermal and differential movement within system (both directions).<br><br>Thermal and differential movement between system and adjacent construction.<br><br>Movement between curtain wall framing and brick masonry walls.<br><br>Movement between curtain wall framing and r. c. c. beam bottoms and any other roof components.<br><br>Movement between curtain wall framing and long term shortening of structural frame (creep) and deflection of structural framework (sway).<br><br>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.<br><br>Base thermal movement on temperature differential of not less than 77 degrees C (170 degrees F). |
| **1.7.** | Air Infiltration: Installed system shall conform to the following minimum standards when tested to comply with ASTM E283.<br><br>Fixed wall area: Test pressure 30.5 kgf/sq m (6.24 psf): 12 Lm/sqm (0.04 cfm/sf) allowable. |
| **1.8.** | Water Resistance: Installed system shall conform to the following minimum standards when tested to comply with ASTM E 331.<br><br>No water penetration to interior surface.<br><br>Test pressure regardless of location: Static Water at 73 kg/sq m (15 psf ) : No Leakage. |
| **1.9.** | **Submittals :** |

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| | 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.<br><br>**Product Data :** Manufacturer's data sheets on each product to be used, including<br><br>Detailed specification of construction and fabrication.<br>Manufacturer's installation instructions.<br><br>Certified test reports clearly indicating compliance with performance requirements specified herein.<br><br>Sealant manufacturer's data on surface preparation and application for each type of sealants proposed.<br><br>**Shop Drawings :**<br><br>Indicate dimensioning, general construction, specific modifications, component connections, anchorage methods, hardware, and installation procedures, plus the following specific requirements.<br><br>Elevate entire openings of system.<br><br>Indicate conditions at adjacent and dissimilar construction, corners, terminations, parapets, soffits, sills, etc.<br><br>Indicate anchorage details, including dimensioning for sizing and setting embedded items, expansion joints both vertically and horizontally.<br><br>Indicate glass types, sizes, and edge clearances.<br><br>Indicate jamb, head, sill, and corner conditions and specific anchorage details for each situation.<br><br>**Selection Samples:**<br><br>For each finish product specified, two complete sets of color chips representing manufacturer's full range of available colors and patterns.<br><br>**Finish selection:** Glass connector hardware.<br><br>**Glass:** 305 mm by 305 mm (12 inches by 12 inches) sample of glass.<br><br>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.<br><br>Finish shall represent color range, finish thickness, and sheen to be expected in the finished Work.<br><br>**Verification Samples:**<br><br>For each finish product specified, two samples, minimum size 150 mm (6 inches) square, representing actual product, color, and patterns.<br><br>**Finish selection:** glass connector hardware.<br><br>**Glass:** 305 mm by 305 mm (12 inches by 12 inches) sample of glass.<br><br>**Quality Control Submittals:**<br><br>Statement of qualifications for manufacturers and installers.<br><br>Statement of compliance with regulatory requirements.<br><br>Professional certifications. |

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| | Mock-up Assembly.<br><br>Field Quality Control Submittals as specified in Part 3.<br><br>a. Sealant adhesion field tests.<br>b. Field performance tests.<br>c. Manufacturer's field services.<br><br>**Contract Closeout Submittals:**<br><br>Operating and maintenance manuals.<br><br>Special warranties.<br><br>Glass warranties, including manufacturer's written certification of compatibility between glazing material and hermetic seal. |
| **1.10.** | **Quality Assurance :**<br><br>**Manufacturer Qualifications :** Not less than 10 years experience in the actual production of specified products.<br><br>Components shall be factory fabricated and engineered by single entity.<br><br>**Installer Qualifications :**<br><br>Not less than 10 years experience with structural silicone systems.<br><br>Successfully completed not less than 5 comparable scale projects using this system.<br><br>**Sole Source Responsibility :**<br><br>Acceptable to InKan Ltd., or any other selected supplier of system hardware.<br><br>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 qualified to install system.<br><br>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.<br><br>**Regulatory Requirements :**<br><br>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 :<br><br>**Engineering Qualifications and Certifications :**<br><br>Perform design and engineering work of this section under direct supervision of a professional engineer registered in the state of the project location.<br><br>**Mock-Up :**<br><br>Provide a mock-up for evaluation of surface preparation techniques and application Workmanship :.<br><br>Finish areas designated by Engineer-in-Charge. |

