

**RAJKOT MUNICIPAL CORPORATION**  
e - Tender No.RMC/PWD/CZ/20-21/32



**Bid Documents For**

**Construction of New Laboratory at Quality Control Cell in  
Gurukul Pumping Station in Ward No.14**



<b>Milestone Dates for e-tendering is as under</b>	
1. Downloading of e-Tender documents	11-01-2021 To 20-01-2021 upto 18.00 Hrs.
2. Online submission of e - Tender	20-01-2021 upto 18.00 Hrs.
3. Submission of EMD, Tender fee and other required documents as per Financial, Experience etc. in Person /by Regd.A.D./ Speed Post / Courier.	22-01-2021 up to 18.00 Hrs.
4. Opening of online Primary Bid	22-01-2021 at 18.00 Hours onwards
5. Verification of submitted documents	25-01-2021 at 10.30 Hours onwards
6. Agency to remain present in person along with original documents for verification	25-01-2021 between 16.00 to 17.00 Hours
7. Opening of online Price Bid	27-01-2021 at 11.00 Hours onwards (If Possible)
8. Bid Validity	180 Days

**JANUARY-2021**

**ADDL. CITY ENGINEER  
RAJKOT MUNICIPAL CORPORATION  
DR.AMBEDKAR BHAVAN,  
CENTRA; ZONE, DHEBARBHAI ROAD,  
RAJKOT- 360 001(GUJARAT)**

# Rajkot Municipal Corporation



## e-TENDER FOR

Construction of New Laboratory at Quality Control Cell in Gurukul Pumping Station in Ward No.14

<b>PART – I</b>	
<b>Section-1</b>	Invitation to Bid, Instructions to Bidders
<b>PART – II</b>	
<b>Section-2</b>	Technical Specifications
<b>PART – III</b>	
<b>Section-3</b>	Price Schedule – B

Name of contractor:

Rs. \_\_\_\_\_

Receipt No. \_\_\_\_\_

Date: \_\_\_\_\_



**Rajkot Municipal Corporation**  
**Construction Branch**

---

**TERMS AND CONDITIONS OF TENDER**

---

I/We agree to carry out the below work at \_\_\_\_\_% (In figures) \_\_\_\_\_  
 \_\_\_\_\_ (In words) above/ below the estimated  
 cost.

Name of work :- **Construction of New Laboratory at Quality  
 Control Cell in Gurukul Pumping Station in  
 Ward No.14**

Approved estimated cost :- Rs.80,83,000/-  
 Earnest Money :- Rs.80,830/-  
 Security Deposit :- 2.5% cash  
 2.5% from R.A.Bill

Name of contractor :- \_\_\_\_\_

Address :- \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

Date: :- \_\_\_\_\_

Witness :- \_\_\_\_\_

Address :- \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

Occupation :- \_\_\_\_\_

Sign of Tenderer

Rates approved on behalf of Rajkot Municipal Corporation

Date:

Sign of Sanctioning authority

### **Rajkot Municipal Corporation**

#### **:: e-Tender Notice ::**

Rajkot Municipal Corporation, Construction Branch, Dr.Ambedkar Bhavan, Central Zone, Dhebarbhai Road, Rajkot-360001, invites E-tenders with two bid system by e-tendering from the contractors registered in State Government / Central Government in appropriate class for the following work as detailed below:

Sr No	Name of work	a) Estimated cost b) Earnest Money c) e-Tender fee d) Time limit for completion of work
1	Construction of New Laboratory at Quality Control Cell in Gurukul Pumping Station in Ward No.14	a) Rs.80,83,000/- b) Rs.80,830/- c) Rs.3,000/- d) 9 Months

#### **Milestone Dates for e-tendering is as under**

1. Downloading of e-Tender documents	11-01-2021 To 20-01-2021 upto 18.00 Hrs.
2. Online submission of e - Tender	20-01-2021 upto 18.00 Hrs.
3. Submission of EMD, Tender fee and other required documents as per Financial, Experience etc. in Person /by Regd.A.D./ Speed Post / Courier.	22-01-2021 up to 18.00 Hrs.
4. Opening of online Primary Bid	22-01-2021 at 18.00 Hours onwards
5. Verification of submitted documents	25-01-2021 at 10.30 Hours onwards
6. Agency to remain present in person along with original documents for verification	25-01-2021 between 16.00 to 17.00 Hours
7. Opening of online Price Bid	27-01-2021 at 11.00 Hours onwards (If Possible)
8. Bid Validity	180 Days

1. All bidders must submit Bid Security (EMD) either directly deposited in Account No.015305010638 (Rajkot Municipal Corporation) IFSC Code ICIC0000153 or submit at the below mentioned address in form of Demand Draft in favour of "Rajkot Municipal Corporation", Rajkot, from any Nationalized Bank or Scheduled Bank (except Co-operative Bank) in India. The receipt of professional tax paid for current year, address proof, tender appendix details and ID proof shall have to be submitted along with physical submission of required documents shall have to be done at the below mentioned address:

Addl. City Engineer  
Rajkot Municipal Corporation, Bandhkam Branch  
2nd Floor, Dr.Ambedkar Bhavan, Central Zone,  
Dhebarbhai Road,  
RAJKOT - 360 001.

2. The Tender Fee will be accepted in form of Demand Draft only in favor of "Rajkot Municipal Corporation" Rajkot, from any Nationalized Bank or Scheduled Bank (except Co-operative Bank) in India and must be delivered to above address.

3. **The prequalification requirement is as under:**

**i) Financial Criteria:**

1. An average annual turnover of last seven years should not be less than 50% of the tender amount.
2. Working capital should not be less than 25% of the estimated amount.
3. Solvency should not be less than Rs.12.00 lacs
4. Class of Registration : Class-'D' & Above.

**Note:** Enhancement factor at 10% per year for last seven years will be applicable to arrive average annual turnover and finalize the magnitude of work done in last seven years.

Sr. No.	Year	Enhance Factor
1	Year of inviting tender (e.g. 2020-21)	1.00
2	-1 (2019-20)	1.10
3	-2 (2018-19)	1.21
4	-3 (2017-18)	1.33
5	-4 (2016-17)	1.46
6	-5 (2015-16)	1.61
7	-6 (2014-15)	1.77
8	-7 (2013-14)	1.95

**ii) Experience Criteria:**

The bidder should possess following minimum experience:

1. Bidder should have completed at least one work of similar nature **50%** or two works of **40%** of tender amount of either Government or Semi-Government as a main contractor in period of last seven years.
  2. Bidder should have enough machinery and experienced personnel to supervise the work.
4. The contractor shall have to quote their rates including GST and other taxes and the Invoice with break-up of GST is to be submitted accordingly, failing which, such amount will be deducted from the bill of the agency and deposited accordingly.
- The contractor shall have to purchase the material required for this tender work, only from the supplier having registered GST Number. RMC will not be responsible to pay any amount towards GST if the material is purchased from the unregistered supplier / not having GST Number.
5. **The bidder(s) submitting the tender shall also have to submit the copy of ESIC & EPF Registration document along with the other documents, duly self attested, failing which, the tender of such bidder(s) will be considered as non-responsive and their online price bid will not be opened.**
6. After opening of Technical Bid, the procedure for the pre-qualification shall be adopted and the Price Bid of only successful qualified bidder shall be opened for final evaluation of the contract. The decision of Municipal Commissioner regarding the pre-qualification shall be final and binding to all the bidders.
7. The Tender of those bidder(s) those who fails to submit the required documents for verification within the stipulated date and time, will be treated as non responsive and their Price Bid will not be opened. The physical submission of required documents received after the prescribed date and time will be out rightly rejected.
8. The bidder should not have been Black Listed by Government of India / Government of Gujarat or any State Board / Corporations, since inception of the firm / Company. A Declaration in this regard on Rs.300/- Stamp Paper duly Notarized, shall have to be submitted as per Annexure, along with the tender documents.
9. The bidder should provide accurate information on any litigation history or arbitration resulting from contracts completed or under execution by him over the last ten years. This should also include such cases, which are in process / progress. A consistent history of awards against the bidder may result in failure of the bid. In case the bidder has not provided such information and has come to the notice of the authority, the

tender will be rejected at what so ever stage and in such case all the losses that will arise out of this issue will be recovered from the tenderer / bidder and he will not have any defense for the same .