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| | Do not proceed with remaining work until Workmanship :, color, and sheen are approved by Engineer-in-Charge.<br><br>Refinish mock-up area as required to produce acceptable work. |
| **1.11.** | **Delivery, Storage and Handling :**<br><br>Store products in manufacturer's unopened packaging until ready for installation.<br><br>Store and dispose of solvent-based Materials :, and Materials : used with solvent-based Materials :, in accordance with requirements of local authorities having jurisdiction. |
| **1.12.** | **Project Conditions :**<br><br>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.<br><br>**Field Measurements:** Check openings by field measurement before fabrication to ensure proper fitting of work; indicate measurements on shop drawings.<br><br>Where necessary, proceed with fabrication without measurements, and coordinate fabrication tolerances to ensure proper fit. |
| **1.13.** | **Project Warranty :**<br><br>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.<br><br>**Manufacturer Warranty:**<br><br>Provide twelve year warranty for design and Materials : provided. Provide written requirements for notification of manufacturer and terms for maintaining warranty provisions.<br><br>**Installer Warranty:**<br><br>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.<br><br>Stress breakage resulting from improper framing design.<br><br>Breakage resulting from chipped or damaged edge conditions from original installation or thermal stresses.<br><br>Water and air infiltration in excess of performance requirements specified herein.<br><br>Sealant failure, both around perimeter and within curtain wall system. |
| **1.14.** | **Products :**<br><br>Acceptable Manufacturers :<br><br>“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 : info@enoxindia.com. Web site : www.enoxindia.com.<br><br>Ozone Overseas Ltd. Telephon no. : 011-45576677 ( 30 lines ). Fax : 011-45576699. e-mail : |

ozone@ozone-india.com web site : www.ozone-india.com.

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: request info; Web: www.inkan.on.ca

**Substitutions:**

Requests for substitutions may be considered upon merit and equivalence by the Engineer-in-Charge.

**Components :**

**Glass :**

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.

**Construction for Face Plates and Stabilizing Fins :**

19 mm (3/4 inch) clear. Straight profile as indicated on drawings.

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.

Glass shall be horizontally tempered eliminating tong marks.

**Structural Silicone Sealant:**

Single component silicone elastomeric sealant.

Acceptable manufacturers and products:

Dow Corning or GE or its equivalent as approved by the Engineer-in-Charge : Formulation determined by glazing system manufacturer.

Fittings:

Splice Plates:

Satin Stinless 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 ).

Architectural Routel :

SSS, grade 316, bright machine finished, socket head bolt with hexagonal shank, flat type.

Base Metal and Finish:

As scheduled. Refer to drawings.

All structural bolts to carry an S.A.E. grade or A.S.T.M. specification as defined on the drawings.

**Spider Fittings:**

SSS, grade 316, 4-way spider fittings for flush glazing to suit 4-glass panels assembly.

SSS, grade 316, 2-way spider fittings for flush glazing to suit 2-glass panels assembly at 180 degrees.

All structural bolts to carry an S.A.E. grade or A.S.T.M. specification as defined on the drawings.

No exterior plates, caps, disks or buttons Shall be permitted.

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| | Base Metal and Finish: As scheduled. Refer to drawings. |
| **1.15.** | **Execution :**<br><br>**Examination** :<br><br>Verification of Conditions:<br><br>Examine areas and conditions under which Work is to be performed and identify conditions detrimental to proper and or timely completion.<br><br>Do not proceed until unsatisfactory conditions have been corrected.<br><br>**Installation :**<br><br>Install curtain wall system to comply with manufacturer's instructions.<br><br>Comply with AISC "Manual of Standard Practice" for installation of steel elements.<br><br>Plate to plate joints of glass are sealed with silicone sealant. Joint dimensions shall be designed to be compatible with sealant properties and live load movement of the structure.<br><br>**Bolt Torque:**<br><br>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.<br><br>**Erection Tolerances:**<br><br>Installed system shall be less than the limits specified herein. Shim system to maintain tolerances.<br><br>Limit variations from plumb, level, or dimensional angle to the following:<br><br>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.<br><br>Not more than 6 mm (1/4 inch) deviation in 12 m (40 foot) run, in any direction.<br><br>At battered wall areas, plumb is defined to match indicated slope.<br><br>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:<br><br>Not more than 9.5 mm (3/8 inch) total deviation for member at any location.<br><br>Not more than 3 mm (1/8 inch) change in deviation for member for 3 m (10 foot) run.<br><br>**Weathering Sealants:**<br><br>Install sealants as indicated and required to achieve water and airtight assembly, complying with requirements of curtain wall manufacturer.<br><br>Clean and prime joints as recommended by sealant manufacturer. Install sealant and related backing material around perimeter of frames.<br><br>Apply sealant filling joint and tool smooth to insure full contact with adjacent surfaces. Strike off excess material.<br><br>**Field Quality Control :**<br><br>**Sealant Adhesion Field Test:** |

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| | Comply with the following.<br><br>**Weathering Sealant Adhesion :**<br><br>After liquid-applied sealant is fully cured, perform sealant adhesion test according to sealant manufacturer's recommendations.<br><br>**Structural Glazing Sealant Adhesion:**<br><br>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.<br><br>**Manufacturer's Field Services:**<br><br>Field engineer from curtain wall manufacturer shall visually inspect the system at the following stages to ensure compliance with manufacturer's recommendation for installation.<br><br>Prior to erection, verify structural support system is within tolerances and proper alignment.<br><br>**During installation:**<br><br>Provide periodic inspection during installation at critical stages of each curtain wall system.<br><br>**Upon completion of installation:**<br><br>Inspect entire system for areas of non-conformance to either manufacturer's recommendations or mock-up test report recommendation.<br>Issue written report within 48 hours of each Site inspection to Contractor and Architect.<br><br>**Cleaning and Protection :**<br><br>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.<br><br>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. |
| **2.0.** | **Mode or measurement and payment :** |
| 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. |
| **Additional Specifications Item no. 11.** | **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.** |
| **1.0.** | **Materials : Plasticizer :** |
| 1.1. | 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.<br><br>It shall meet the specifications mentioned in ASTMC 494 types A & D, CRD –C-87 types A & D, BS 5075 Part 1.<br><br>It shall be a dark brown or black liquid, having specific gravity of 1.20 at $25^0$ 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.<br><br>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 grunting, and to waterproof the mix, thus forming impermeable concrete.<br><br>It is typically used at the areas where there is highly congested reinforcement. |

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| **2.0.** | **Workmanship :** |
| 2.1. | It shall be added with gauging water to the concrete / mix during the mixing cycle. It shall never be added to the dry mix.<br><br>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.<br><br>280 ml. of the plasticizer shall be added to a 50 kg. bag of cement. |
| **3.0.** | **Mode or measurement and payment :** |
| 3.1. | The rate shall be for a unit of one Litre. |
| **Additional Specifications Item no. 12.** | **Providing & fixing aluminium "C" - sections, as approved by the Engineer-in-Charge, fixed into plaster on the walls as grooves, in line, level & plumb, as per the details, etc. complete.** |
| **1.0.** | **Materials :** |
| 1.1. | Aluminium C - sections shall conform to M-31. |
| **2.0.** | **Workmanship :** |
| 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. |
| **3.0.** | **Mode or measurement and payment :** |
| 3.1. | The rate shall be for a unit of running meter. |
| **Additional Specifications Item no. 13.** | **Providing & fixing 4.00 mm. thick exterior grade aluminum composite panels :** |
| **1.0.** | **Materials :** |
| 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. |
| | **M.92. ALUMINIUM COMPOSITE PANELS :**<br><br>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.<br><br>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.<br><br>The ACPs shall be either 4 mm. thick as specified in the detailed design drawings.<br><br>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 |

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| | coating and finally a protecting film, and they shall be covered on the other side with anti-corrosive protecting film and anti-corrosive primer.<br><br>The minimum unit weight of 4 mm. thick ACPs shall be 5.50 Kgs./S.Mt. as per ASTM D792.<br><br>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.<br><br>The flexural rigidity shall be 14.0 x $10^5$ as per ASTM C393.<br><br>The impact resistant shall be 1.650 kgf as per ASTM D372.<br><br>The adhesive strength shall be 0.78 kgs./mm. as per ASTM D903.<br><br>The sound insulating rate shall be 25 db as per ASTM E413.<br><br>The flexural elasticity shall be 4055 Kgs./$mm^2$ as per ASTM D790.<br><br>The shear resistant shall be 2.60 kgf/$mm^2$ as per ASTM D732.<br><br>The minimum bending radius shall be 70 mm. as per ASTM D790.<br><br>The fire propagation shall be as per ASTM E84.<br><br>The smoke developed shall be less than 45 as per ASTM E84.<br><br>The wind pressure resistant shall be as per ASTM E330.<br><br>The properties against water shall be as per ASTM E331.<br><br>The properties against air shall be as per ASTM E283.<br><br>The colors and the surface texture shall be as specified in the detailed design drawings.<br><br>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.<br><br>The tolerances in width shall be +- 0.2 mm, in length shall be +- 4 mm, in thickness shall be +- 0.2 mm. in bow maximum 0.5 % of the length, and in square ness shall be maximum 5.00 mm. |
| **2.0.** | **Workmanship :** |
| 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. |
| **3.0.** | **Mode or measurement and payment :** |
| 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. |
| **Additional Specifications** | **Polymer Vata :** |