10. Conditional Tenders will be out rightly rejected.
11. Commissioner, Rajkot Municipal Corporation, Rajkot, reserves the right to accept / reject any or all e-Tender(s) without assigning any reasons thereof.

Addl. City Engineer  
Rajkot Municipal Corporation

Note: The Declaration submitted earlier to this office will not be considered as such a fresh Declaration shall have to be done as on the milestone dates of this tender document

(On Non-Judicial stamp paper of Rs.300/-)

## **DECLARATION**

I/We hereby declared that I/We am/are not partner(s) blacklisted / terminated / debarred or connected with firm blacklisted / terminated / debarred in any States, CPWD / MES / Railways or any Government, Semi- Government or Private body.

At present I/We am/are registered as approved contractor (s), firms in \_\_\_\_\_ State, CPWD / MES / Railways.

We, the partners / owners of this firm, hereby give an undertaking that we are jointly and severally responsible to meet all the liabilities ever and above the business of this firm and make good the above financial loss sustained by the Rajkot Municipal Corporation as a result of our abandoning the works entrusted to us.

**Date:**

**Seal and Signature of the Bidder**

**APPLICABILITY OF PROVIDENT FUND AND MISCELLANEOUS  
PROVISIONS ACT 1952**

Successful bidder i.e. the agency whose tender is accepted by the RMC shall have to comply the necessary formalities under the employees provident fund and Miscellaneous Provisions Act, 1952 as Contributory Provident Fund Scheme is applicable to labourers engaged in construction activity and shall have to submit proofs regarding deduction of provident fund and other dues and depositing the same with government department under the act and the scheme regularly on monthly basis failing which no running / final bill payment will be made by the RMC to the contractor in any circumstances.

**A certificate to the above effect has to be given by the contractor as under.**

**Declaration  
Of  
Depositing Provident Fund contribution**

This to certify that we have deducted the employees' P.F. and deposited the same along with employer's contribution towards provident fund on labour charges / wages paid by us to the labourers engaged for the work of \_\_\_\_\_

\_\_\_\_\_ with  
Provident  
Fund Authority under our Provident Fund Code No.

We produce herewith the copies of the challans for the provident fund deduction and contribution deposited as mentioned above.

**Date:**

**Seal and Signature of the Bidder**



### BIDDER'S FINANCIAL CAPACITY

Sr. No.	Financial Year	Annual Turnover in Engineering Project Rs.	Net worth Rs.	Net Cash Rs.	Working Capital Rs.
1	2019-2020				
2	2018-2019				
3	2017-2018				
4	2016-2017				
5	2015-2016				
6	2014-2015				
7	2013-2014				

**Note:-**

- 1) *Figures to be taken from audited balance sheets. Duly certified attested true copy*
- 2) *Copies of the balance sheet to be attached..*
- 3) *The bidder shall have to provide that for a period of at least 6 Months the bidder has ability to sustain negative cash balance and how he proposes to meet with the same.*
- 4) *Cash Plan / Cash flow Statement.*

### AVAILABLE BID CAPACITY

	2013-14	2014-15	2015-16	2016-17	2017-18	2018-19	2019-20
Value of works executed in Rs. Crores.							

The available bid capacity will be worked out as follows.

**Available bid capacity = (A x**

**N x 2) – B, where**

**A** = Maximum of updated total amount of work executed in any one year of the last five financial years.

**B** = The amount of the existing commitments and ongoing works to be discharge during time interval of N years from the bid due date.

**N** = Number of years prescribed for completion of the proposed works

**METHOD STATEMENT AND WORK PLAN**

The Bidder shall have to provide a brief write up to be enclosed with the “Technical Bids” covering his approach and methodology to handle the project construction activities including his details work plan. The brief shall include the following aspects.

<b>Sr. No.</b>	<b>Components</b>	
1.	Methodology	
2.	Construction equipment availability and plan of deployment.	
3.	PERT / Construction chart / Bar chart.	

**INSTRUCTIONS  
TO  
BIDDERS**

## **Rajkot Municipal Corporation**

### **:: INSTRUCTIONS TO TENDERER ::**

#### **IT 1. GENERAL**

The contract documents may be secured in accordance with the Notice Inviting e-TENDER for the work called. The work shall include supply of materials necessary for construction of the work.

#### **IT 2. INVITATION TO E - TENDER**

The Rajkot Municipal Corporation hereinafter referred as the Corporation will receive e-Tenders for the work as per the specifications and schedule of prices in the e-Tender document. The e-Tenders shall be opened online as specified in the e-Tender notice in the presence of interested Tenderers or their representatives. The Corporation reserves the right to reject the lowest or any other or all e-Tenders or part of it which in the opinion of the Corporation does not appear to be in its best interest, and the Tenderer shall have no cause of action or claim against the Corporation or its officers, employees, successors or assignees for rejection of his e-Tender.

#### **IT 3. LANGUAGE OF e - Tender**

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

#### **IT 4. QUALIFICATIONS OF TENDERERS**

- A. The Tenderers shall abide by the laws of the Union of India and of Gujarat State and legal jurisdiction of the place where the works are located.
- B. The Tenderer shall furnish a written statement of financial and technical parameters with details and documents along with his e-Tender which contains namely as below:
- i. The Tenderer's experience in the fields relevant to this contract.
  - ii. The Tenderer's financial capacity/resources and standing over at least 3 (Three) years.
  - iii. The Tenderer's present commitments (Jobs on hand).
  - iv. The Tenderer's capability and qualifications of himself and his regular staff etc.
  - v. Plants and Machinery available with the Tenderer for the work Tendered.

#### **IT 5. e - Tender DOCUMENTS**

The e-Tender documents and drawings shall comprehensively be referred to as e-Tender document. The several sections form in the document are the essential parts of the contract and a requirement occurring in one shall be as binding as though occurring in all, they are to be taken as mutually, explanatory and describe and provide for complete works.

#### **IT 6. EXAMINATION BY TENDERERS**

- A. At this own expense and prior to submitting his e-Tender, each Tenderer shall (a) examine the Contract Documents, (b) visit the site and determine local conditions which may affect the work including the prevailing wages and other pertinent cost factors, (c) familiarize, himself with all central, state and local laws, ordinance, rules regulations and codes affecting the material supply including the cost of permits and licenses required for the work and (d) correlate his observations, investigations, and determinations with the requirements of the e-Tender Documents, site & subsoil investigation.