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| **Item no. 14.** | **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.** |
| **1.0.** | **Materials :** |
| 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 mofdifiesthe 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. |
| **2.0.** | **Workmanship :** |
| 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. |
| **3.0.** | **Mode or measurement and payment :** |
| 3.1. | The rate shall be for a unit of one running meter. |
| **Additional Specifications Item no. 15.** | **Chemical based Waterproofing Treatment :** |
| **1.0.** | **Materials & Workmanship :** |
| | **Providing & applying chemical based waterproofing treatment as follows :**<br><br>**Preparing the surface by way of chipping and removing extra mortar, slurry, etc., & / or any loose material with wire brush and cleaning the surface of any dust particles by using a blower.**<br><br>**Opening up the existing cracks and making "V" grooves of size 5 mm. to 15 mm. using a cutter machine, wherever necessary, providing & 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.**<br><br>**Treating construction joints, if required.**<br><br>**Providing & treating the construction joints by applying paste made out of polymer and grout, etc. complete.**<br><br>**Providing & 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.** |

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| | **Applying coats of Elastomeric Membrane - Flexicoat :**<br><br>**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 & floors of u. g. tanks & 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.**<br><br>**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.**<br><br>**The whole works to be executed through specialised agency with a guarantee of 10 ( ten ) years given on a prescribed performa duly stamped.** |
| **2.0.** | **Mode of measurement and payment :** |
| **2.1.** | The rate shall be unit of one square meter. |
| **Additional Specifications Item no. 16.** | **Indian style cement based waterproofing :**<br><br>**P & l 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.** |
| **1.0.** | **Materials : :** |
| 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 mofdifiesthe 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 confirm to M – 15. Cement mortar shall confirm to M – 11. |
| **2.0.** | **Workmanship :** |
| **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.** | **Mode of measurement and payment :** |
| **3.1.** | The rate shall be for a unit of one square meter. |
| **Additional Specifications Item no. 17.** | **Providing and filling in depression with cinder or fly ash on all floors :** |

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| **1.0.** | **Materials :** |
| 1.1. | The cinder shall conform to M – 9. |
| **2.0.** | **Workmanship :** |
| 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.** | **Mode of measurement and payment :** |
| 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. |
| **Additional Specifications Item no. 18.** | **Providing & laying in position for flooring as per the designed pattern ceramic & 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 & grout, and skirting, including curing & 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.**<br><br>**The various types of tiles and their sizes shall be as follows :**<br><br>**1. 900 mm. x 900 mm. Vitrified tiles.**<br>**2. 600 mm. x 600 mm. Vitrified tiles.**<br>**3. 300 mm. x 300 mm. Ceramic tiles.**<br>**4. 300 mm. x 300 mm. Ceramic group-IV tiles.**<br>**5. 600 mm. x 600 mm. Ceramic group-IV tiles.**<br>**6. 1,200 mm. x 600 mm. full body vitrified tiles slab.** |
| **1.0.** | **Materials :** |
| 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. |
| | **FLOOR TILES :**<br><br>Floor tiles shall be of the best quality from manufacturers such as H. & 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.<br><br>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.<br><br>Maximum deviation in length +- 0.3 %, maximum deviation in thickness +- 2.0 %, maximum wedging allowed +- 0.2%, maximum surface flatness shall be +- 0.2 %, water absorption capacity < 0.5 %, maximum Mhos hardness 8.0, flexural strength shall be of > 45 N/mm2, maximum Abrasion resistance < 144 mm3, maximum thermal expansion < 6 x $10^{-6}$, 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 ( g/cm3 ) shall be 2.4 & no moisture expansion. |
| **2.0.** | **Workmanship :** |

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| **2.1.** | Bedding : |
| **2.1.1.** | 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 their shall be no hard lumps, which may interfere with the evenness of the bedding. |
| **2.2.** | **Fixing the tiles :** |
| **2.2.1.** | 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 ads 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. |
| **2.2.2.** | 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.<br><br>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. |
| **2.2.3.** | While laying, any chiseling, which may be required for making the skirting or dado flush with the finished wall, shall be done. |
| **2.3.** | **Cleaning :** |
| **2.3.1.** | 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. |
| **2.3.2.** | 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. |
| **3.0.** | **Mode of measurement and payment :** |
| 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.<br><br>The rate shall be for a unit of one running meter for skirting. |

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| **Additional Specifications Item no. 19.** | **P & l 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 & slope, including filling the joints with matching coloured grout & sealer of "Bal-Endura" or approved equal make & quality, with proper curing, etc. complete on all floors.** |
| **1.0.** | **Materials :** |
| 1.1. | Water shall conform to M-1. Cement mortar shall conform to M-11. The granite stone slab shall conform to M-52. |
| 2.0. | **Workmanship :** |
| 2.1. | The relevant specifications of item no. 14.36. ( A )/ P-97and 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. |
| **3.0.** | **Mode of measurement and payment :** |
| 3.1. | The rate shall be for a unit of one running meter. |
| **Additional Specifications Item no. 20.** | **P & l 20 mm. thick double coat smooth cement plaster ( I. P. S. ) on steps & 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.** |
| **1.0.** | **Materials : :** |
| 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. | The fibre shall be "Recron 3S" by Reliance Industries Ltd., or its equivalent as approved by the Engineer-in-Charge.<br><br>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.<br><br>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.<br><br>It shall be mixed with cement mortar while carrying out the internal plaster. |
| 2.1. | **Workmanship :** |
| | 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. |
| | **Mode of measurement and payment :** |
| **3.0.** | The rate shall be for a unit of one square meter. |