- B. The e-Tender is invited on percentage rate basis The works shall have to be completed in all respect as stated in the e-Tender document to the satisfaction of the Corporation.
- C. The following comprises in Contract Documents at a price of Rs.3,000/-  
**e - Tender Document:**  
 1. Notice inviting Tenders.  
 2. Information to the Tenderer.  
 4. Instructions to the Tenderer.  
 5. Technical specifications
- D. Copy of the e-Tender Document should be completed, checked in a responsible manner, digitally signed, and submitted. Security Bond shall be submitted in person up to the stipulate date, which shall be as per tender condition.

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

#### **IT 7. EARNEST MONEY DEPOSIT:**

- A. Each Tenderer must submit a receipt of deposit as Tender guarantee towards **Earnest money** amounting to **Rs.80,830/-** only in the form of crossed Demand Draft in favor of "Rajkot Municipal Corporation", from any Scheduled bank (except Co-operative Bank) in India acceptable to owner payable at Rajkot.
- B. The Earnest Money Deposit will be refunded to the unsuccessful Tenderers after an award has been finalized.
- C. The Earnest Money Deposit (Tender Guarantee) will be forfeited in the event, the successful Tenderer fails to accept the contract and fails to submit the "Performance Guarantee Bonds to the Owner as stipulated in this e-Tender documents within ten days. (10) days after receipt of notice of award of contract.
- D. The Earnest Money Deposit of the successful Tenderer shall be returned after the performance guarantee bond, as required, is furnished by the contractor.
- E. Within 10 (ten) days from the date of issue of the letter accepting his tender, the successful Bidder shall furnish the required Security Deposit for performance and plus additional security if any for unbalanced bids in accordance with the condition of the contract and attend the office of the Engineer In-charge for execution o the contract documents. If he fails to furnish the Security Deposit for performance or to execute the contract for the work offered to him, his EMD shall be forfeited and the Bidder may be Black Listed / Debarred from tendering for further works for three years.
- F. No interest shall be paid by the owner on any e-Tender guarantee.

#### **IT 8. INCOME TAX CLEARANCE CERTIFICATE : (NOT APPLICABLE) :**

#### **IT 9. PREPARATION OF e-TENDER DOCUMENTS**

Tenderers are required to note the following while preparing the e-TENDER Documents:

- A. e-TENDER shall be submitted on the e-TENDER form bound here in English. All statements shall be properly filled in. Numbers shall be stated both in words and in figures where so indicated.
- B. All entries or prices and arithmetic shall be checked before submission of the e - TENDERS. If there is discrepancy between the rates quoted in figures and in words, the rates expressed in words shall be considered as binding.

- C. Each e-Tender shall be accompanied by the prescribed e-Tender security bond and other required documents and drawings. All witnesses and sureties shall be persons of status and probity and their full names, occupations and addresses shall be stated below their signature.
- D. Variation to the contract Documents requested by the Tenderer may be affixed and duly signed and stamped. Such variations may be approved or refused by the Corporation is not obliged to give reason for his decisions.

#### **IT 10. SUBMISSION OF e-TENDER DOCUMENTS**

Tenderers are requested to submit the e-TENDER Documents on following lines.

- A. Volume containing following documents :
  - I. Earnest Money Deposit.
  - II. Certificates as registered contractor in appropriate class with Government of Gujarat or appropriate authority.
  - III. Tenderer 's financial capability statement including last three years Income tax returns, balance sheet, duly signed by registered chartered account.
  - IV. Tenderer's experience in the field relevant to this contract.
  - V. A list of the equipment the Tenderer possesses and that which he proposed to acquire and use for the purpose related to the work.

The time limit for receipt of e-Tender shall strictly apply in all cases. The Tenderers should therefore ensure that their e-Tender is received by the competent authority **The Rajkot Municipal Corporation** at before expiry of the time limit. No delay on account of any cause for receipt of e-Tender shall be entertained.

The e-Tender must contain the name address of residence and place of business of the person or persons submitting the e-Tender and must be digitally signed.

e-TENDERS by partnership firm must be furnished with the full names and addresses of all partners and be signed by one of the members of the partnership or by a legally authorized representative holding power of attorney followed by signature and designation of the person of person signing.

e-TENDERS by corporations/companies must be signed with the legal name of the Corporation/Companies by the president/or by the secretary or other person or persons legally authorized to bind the Corporation/Company in the matter.

#### **IT 11 TENDER VALIDITY PERIOD**

The validity period of the e-Tender submitted for this work shall be of One eighty (180) calendar days from the date of opening of the online price bid and that the Tenderer shall not be allowed to withdraw or modify the e-Tender offer on his own during the validity period. The Tenderer will not be allowed to withdraw the e-Tender or make any modifications or additions in the terms and conditions on his own e-Tender. If this is done then the owner shall, without prejudice to any other right or remedy, be at liberty to reject the e-Tender and forfeit the earnest money deposit in full.

#### **IT 12 GENERAL PERFORMANCE DATA**

Tenderers shall present all the information which sought for in the e-Tender document in form of various schedules if given. e-TENDERS may not be considered if left blank or the schedules are not properly filled in.

#### **IT 13 SIGNING OF e-TENDER DOCUMENTS**

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

by the proprietor above his name and the name of his firm with his current address.

If the e-Tender is made by a firm in partnership, it shall be signed by all the partners of the firm above their full names and current address, or by a partner holding the power of attorney for the firm, in which case a certified copy of the power of attorney shall accompany the e-TENDER. A certified copy of the partnership deed, current addresses of all the partners of the firm shall also accompany the e-Tender.

If the e-Tender is made by a limited company or a limited corporation, it shall be signed by a duly authorized person holding the power of attorney, shall accompany the e-Tender. Such limited company or corporation may be required to furnish satisfactory evidence of its existence before the contract is awarded.

If the e-TENDER is made by a group of firms, the sponsoring firm shall submit complete information pertaining to each firms in the group and state along with the bid as to which of the firms shall have the responsibility for e-Tendering and for completion of the contract documents and furnish evidence admissible in law in respect of the authority to such firms on behalf of the group of firms for e-Tendering and for completion of contract documents. The full information and satisfactory evidence pertaining to the participation of each member of the group of firms in the e-Tender shall be furnished along with the e-Tender.

All witnesses and sureties shall be persons of status and probity and their full names, occupations and addresses shall be stated below their signatures. All the signatures in the e-Tender document shall be dated.

#### **IT 14 WITHDRAWAL OF TENDERS**

If, during the tender validity period, the Tenderer withdraws his Tender, Tender security (Earnest Money) shall be forfeited and Tenderer will be debarred for next three years to quote in R.M.C.

#### **IT 15 INTERPRETATIONS OF e-TENDER DOCUMENTS**

Tenderers shall carefully examine the e-TENDER Document and fully inform themselves as to all the conditions and matters which may in any way affect the work or the cost thereof. If a Tenderer finds discrepancies, or omission from the specifications or other documents or should be in doubt as to their meaning, he should at once address query to the Addl. City Engineer, R.M.C. The result of interpretation of the e-TENDER will be issued to all Tenderers as addendum.

#### **IT 16 ERRORS AND DISCREPANCIES IN e-TENDERS**

In case of conflict between the figures and words in the rates the rate expressed in words shall prevail and apply in such cases.

#### **IT 17 MODIFICATION OF DOCUMENTS**

Modification of specifications and extension of the closing date of the e-Tender, if required will be made by an addendum. Each addendum will be made available online to all Tenderers. These shall form a part of e-Tender. The Tenderer shall not add to or amend the text of any of the documents except in so far as may be necessary to comply with any addendum.

#### **ADDENDA**

Addenda form part of the Contract Documents, and full consideration shall be given to all Addenda in the preparation of e-Tender. Tenderers shall verify the number of Addenda issued, if any and acknowledge the receipt of all Addenda in the e-TENDER Failure to so acknowledge may cause the e-Tender to be rejected.



- A. The Owner may issue Addenda to advise Tenderers of changed requirements. Such addenda may modify previously issued Addenda.
- B. No addendum may be issued after the time stated in the notice inviting e - Tenders.

**IT 18. TAX AND DUTIES ON MATERIALS**

All charge on account of excise duties, Central / State, sales tax, work contract tax and other duties etc. on materials obtained for the works from any source shall be borne by the contractors. No (P) or 'C' or 'D' form shall be supplied.

**IT 19 EVALUATION OF E - TENDERS**

While comparing e-Tenders, the Rajkot Municipal Corporation shall consider factors like price offer is workable with the market price, efficiency and reliability of construction method proposed, compliance with the specifications, relative quality, work done in past with Rajkot Municipal Corporation or other Government Organizations, litigation issues etc. Evaluation criteria specifically mentioned in the specification will also be taken into consideration in the evaluation of e-Tenders.

**IT 20 TIME REQUIRED FOR COMPLETION**

The completion period mentioned in the Tender Notice is to be reckoned from the date of notice to proceed. Total completion period is as described in Tender Notice, from the date of issue of notice to proceed and contractor should adhere to this completion time.

**IT 21 POLICY FOR TENDER UNDER CONSIDERATION**

TENDER shall be termed to be under consideration from the opening of the e - Tender until such time any official announcement or award is made.

While e-Tenders are under consideration, Tenderers and their representative or other interested parties are advised to refrain from contacting by any means any corporations personnel or representatives on matters related to the e-Tenders under study. The Corporation's representatives if necessary will obtain clarification on e-Tenders by requesting such information from any or all the Tenderers, either in writing or through personal contact, as may be necessary. The Tenderer will not be permitted to change the substance of his e-Tender after e-Tenders have been opened. This includes any post Tender price revision. Non-compliance with his provision shall make the Tender liable for rejection.

**IT 22 PRICES AND PAYMENTS**

The Tenderer must understand clearly that the prices quoted are for the total works or the part of the total works quoted for and include all costs due to materials, labour, equipment, supervision, other services, royalties, taxes etc. and to include all extra to cover the cost. No claim for additional payment beyond the prices quoted will be entertained and the Tenderer will not be entitled subsequently to make any claim on any ground.

**IT 23 PAYMENT TERMS**

The terms of payment are defined in the General Conditions of Contract and Technical specifications. The Corporation shall not under any circumstances relax these terms of payment and will not consider any alternative payment terms. Tenderers should therefore in their own interest note this provision to avoid rejection of their e-Tenders.

**IT 24 AWARD**

Award of the contract or the rejection or e-TENDERS will be made during the Tender validity period. A separate Schedule-B (Price Schedule) is given. The

contractors are requested to quote their price offer **in % below or above on the given price in the schedule-B of Price Schedule only.**

- A. After all contract contingencies are satisfied and the Notice of Award is issued, the successful Tenderer shall execute the Contract Agreement within the time stated and shall furnish the Bond as required herein. The contract Agreement shall be executed, in form stipulated by the Owner.
- B. If the Tenderer receiving the Notice of Award fails or refuses to execute the Contract Agreement within the stated time limit or fails or refuses to furnish the Bond as required herein. The Owner may annul his award and declare the e-Tender security forfeited and will take action as deemed fit.
- C. A corporation, partnership firm or other consortium acting as the Tenderer and receiving the award shall furnish evidence of its existence and evidence that the officer signing the contract agreement and Bonds for the corporation, partnership firm or other consortium acting as the Tenderer is duly authorized to do so.

#### **IT 25 SIGNING OF CONTRACT**

The successful Tenderer shall be required to execute the contract agreement within 10 days of receipt of intimation to execute the contract, failing which the Corporation will be entitled annul to the award and forfeit the Earnest Money Deposit. The person to sign the contract document shall be person as detailed in Article IT. 13 (signing of e-Tender documents).

#### **IT 26 DISQUALIFICATION**

A e-Tender shall be disqualified and will not be taken for consideration if,

- (a) The Tender fee and Tender Earnest Money Deposit is not deposited in full and in the manner as specified as per Article IT. 7 i.e. Earnest Money Deposit.
- (b) The e-Tender is in a language other than English or does not contain its English Translation in case of other language adopted for e-Tender preparation.
- (c) The e-Tender documents are not signed by an authorized person (as per Article IT. 13 i.e. signing of e-Tender documents).
- (d) The general performance data for qualification is not submitted fully (as per Article IT 12 i.e. General performance Data).
- (e) Tenderer does not agree to payment terms defined as per Article IT. 23 i.e. payment terms.

#### **A. A e-Tender may further be disqualified if,**

- (a) Price variation is proposed by the Tenderer on any principle other than those provided in the e-TENDER Documents.
- (b) Completion schedule offered is not consistent with the completion schedule defined and specified in e-Tender document.
- (c) The validity of e-Tender bond is less than that mentioned in Article IT. 11 i.e. e - Tender validity period.
- (d) Any of the page or pages of e-Tender is/are removed or replaced.
- (e) Any conditional tender.

#### **IT 27 PERFORMANCE GUARANTEE (SECURITY DEPOSIT)**

As a contract security the Tenderer to whom the award is made shall furnish a performance guarantee (Security deposit) for the amount of **5%** of the contract price to guarantee the faithful performance, completion and maintenance of the works of the contract in accordance with all conditions and terms specified herein and to the satisfaction of the Engineer-in-charge and ensuring the discharge of all obligations arising from the execution of contract in the forms mentioned below:

- a. By a Demand Draft on the Rajkot Branch of any Nationalized Bank or Scheduled Bank except co-operative bank duly endorsed in favour of the "**RAJKOT MUNICIPAL CORPORATION**", Rajkot.
- b. A Fixed Deposit Receipt of any Nationalized Bank or Schedule Bank duly endorsed in favour of the "**RAJKOT MUNICIPAL CORPORATION**", Rajkot.

The performance guarantee shall be delivered to the Corporation within ten (10) days of the notice of award and at least three (3) days before the contract agreement is signed unless otherwise specified by the Engineer-in-charge. Alternatively, the contractor may at his option deposit an amount of **2.5%** of the value of the contract price within ten days and the balance **2.5%** to be recovered in installments through deduction @ the rate of 10% from the running account bills.

On due performance and completion of the contract in all respects, **THE PERFORMANCE GUARANTEE WILL BE RETURNED TO THE CONTRACTOR WITHOUT ANY INTEREST AFTER THE DEFECT LIABILITY PERIOD IS OVER.**

#### **IT 28 STAMP DUTY**

The successful Tenderer shall have to enter into an agreement on a Non-Judicial stamp paper of amount as per Stamp Duty Act in the form of the agreement approved by the Corporation. The cost of stamp paper and adhesive stamp shall be borne by the contractor.

#### **IT 29 BRAND NAMES**

Specific reference in the specifications to any material by manufacturer's name, or catalogue shall be construed as establishing a standard or quality and performance and not as limiting competition and the Tenderer in such cases, may at his option freely use only other product, provided that it ensures an equal or higher quality than the standard mentioned and meets Corporation approval.