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| 3.1. | The rate shall be for a unit of one running meter. |
| **Additional Specifications Item no. 21.** | **Providing & fixing 100 mm. wide x 920 mm. long x 3.00 mm. thick U. V. resistant vinyl tiles :** |
| **1.0.** | **Materials :** |
| **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. |
| **M.91.** | **PVC / VINYL FLOORING :** |
| 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 :<br><br>Thickness : + 0.15 mm.<br>Length or Width :<br>1.30 mm. square tiles, + 0.20 mm.<br>3.90 mm. square tiles, + 0.60 mm.<br>2.60 mm. square tiles, + 0.40 mm.<br>4 sheets and roll, + 0.10 %. |
| 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. |
| **2.1.** | **Workmanship :** |
| **2.2.** | The sub-grade shall be even, hard, cleaned and well dried, before the commencement of laying, so as to provide good adhesion. |
| **2.3.** | The sub-grade shall be even, hard, cleaned and well dried, before the commencement of laying, so as to provide good adhesion. |
| **3.0.** | 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 |

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| | 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. |
| **3.1.** | 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. |
| **3.2.** | **Mode of measurement and payment :** |
| | 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. |
| **Additional Specifications Item no. 22.** | **Providing & fixing open well submersible pumps in u.g. collection tank :** |
| **1.0.** | **Materials :** |
| **1.1.** | 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. |
| **2.0.** | **Mode of measurement and payment :** |
| **2.1.** | The rate shall be for a unit of one no. system. |
| **Additional Specifications Item no. 23.** | **Providing & 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 & 20 mm. diameter tube as vertical support :** |
| **1.0.** | **Materials :** |
| **1.1.** | The stainless steel pipes & plates shall conform to M-91. |
| | **91.00: STAINLESS STEEL PIPES & PLATES :**<br><br>The stainless steel pipe shall be of 316 grade, best quality stainless steel.<br><br>The handrail shall be of 38 mm. diameter stainless steel pipe.<br><br>The pipes used for balustrade shall be of 20 mm. diameter stainless steel pipes.<br><br>The vertical support shall be of 25 mm. wide x 10 mm. thick stainless steel plates. |
| **2.0.** | **Workmanship :** |
| **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. |
| **3.0.** | **Mode of measurement and payment :** |
| **3.1.** | The rate shall be for a unit of one running meter. |
| **Additional Specifications Item no. 24.** | **MODULAR STAINLESS STEEL HANDRAIL with GLASS PANEL :**<br><br>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.** |

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| | **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 studds 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.** |
| **1.0.** | **Materials :** |
| 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. |
| **2.0.** | **Workmanship :** |
| 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. |
| **3.0.** | **Mode of measurement and payment :** |
| 3.1. | The rate shall be for a unit of one running meter. |
| **Additional Specifications Item no. 25.** | **BUBBLE GUARD TILES / FLOOR PROTECTOR :**<br><br>**Providing & 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.** |
| **1.0.** | **Materials :** |
| **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. |
| **2.0.** | **Workmanship :** |
| **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. |
| **3.0.** | **Mode of measurement and payment :** |
| **3.1.** | The rate shall be unit of one square meter. |
| **Additional Specifications Item no. 26.** | **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.**<br><br>**'ICI' DULUX "WEATHERSHIELD" exterior ACRYLIC EMULSION paints or approved equal quality.** |
| **1.0.** | **Materials :** |
| **1.1.** | The 'Weather Shield' acrylic emulsion exterior paints of 'ICI' shall conform to M-95. Water shall conform to M-1. |
| **2.0.** | **Workmanship :** |
| **2.1.** | The relevant specifications of item nos. 18.51, 18.54 & 18.56 shall be followed. |

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| **3.0.** | **Mode of measurement and payment :** |
| **3.1.** | The relevant specifications of item no. 18.11 shall be followed. |
| **3.0.** | **Mode of measurement and payment :** |
| **3.1.** | The rate shall be unit of one square meter. |
| **Additional Specifications Item no. 27.** | **Providing & applying textured wall finish/s on exterior walls of different specified texture/s & 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 & / 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.** |
| **1.0.** | **Materials :** |
| **1.1.** | 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. |
| **2.0.** | **Workmanship :** |
| **2.1.** | 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. |
| **3.0.** | **Mode of measurement and payment :** |
| **3.1.** | The relevant specifications of item no. 18.11 shall be followed. |
| **3.2.** | The rate shall be unit of one square meter. |
| **Additional Specifications Item no. 28.** | **P & 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 qpproved make, fixed in line & level, including connecting properly with outlet - inlet pipes, sealing the joints with white cement and tested for any leakages,curing, etc. complete.** |
| **1.0.** | **Materials :** |
| **1.1.** | 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. |
| **1.2.** | Superficial damage to a depth of 0.010 inch (.25 mm) shall be repairable by sanding and/or polishing. |
| **1.3.** | The sheet shall be 12 mm. ( 0.50" ) thick for horizontal surfaces and 6 mm. ( 0.25" ) thick for vertical surfaces. |
| **1.4.** | 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 |

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| | facia panel as per details. |
| | 1. Fabricate using manufacturer's approved method.<br>2. Rout 1/8" deep max. groove for inlay to pattern indicated on designer's drawings.<br>3. Fill groove using methods approved by manufacturer, avoiding air bubbles or voids.<br>4. Overfill inlay area.<br>5. Allow area to fully cure.<br>a. Do not overheat inlay while sanding.<br>6. Finish and touch up to uniform appearance. |
| **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-existant, 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.** | Performance characteristics:<br><br>**Property** — **Typical Result** — **Test**<br><br>Tensile Strength — 6,000 psi — ASTM D 638<br>Tensile Modulus — 1.5 x $10^{-6}$ psi — ASTM D 638<br>Tensile Elongation — 0.4% min. — ASTM D 638<br>Flexural Strength — 10,000 psi — ASTM D 790<br>Flexural Modulus — 1.2 x $10^{-6}$ psi — ASTM D 790<br>Hardness — >85 — Rockwell "M" Scale ASTM D 785<br>56 — Barcol Impressor ASTM D 2583<br>Thermal Expansion — 3.02 x $10^{-5}$ in./in./°C (1.80 x $10^{-5}$ in./in./°F) — ASTM D 696<br>Gloss (60° Gardner) — 5–75 (matte—highly polished) — ANSI Z124<br>Light Resistance — (Xenon Arc) No effect — NEMA LD 3-2000 Method 3.3<br>Wear and Cleanability — Passes — ANSI Z124.3 & Z124.6<br>Stain Resistance: Sheets — Passes — ANSI Z124.3 & Z124.6<br>Fungus and Bacteria Resistance — Does not support microbial growth — ASTM G21&G22<br>Boiling Water Resistance — No visible change — NEMA LD 3-2000 Method 3.5<br>High Temperature Resistance — No change — NEMA LD 3- |

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| | 2000 | | |
| | | | Method 3.6 |
| | Izod Impact | 0.28 ft.-lbs./in. of notch | ASTM D 256 |
| | (Notched Specimen) | | (Method A) |
| | Ball Impact | No fracture—1/2 lb. ball: | NEMA LD 3-2000 |
| | Resistance: Sheets | 1/4" slab—36" drop | Method 3.8 |
| | | 1/2" slab—144" drop | |
| | Weatherability | $\Delta E^*_{94}$<5 in 1,000 hrs. | ASTM G 155 |
| | Specific Gravity † | 1.7 | |
| | Water Absorption | Long-term | ASTM D 570 |
| | | 0.4% (3/4") | |
| | | 0.6% (1/2") | |
| | | 0.8% (1/4") | |
| | Toxicity | 99 (solid colors) | Pittsburgh |
| | Protocol | | |
| | | 66 (patterned colors) | Test |
| | | ("LC50"Test) | |
| | Flammability | All colors | ASTM E 84, |
| | | (Class I and Class A) | NFPA 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. | | |
| **1.91.** | **ACCESSORIES :** | | |
| | A. Joint adhesive: | | |
| | 1. Manufacturer's standard one- or two-part adhesive kit to create inconspicuous, nonporous joints. | | |
| | B. Sealant: | | |
| | 1. Manufacturer's standard mildew-resistant, FDA-compliant, NSF 51-compliant (food zone — any type), UL-listed silicone sealant in colors matching components. | | |
| | C. Sink/lavatory mounting hardware: | | |
| | 1. Manufacturer's standard bowl clips, panel inserts and fasteners for attachment of undermount sinks/lavatories. | | |
| | D. Conductive tape: | | |
| | 1. Manufacturer's standard aluminum foil tape, with required thickness, for use with cutouts near heat sources. | | |
| | E. Insulating felt tape: | | |
| | 1. Manufacturer's standard for use with conductive tape in insulating solid surface material from adjacent heat source. | | |
| **1.92.** | **FACTORY FABRICATION :** | | |
| | A. Shop assembly : | | |
| | 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. | | |
| | 2. Form joints between components using manufacturer's standard joint adhesive | | |