#### **IT 30 NON TRANSFERABLE**

e-TENDER documents are not transferable.

#### **IT 31 COST OF e-Tendering**

The owner will not defray expense incurred by Tenderers in e - Tendering.

#### **IT 32 EFFECT OF e-Tender**

The e-Tender for the work shall remain for a period of 180 calendar days from the date of opening of the e-Tenders for this work and that the Tenderer shall not be allowed to withdraw or modify the offer in his own during the period. If any Tenderer withdraws or makes any modification or additions in the terms and conditions of his own e-Tender, then the Corporation shall, without prejudice to any other right or remedy, be at liberty to reject the e-Tender and forfeit the earnest money in full.

#### **IT 33 CHANGE IN QUANTITY**

The Corporation reserves the right to waive any information in any e-Tender and to reject one or all e-Tenders without assigning any reasons for such rejection and also to vary the quantities of items or group as specified in the scheduled of prices as may be necessary.

#### **IT 34 NEW EQUIPMENT AND MATERIAL**

All materials, equipment and spare parts thereof shall be new, unused and originally coming from manufacturer's plant to the Corporation. The rebuilt or overhauled equipment/materials will not be allowed to be used on works.

**IT 35 RIGHTS RESERVED**

The owner reserves the right to reject any or all e-Tenders, to waive any informality or irregularity in any e-Tender without assigning any reason. The owner further reserves the right to withhold issuance of the notice to proceed, even after execution of the contract agreement. No payment will be made to the successful Tenderer on account of such withholding. The owner is not obliged to give reasons for any such action.

**IT 36 ADDITIONAL RIGHTS RESERVED**

The Commissioner, Rajkot Municipal Corporation, reserves right to reduce the scope of work & split the e-Tender on two or more parts without assigning any reason even after the awards of contract.

**IT 37 MOBILIZATION ADVANCE**

No mobilization advance or advance on machinery will be given.

**IT 38 CONDITIONAL e-Tenders**

The scope of work is clearly mentioned in the e-Tender documents. The contractor shall have to carry out the work in accordance with the details specifications. No condition will be accepted. The conditional e-Tender will liable to be rejected.

**IT 39 1% CESS & REGISTRATION:**

For the welfare of labour working under construction Industry, the agency shall have to take the registration with competent authority as per Circular No.CWA/2004/841/M-3 dated 30-01-2006 of Government of Gujarat. Rajkot Municipal Corporation will deduct 1% Cess of the value of work and will deposit the same in Government.

**IT 40 PROFESSIONAL TAX**

The bidder shall have to pay the Professional Tax for current financial year imposed by Government of Gujarat, and also the bidder shall have to produce Enrollment Certificate for the same.

**Addl.A.E.  
R.M.C.**

**Dy.Ex.Engineer  
R.M.C.**

**Addl. City Engineer  
R.M.C.**

**Signature of Contractor.**

**:: GENERAL CONDITIONS OF CONTRACT ::**

**:: TABLE OF CONTESTS ::**

No.	Description
GC-1	Definitions and Interpretations
GC-2	Location of site and accessibility
GC-3	Scope of work
GC-4	Ruling language
GC-5	Interpretation of Contract Document
GC-6	Contractor to understand himself fully
GC-7	Errors in submissions
GC-8	Sufficiency of E-TENDER
GC-9	Discrepancies
GC-10	Performance Guarantee (Security Deposit)
GC-11	Inspection of work
GC-12	Defect Liability
GC-13	Power of Engineer-In-Charge to give further instructions.
GC-14	Programme
GC-15	Sub-letting of work
GC-16	Sub-Contracts for temporary works, etc .
GC-17	Time for completion
GC-18	Extension of time
GC-19	Contract Agreement
GC-20	Liquidated damages
GC-21	Forfeiture of Security Deposit
GC-22	Action of Forfeiture of Security Deposit
GC-23	No compensation for alteration in or restriction in work
GC-24	In the event of death of contractor
GC-25	Members of the owner not individually liable
GC-26	Owner not bound by personal representations
GC-27	Contractor's office at site
GC-28	Contractor's subordinate staff and their conduct
GC-29	Termination of sub-contract by owner
GC-30	Power of entry
GC-31	Contractor's responsibility with the other Contractor and Agencies.
GC-32	Other Agencies at site
GC-33	Notices
GC-34	Rights of various interests
GC-35	Price adjustments
GC-36	Terms of Payment
GC-37	Retention Money
GC-38	Payments due from the Contractor
GC-39	Contingent Fee
GC-40	Breach of Contract by Contractor
GC-41	Default of Contractor
GC-42	Bankruptcy
GC-43	Ownership
GC-44	Declaration against waiver
GC-45	Laws governing the contract
GC-46	Over payment and under payment
GC-47	Settlement of disputes
GC-48	Disputes of differences to be referred to

GC-49	DELETED
GC-50	Termination of the Contract
GC-51	Special risks
GC-52	Change in Constitution
GC-53	Sub-contractual relations
GC-54	Patents and Royalties
GC-55	Lien
GC-56	Execution of work
GC-57	Work in monsoon
GC-58	Work on Sundays and Holidays
GC-59	General Conditions for construction work
GC-60	Drawings to be supplied by the Owner
GC-61	Drawings to be supplied by the Contractor
GC-62	Setting outwork
GC-63	Responsibilities of Contractor for correctness of work
GC-64	Materials to be supplied by the Owner
GC-65	Conditions of issue of materials by the Owner
GC-66	Materials procured with assistance of the Owner
GC-67	Materials obtained from dismantling
GC-68	Article of value of treasure found during construction
GC-69	Discrepancies between instructions
GC-70	Alterations in specifications and designs and extra work.
GC-71	Action when no specifications are issued
GC-72	Abnormal rates
GC-73	Assistance to Engineer-In-Charge
GC-74	Tests for quality of work
GC-75	Action and compensation in case of bad workmanship
GC-76	Suspension work
GC-77	Owner may do part of the work
GC-78	Possession prior to completion
GC-79	Completion Certificate
GC-80	Schedule of Rates
GC-81	Procedure for measurement of work in progress
GC-82	Running account payments to be regarded as advances
GC-83	Notice for claim for additional payment
GC-84	Payment of Contractor's Bill
GC-85	Final Bill
GC-86	Receipt for payment
GC-87	Completion Certificate
GC-88	Taxes, Duties, etc.
GC-89	Insurance
GC-90	Damage to Property
GC-91	Contractor to Indemnify Owner
GC-92	Implementation of Apprentice Act 1954
GC-93	Health and Sanitary arrangements for workers
GC-94	Safety Code
GC-95	Accidents

**GC-01 DEFINITIONS AND INTERPRETATIONS :**

- 1.0 In the contract (as hereinafter defined) the following words and expressions shall, unless repugnant to the subject or context thereof, have the following means as signed to them.
- 1.1 The "Owner / Corporation" shall mean Rajkot Municipal Corporation and shall include its Municipal Commissioner or other Officers authorized by the Corporation and also include owner's successors and assignees.
- 1.2 The "Contractor" shall mean the person or the persons, firm or Company whose e-Tender has been accepted by the Owner and includes the Contractors legal representative, his successors and permitted assigned.
- 1.3 DELETED**
- 1.4 The "Engineer-In-Charge" shall mean the person designated as such by the owner from time to time and shall include those who are expressly authorized by the Corporation to act for and on its behalf for all functions pertaining to the operation of this contract.
- 1.5 Engineer-In-Charge's Representtive shall mean any resident Engineer or Assistant to the Engineer-In-Charge appointed from time to time by the owner to perform duties set forth in the E-TENDER Document whose authority shall be notified in writing to the Contractor by the Engineer-In-Charge.
- 1.6 "E-TENDER" – the offer or proposal of the Tenderer submitted in the prescribed form setting for the prices for the work to be performed, and the details thereof.
- 1.7 "Contract Price" shall mean total money payable to the Contractor under the contract.
- 1.8 "Addenda" shall mean the written or graphic notices issued prior to submission of e-Tender which modify or interpret the contract documents.
- 1.9 "Contract Time" – the time specified for the completion of work.
- 1.10 "Contract" shall mean agreement between the parties for the execution of works including therein all contract documents.
- 1.11 "Contract Document" shall mean collectively the e-Tender documents, designs, drawings, specifications, agreed variations, if any and such other documents constituting the e-Tender and acceptance thereof.
- 1.12 "The Sub-Contractor" shall mean any person, firm or company (other than the Contractor) to whom any part of the work has been entrusted by the Contractor with the written consent of the Engineer-In-Charge and the legal representative successors and permitted assignee of such person, firm or company.



- 1.13 The "Specifications" shall mean all directions, the various Technical Specifications, provisions and requirements attached to the contract which pertains to the method and manner of performing the work, to the quantities and qualities of the work and the materials to be furnished under the contract for the work and any order(s) or instruction(s) there under. It shall also mean the latest Indian Standard Institute Specification relative to the particular work or part thereof, so far as they are not contrary to the E-TENDER specifications and in absence of any other Country applied in Indian as a matter of standard engineering practice and approved in writing by the Engineer-In-Charge with or without modification.
- 1.14 The "Drawings" shall include maps, plans, tracings, or prints thereof with any modification approved in writing by the Engineer-In-Charge and as such other drawings as may, from time to time, be furnished or approved in writing by the Engineer-In-Charge in connection with the work.
- 1.15 The "Work" shall mean the works to be executed in accordance with the contract or the part thereof as the case may be and shall include extra, additional, altered or substituted works as required for the purpose of the contract. It shall mean the totality of the work by expression or implication envisaged in the contract and shall include all materials, equipment and labour required for or relative or incidental to or in connection with the commencement, performance and completion of any work and / or incorporation in the work.
- 1.16 The "Permanent Work" shall mean works which will be incorporated in and form part of the work to be handed over to the owner by the Contractor on completion of the contract.
- 1.17 The "Temporary Work" shall mean all temporary works of every kind required in or about the execution, completion and maintenance of the work.
- 1.18 "Site" shall mean the land and other places, on, under, in or through which the permanent works are to be carried out and any other lands or places provided by the Corporation for the purpose of the contract together with any other places designated in the contract as forming part of the site.
- 1.19 The "Construction Equipment" shall mean all appliances / equipment of whatever nature required in or for execution, completion or maintenance of works or temporary works (as herein before defined) but does not include materials or other things intended to form or forming part of the permanent work.
- 1.20 "Notice in writing or written Notice" shall mean a notice written, typed or in printed form delivered personally or sent by SMS on Mobile/E-mail/Registered Post to the last known private or business address or Registered Office of the Contractor or Email or SMS on Mobile of the

contractor and shall be deemed to have been received in the ordinary course of post it would have been delivered.

- 1.21 The "Alteration / variation order" shall mean an order given in writing by the Engineer-In-Charge to effect additions or deletions from or alterations in the work.
- 1.22 "Final Test Certificate" shall mean the final test certificate issued by the owner within the provisions of the contract.
- 1.23 The "Completion Certificate" shall mean the certificate to be issued by the Engineer-In-Charge when the work has been completed and tested to his satisfaction.
- 1.24 The "Final Certificate" shall mean the final certificate issued by the Engineer-In-Charge after the period of defects liability is over and the work is finally accepted by the owner.
- 1.25 "Defects Liability Period" shall mean the specified period between the issue of Completion Certificate and the issue of final certificate during which the Contractor is responsible for rectifying all defects that may appear in the works.
- 1.26 "Approved" shall mean approved in writing including subsequent confirmation in writing of previous verbal approval and "Approval" means approved in writing including as aforesaid.
- 1.27 "Letter of Acceptance" shall mean an intimation by a letter to Tenderer that his e-Tender has been accepted in accordance with the provisions contained therein.
- 1.28 "Order" and "Instructions" shall respectively mean any written order or instruction given by the Engineer-In-Charge within the scope of his powers in terms of the contract.
- 1.29 "Running Account Bill" shall mean a bill for the payment of "On Account" money to the Contractor during the progress of work on the basis of work done and the supply of non-perishable materials to be incorporated in the work.
- 1.30 "Security Deposit" shall mean the deposit to be held by the owner as security for the due performance of the contractual obligations.
- 1.31 The "Appointing Authority" for the purpose of Arbitration shall be the Municipal Commissioner, Rajkot Municipal Corporation.
- 1.32. "Retention Money" shall mean the money retained from R.A.Bills for the due completion of the "LET WORS".
- 1.33 Unless otherwise specifically stated, the masculine gender shall include the feminine and neuter genders and vice-versa and the singular shall include the plural and vice-versa.

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

The work is to be carried out in the City area. Non-availability of access roads shall in no case be the cause to condone delay in the execution of the work and no claim or extra compensation will be paid. The intending bidder should inspect the site and make himself familiar with site conditions.

**GC-03 SCOPE OF WORK :**

The scope of work is defined broadly in the special conditions of contract and specifications. The Contractor shall provide all necessary materials, equipment and labour etc. for the execution and maintenance of the work. All material that go with the work shall be approved by the Engineer-In-Charge prior to procurement and use.

Power Supply :

The Contractor shall make his own arrangement for power supply during installation.

Land for Contractor's Field Office, Godown Etc.:

Owner will not be in a position to provide land required for Contractor's field office, godown, etc. The Contractor shall have to make his own arrangement for the same.

**GC-04 RULING LANGUAGE :**

The language according to which the contract shall be construed and interpreted shall be English. All entries in the contract document and all correspondence between the contractor and the Corporation or the Engineer-In-Charge shall be in English/Gujarati. All dimensions for the materials shall be given in metric units only. A reasonable proportion of the contractor's superintending staff shall have a working knowledge of Gujarati and/or Hindi language or the contractor shall have sufficient competent interpreters available for communications.

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

1. The provision of the General Conditions of Contract and Special Conditions of Contract shall prevail over those of any other documents of the contract unless specifically provided otherwise, should there be any discrepancy, inconsistency, error or omission in the several documents forming the contract, the matter may be referred to the Engineer-In-Charge for his instructions and decision. The Engineer-In-Charge's decision in such case shall be final and binding to the Contractor.
2. Works shown upon the drawings but not described in the specifications or described in the specifications without showing on the drawings shall be taken as described in the specifications and shown on the drawings.