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| | without conspicuous joints.<br>a. Reinforce with strip of solid polymer material, 2" wide.<br>3. Provide factory cutouts for plumbing fittings and bath accessories as indicated on the drawings.<br>4. Rout and finish component edges with clean, sharp returns.<br>a. Rout cutouts, radii and contours to template.<br>b. Smooth edges.<br>c. Repair or reject defective and inaccurate work.<br><br>B. Thermoforming :<br><br>1. Comply with manufacturer's data.<br>2. Heat entire component.<br>a. Material shall be uniform, between 275 and 325 degrees Fahrenheit during forming.<br>3. Form pieces to shape prior to seaming and joining.<br>4. Cut pieces to finished dimensions.<br>5. Sand edges and remove nicks and scratches. |
| **1.93.** | 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. |
| **1.94.** | Execution :<br><br>**EXAMINATION :**<br><br>A. Examine substrates and conditions, with fabricator present for compliance with requirements for installation tolerances and other conditions affecting performance of work.<br>B. Proceed with installation only after unsatisfactory conditions have been corrected.<br><br>**INSTALLATION :**<br><br>A. Install components plumb, level and rigid, scribed to adjacent finishes, in accordance with approved shop drawings and product data.<br>1. Provide product in the largest pieces available.<br>2. Form field joints using manufacturer's recommended adhesive, with joints inconspicuous in finished work.<br>a. Exposed joints/seams shall not be allowed.<br>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.<br>4. Cut and finish component edges with clean, sharp returns.<br>5. Rout radii and contours to template.<br>6. Anchor securely to base cabinets or other supports.<br>7. Align adjacent countertops and form seams to comply with manufacturer's written recommendations using adhesive in color to match countertop.<br>8. Carefully dress joints smooth, remove surface scratches and clean entire surface.<br>9. Install countertops with no more than 1/8-inch (3 mm) sag, bow or other variation from a straight line.<br><br>B. Coved backsplashes and sidesplashes:<br><br>1. Provide coved backsplashes and sidesplashes at all walls and adjacent millwork.<br>2. Fabricate radius cove at intersection of counters with backsplashes to dimensions shown on the drawings.<br>3. Adhere to countertops using manufacturer's standard color-matched Joint Adhesive.<br><br>C. Integral sinks/vanities: |

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| | 1. Provide solid surface Materials : bowls and/or lavatories sinks with overflows in locations shown on the drawings.<br>2. Secure sinks and lavatory bowls to tops using manufacturer's recommended sealant, adhesive and mounting hardware to maintain warranty. |
| **1.95.** | **REPAIR :**<br><br>Repair or replace damaged work which cannot be repaired to architect's satisfaction. |
| **1.96.** | **CLEANING AND PROTECTION :**<br><br>A. Keep components clean during installation.<br>B. Remove adhesives, sealants and other stains. |
| **1.97.** | **SCHEDULE :**<br><br>Countertops :<br><br>Surfaces of material adhesively joined with inconspicuous seams.<br><br>a. Vertical Thickness : 6 mm. ( 0.25" )<br>b. Horizontal Thickness : 12 mm. ( 0.50" )<br>c. Edge Details : Chamfered and rounded as per details.<br>e. Finish : Matte. Gloss range of 05 – 20.<br>f. Backsplash : 100 mm. high with front top edge chamfered as per details.<br>g. Sidesplash : 100 mm. high with front top edge chamfered as per details.<br>h. Front fascia panel : 150 mm. high with front top edge rounded as per details. |
| **1.98.** | **SOLID SURFACE FABRICATIONS :**<br><br>Countertops with seamed undermount solid surface sinks :<br><br>Surfaces of material adhesively joined with inconspicuous seams.<br><br>a. Finish : Matte. Gloss range of 05 – 20.<br>b. Basin : 575 mm. x 415 mm. x 250 mm. deep oval - shaped with rounded edges all around as per details, white colored. |
| **2.0.** | **Mode of measurement and payment :** |
| **2.1.** | The rate shall be for a unit of one running meter. |
| **Additional Specifications Item no. 29.** | **P & 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 & 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.** |
| **1.0.** | **Materials :** |
| **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.** | **Mode of measurement and payment :** |
| **2.1.** | The rate shall be for a unit of one no. set. |
| **Additional Specifications Item no. 30.** | **Providing & fixing gas based geyser :** |

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| **1.0.** | **Materials :** |
| **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.** | **Mode of measurement and payment :** |
| **2.1.** | The rate shall be for a unit of one no. system. |
| **Additional Specifications Item no. 31.** | **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.** |
| | **Material :** |
| | 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 of carbon black content m polyethylene shall be 2.5 ± 0.5 percent and it shall be uniformly distributed.<br><br>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. |
| | **Manufacture and Finish :** |
| | 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. |
| | **Shape, Size :** |
| | 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. |
| | **Weight and Wall Thickness :** |
| | 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. |
| | **Installation and fittings :** |
| | 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 he 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 of leaving the tank shall be straight to avoid pressure on tank walls due to water. |
| | **Manhole Lid:** |