3. The headings and the marginal notes to the clause of these General Conditions of Contract or to the specifications or to any other part of e-Tender documents are solely for the purpose of giving a concise indication and not a summary of contents thereof. They shall never be deemed to be part thereof or be used in the interpretation or construction of the contract.
4. Unless otherwise states specifically, in this contract documents the singular shall include the plural and vice-versa wherever the context so requires. Works imparting persons shall include relevant Corporations / Body of individual / firm of partnership.
5. Notwithstanding the sub-division of the documents into separate section and volumes every part of each shall be supplementary to and complementary of every other part and shall be read with and into the context so far as it may be practicable to do so.
6. Where any portion of the General Conditions of Contract is repugnant to or at variance with any provisions of the Special Conditions of Contract, then, unless a different intention appears, the provisions of the special conditions of contract shall be deemed to over ride the provisions of General Conditions of Contract to the extent of each repugnancy of variance.
7. The materials, design, and workmanship shall satisfy the relevant BIS, and codes referred to. If additional requirements are shown in the specifications, the same shall be satisfied over and above BIS and other codes.
8. If the specifications mention that the Contractor shall perform certain work or provide certain facilities, it shall mean that the Contractor shall do so at his own cost.
9. Contractor to Collect His Own Information -  
The details given in the e-Tender are arranged making necessary investigations for framing an estimate. However, when the work is being executed, changes in soil conditions are likely to be met with in view of the formation of soil, strata in Rajkot District. It is, therefore, desirable that the Contractor makes his own investigations or additional investigations as may be required for correctly assessing the cost of different items of work and submit his e-Tender accordingly. Any change in description or quantity of an item shall not vitiate the contract or release the Contractor from executing the work comprised in the contract according to the drawings and specifications at the e-Tendered rates.

He is deemed to have know the scope, nature and magnitude of the work and the requirements of materials and labour involved and as to whatever work he has to complete in accordance with the contract. The Contractor is expected to visit the site and surroundings to satisfy himself as to the nature of all existing structures, if any, and also as to the nature and the conditions of

railways, roads, bridges and culverts, means of transport and communications whether by land, air or water and as to possible interruptions thereto and the access and gross from the site, to have examined and satisfied himself as to the sites for obtaining sand, stones, bricks and other materials, the site for disposal of surplus materials, the available accommodation and make such enquiries as may be necessary for executing and completing the work, to have local enquiries as to the sub-soil, subsoil water and variation thereof, storms, prevailing winds, climatic conditions and all other similar matters, effecting work. He is expected to be familiar with his liability for payment of Government taxes, customs and excise duty and other charges etc. in contract with the execution of this contract. The contractor shall have to a certificate for this.

**GC-06 CONTRACTOR TO UNDERSTAND HIMSELF FULLY :**

The Contractor by e-Tendering shall be deemed to have satisfied himself, as to all considerations and circumstances affecting the e-Tender price, as to the possibility of executing the works as shown and described in the contract and to have fixed his prices according to his own view on these matters and to have understood that no additional allowances except as otherwise expressly provided, will afterwards be made beyond the contract price. The Contractor shall be responsible for any misunderstanding or incorrect information, however, obtained.

**GC-07 ERRORS IN SUBMISSIONS :**

The Contractor shall be responsible for any errors or omissions in the particulars supplied by him, whether such particulars have been approved by the Engineer-In-Charge or not.

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

The Contractor shall be deemed to have satisfied himself before e-Tendering as to the correctness of the e-Tender rates which rates shall, except as otherwise provides for, cover all the Contractor's liabilities and obligations set forth or implied in the contract for the proper execution of the work for compliance with requirements of Article GC-19 thereof.

**GC-09 DISCREPANCIES :**

The drawings and specifications are to be considered as mutually explanatory of each other, detailed drawings being followed in preference to small-scale drawings and figured dimensions in preference to scale and special conditions in preference to General Conditions. The special directions or dimensions given in the specifications shall supercede all else. Should any discrepancies however, appear or should any misunderstanding arise as to the meaning and intent of the said specifications or drawings, or as to the dimensions or the quality of the materials or the due and proper execution of the works, or as to the measurement or quality and valuation of the work executed under this contract or as extra there upon, the same shall be explained by the Engineer-In-Charge and

his explanation shall be subject to the final decision of the Municipal Corporation in case reference be made to it, be binding upon the Contractor and the Contractor shall execute the work according to such explanation and without addition or to deduction from the contract price and shall also do all such works and things necessary for the proper completion of the works as implied by the drawings and specifications, even though such works and things are not specially shown and described in the said specifications. In cases where no particular specifications are given for any article to be used under the contract, the relevant specifications of the Indian Standard Institution shall apply.

**GC -10 PERFORMANCE GUARANTEE (SECURITY DEPOSIT) :**

1. A sum of 5% of the accepted value of the e-Tender shall be deposited by the Tenderer (hereinafter called the contractor when e-Tender is accepted) as security deposit with the owner for the faithful performance, completion and maintenance of the works in accordance with the contract documents and to the satisfaction of the Engineer-In-Charge and assuring the payment of all obligations arising from the execution of the contract. This shall be deposited in one of the forms mentioned below :
  - a. By a Demand Draft on the Rajkot Branch of any Nationalized Bank or Scheduled Bank except co-operative bank duly endorsed in favour of the "**RAJKOT MUNICIPAL CORPORATION**", Rajkot.
  - b. A Fixed Deposit Receipt of any Nationalized Bank or Schedule Bank duly endorsed in favour of the "**RAJKOT MUNICIPAL CORPORATION**", Rajkot.
  - d. The Contractor may pay 2.5% of the value of works as initial security deposit and the balance 2.5% shall be recovered in installments through deductions at the rate of 10 (ten) percent of the value of each Running Account Bill till the total security execution exceeds the accepted value of e-Tender because of allotment of further work, further recoveries towards security deposit shall be effected at 10% of the R A Bills to make up the five percent security deposit of the revised value of contract. Alternatively, the Contractor may at his option deposit the full amount of 5 percent of security deposit within ten days of receipt by him of the notification accepting the e-Tender in the form as aforesaid. **The Performance Guarantee (Security Deposit) will be released to the contractor without any interest after defect liability period is over.**
2. If the Contractor, sub-contractor or their employees shall break, deface or destroy any property belonging to the owner or other agency during the execution of the contract, the same shall be made good by the contractor at his own expense and in default thereof, the Engineer-In-Charge may cause the same to be made good by other agencies and recover expense from the Contractor (for which the certificate of the Engineer-In-Charge shall be final).

These expense can be recovered from the security deposit if recovery from other sources is not possible. The amount as reduced in security deposit will be made good by deduction from the next R A Bill of the Contractor.

**GC -11**

**INSPECTION OF WORK :**

1. The Engineer-In-Charge shall have full power and authority to inspect the work at any time wherever in progress either on the site or at the Contractor's or any other manufacturer's workshop or factories wherever situated and the Contractor shall afford to Engineer-In-Charge every facility and assistance to carry out such inspection, Contractor or his authorized representative shall, at all time during the usual working hours and all times when so notified, remain present to receive orders and instructions.

Orders given to Contractor's representative shall be considered to have the same force as if they had been given to the Contractor himself. Contractor shall give not less than ten (10) days notice in writing to the Engineer-In-Charge before covering up or otherwise placing beyond reach of inspection and measurement any work in order that the same may be inspected and measured. In the event of breach of the above, the same shall be uncovered at Contractor's expenses for carrying out such inspection or measurement.

2. No material shall be despatched from Contractor's store on site of work before obtaining approval in writing of the Engineer-In-Charge. Contractor shall provide at all times during the progress of work and maintenance period of proper means of access with ladders, gangways, etc. and make necessary arrangement as directed for inspection or measurement of work by Engineer-In-Charge.