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| | 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. |
| | **Rate:** |
| | 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. |
| **Additional Specifications Item no. 32.** | **Providing & fixing open well submersible pumps in u.g. collection tank :** |
| **1.0.** | **Materials :** |
| **1.1.** | 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. |
| **2.0.** | **Mode of measurement and payment :** |
| **2.1.** | The rate shall be for a unit of one no. system. |
| **Additional Specifications Item no. 33.** | **Providing & fixing skylight roofing of 1.70 mm. thick polycarbonate sheets on framing of aluminium tubular sections with anodized coating :** |
| **1.0.** | **Materials :** |
| **1.1.** | The polycarbonate sheets shall conform to M-88. The aluminium section shall conform to M-31. |
| **2.0.** | **Workmanship :** |
| **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 with to perform the work. |
| **2.2.** | The frame shall be fabricated by connecting together the anodized aluminium trubular sections using metal screws as per the detailed design drawings. |
| **2.3.** | 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. |
| **2.4.** | 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 the watertight by using specified silicon sealant at all the joints between the sheets, also using gasket, cleats, taping 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. |
| **2.5.** | The skylight roof shall be installed in perfect line and level. |
| **3.0.** | **Mode of measurement and payment :** |
| **3.1.** | The out to out dimensions of the skylight roof shall be measured. |
| **3.2.** | The rate shall be for a unit of one square meter. |
| **Additional** | **MODULAR STAINLESS STEEL HANDRAIL with STAINLESS STEEL PIPE :** |

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| **Specifications Item no. 34.** | 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 studds in the base, with s. s. patch fittings, as per design & details, etc. complete.** |
| **1.0.** | **Materials :** |
| 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. |
| **2.0.** | **Workmanship :** |
| 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. |
| **3.0.** | **Mode of measurement and payment :** |
| 3.1. | The rate shall be for a unit of one running meter. |

**Signature of the Applicant :**

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

## 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 | |

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|---|---|---|---|
| 3. | C.C.Cube | (1) Compressive Strength | 1-5 Cmt. 1-Test<br>6-15 Cmt. 2-Test<br>16-30 Cmt. 3-Test<br>31-50 Cmt. 4-Test<br>51 Cmt. & above 4 + 1<br>for each additional 50 Cmt. or part of thereof. |
| 4A. | Flush Door | (1) End Immersion Test<br>(2)Glue Adhesion Test | Randomly as per IS:7638:1975 |
| 4B. | Cement Bonded Door | - As per IS:14276:1995 | As per IS: |
| 5. | Tiles | (1)Wet Transverse Strength<br>(2) Water Absorption | Randomly as per Strength IS:4905:1968 |
| 6. | Fly ash Brick | (1) Compressive Strength<br>(2) Water Absorption | As per IS:5454:1978 |

**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.**

## SCHEDULE OF APPROVED MAKE FOR VARIOUS MATERIALS :

| SR. NO. | ITEM DESCRIPTION | | APPROVED BRANDS AND MANUFACTURERS | |
|---|---|---|---|---|
| | | | FIRST PREFERENCE | OTHERS |
| A. | CIVIL WORKS : | | | |
| 01. | 53 grade Cement. PPC/ OPC, confirmaing 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. |

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| 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. | : | Concare. | Perma, Fosroc, Roff as approved. |
| 07. | Bonding agent. | : | Concare. | Perma, Fosroc, Roff as approved. |
| 08. | Plasticiser. | : | Concare. | Perma, Fosroc, Roff as approved. |
| 09. | Water Proofing Chemicals. | : | Concare. | Perma, Roff, Fosroc as approved approved. |
| 10. | Synthetic resin based WP membrane. | : | Concare. | 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. | Hardwin Everite 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.** | **PLUMBING AND SANITATION WORKS :** | | | |
| 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. |

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| 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.**

## 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 / HAVELL'S |
| 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 & | ANCHOR / JAINEX/ORPAT/TOYAMA |

| | | |
|---|---|---|
| | ASSESSORIES | |
| 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 /KEI |
| 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 / CROMPTON |
| 30 | AIR CONDITIONERS & WATER COOLERS | DAIKIN,/MISHIBISHU/ONIDA, /O GENRAL/ USHA / BLUESTAR/PANANSONIC/VOLTAS/CARRIERS |
| 31. | SUBSTATION EQUIPMENTS | L&T / SKP /HAVELLS/ UNIVERSAL / NATIONAL, CROMPTON/ SIEMENS |
| 32. | SOLAR SYSTEM & WATER HEATER | REDREN/ RACOLD/ JAIN |
| 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.

**Signature of the Appicant :**

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