**GC -12**

**DEFECT LIABILITY :**

1. Contractor shall guarantee the work for a period of **5 (Five) Years** from the date of issue of Completion Certificate. Any damage or defect that may arise or that may remain undiscovered at the time of issue of Completion Certificate connected in any way with the equipment or materials supplied by him or in the workmanship shall be rectified or replaced by Contractor at his own expense as desired by Engineer-In-Charge or in default Engineer-In-Charge may cause the same to be made good by other agency and deduct expenses of which the certificate of Engineer-In-Charge shall be final from any sums that may then or any time thereafter become due to Contractor or from his security deposit or the proceeds of sale thereof or of a sufficient portion thereof.
2. From the commencement to completion of work Contractor shall take full responsibility for the care of the work including all temporary works and in case any damages, occur from any cause whatsoever he shall at his own cost, repair and make good the same so that on completion, work shall be in good order and in

conformity, in every respect, with the requirements of contract and as per the instructions of the Engineer-In-Charge.

3. If at any time before the work is taken over, the Engineer-In-Charge -
  - a) Decide that any work done or materials used by the Contractor are defective or not in accordance with the contract or that work or any portion thereof is defective or do not fulfill the requirements of contract (all such materials being herein after called defects in this clause) he shall, as soon as reasonably practicably, give notice to Contractor in writing of the said defect specifying particulars of the same then Contractor shall at his own expense and with all speed make good the defects so specified.
  - b) In case Contractor fails to do so, owner may take, at the cost of the Contractor, such stops as may in all circumstances be responsible to make good such defects. The expenditure so incurred by owner will be recovered from the amount due to Contractor. The decision of Engineer-In-Charge with regard to the amount to be recovered from Contractor will be final and binding on the Contractor.

**GC-13 POWER OF ENGINEER-IN-CHARGE TO GIVE FURTHER INSTRUCTIONS :**

The Engineer-In-Charge shall have the power and authority from time to time and at all times to give further instructions and directions as may appear to him necessary or proper for the guidance of the Contractor and the works and efficient execution of the works according to the terms of the specifications, and the Contractor shall receive, execute, obey and be bound by the same, according to the true intent and meaning thereof, as fully and effectively as though the same had accompanied or had been mentioned or referred to in the specifications. No work which radically changes the original nature of the contract shall be ordered by the Engineer-In-Charge and in the event of any deviation being ordered, which in the opinion of the Contractor changes the original nature of the contract, he shall nevertheless carry it out and any disagreement as to the nature of the work and the rate to be paid to thereof shall be resolved.

The time of completion of works shall, in the event of any deviations being ordered resulting in additional cost or reduction in cost over the contract sum, be extended or reduced reasonably by the Engineer-In-Charge. The Engineer-In-Charge's decision in the case shall be final and binding.

**GC-14 PROGRAMME :**

The time allowed for execution of works shall be the essence of the contract. The contract period shall commence from the date of notice of intimation to proceed. The Tenderer at the time of submitting his e-Tender shall indicate in the construction schedule his programme of execution of work commencement with the total



time specified. The Contractor shall provide the Engineer-In-Charge a detailed programme of time schedule for execution of the works in accordance with the specifications and the completion date. The entire programme to be finalized by the Contractor, has to conform to the execution period mentioned along with the Bill of Quantities in the e-Tender documents. The Engineer-In-Charge upon scrutiny of such submitted programme by Contractor, shall examine suitability of it to the requirement of contract and suggest modifications, if found necessary.

**GC-15 SUB-LETTING OF WORK :**

No part of the contract nor any share of interest thereon shall in any manner or degree be transferred, assigned or sublet by the Contractor directly or indirectly to any person, firm or Corporation whosoever except as provided for in the succeeding sub-clause, without the consent in writing of the owner.

**GC-16 SUB-CONTRACTS FOR TEMPORARY WORKS ETC. : (N.A.)**

The owner may give written consent to sub-contractors for execution of any part of the works at the site, being entered upon the contractor provided each individual contract is submitted to the Engineer-In-Charge before being entered into and is approved by him. List of sub-contractors to be supplied.

Notwithstanding any subletting with such approval as aforesaid and notwithstanding the Engineer-In-Charge shall have received of any sub-contractors, the Contractor shall be and shall remain solely responsible for the quality and proper and expeditious execution of the works and the performance of all the conditions of contract in all respects as if such subletting or subcontracting had not taken place and as if such works had been done directly by the Contractor.

**GC-17 TIME FOR COMPLETION :**

1. The work covered under this contract shall be commenced from the date the Contractor is served with a notice to proceed with the work and shall be completed before the date as mentioned in the time schedule of work. The time is the essence of the contract and unless the same is extended as mentioned in Clause GC-18 "Extension of Time", the Contractor shall pay liquidated damages for the delay.
2. The general time schedule for construction is given in the e-Tender document. Contractor shall prepare a detailed weekly or monthly construction programme in consultation with the Engineer-In-Charge soon after the agreement and the work shall be strictly executed accordingly.

The time for construction includes the time required for testing, rectifications, if any, retesting and completion of the work in all respects to the entire satisfaction of the Engineer-In-Charge.

**GC -18 EXTENSION OF TIME :**

Time shall be considered as the essence of the contract. If, however, the failure of the Contractor to complete the work as per the stipulated dates referred to above arises from delays on the part of Corporation in supplying the materials or equipment, it has undertaken to supply under the contract or from delays on the quantity of work to be done under the contract, or force majeure an appropriate extension of time will be given by the Corporation. The Contractor shall request for such extension within one month of the cause of such delay and in any case before expiry of the contract period.

**GC-19 CONTRACT AGREEMENT :**

The successful Tenderer shall enter into and execute the contract agreement within 10 (ten) days of the notice of award, in the form shown in e-Tender documents with such modifications as may be necessary in the opinion of the Corporation. It shall be incumbent on the Contractor to pay the stamp duty and the legal charges for the preparation of the contract agreement.

**GC -20 LIQUIDATED DAMAGES :**

If the Contractor fails to complete the work or designated part thereof within the stipulated completion date for the work or for the part, he shall pay liquidated damages at 0.1 (zero point one) percent of contract value for per day of delay subject to maximum of 10% of the contract value or as decided by Municipal Commissioner.

The Contractor shall complete one-sixth quantum of work within one fourth period, four-tenth quantum of work within one-half period and eight-tenth quantum of work within three-fourth period, failing which, the Contractor shall be liable to pay liquidated damages an amount as specified above, or as decided by Municipal Commissioner.

The amount of liquidated damages shall, however, be subjected to a maximum of 10 percent of the contract value. Delay in excess of 100 days shall be a cause for termination of the contract and forfeiture of all security for performance.

**GC -21 FORFEITURE OF SECURITY DEPOSIT :**

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

**GC-22 ACTION OF FORFEITURE OF SECURITY DEPOSIT :**

In any case in which under any Clause or Clauses of the contract, the Contractor shall committed a breach of any of the terms contained in this contract, the owner shall have power to adopt any of the following courses as he may deem best suited to his interest.

- a) To rescind the contract (of which recession notice in writing to the contractor under the hand of the owner shall be conclusive evidence) in which case the security deposit of the Contractor shall stand forfeited and be absolutely at the disposal of the owner.
- b) To employ labour and to supply materials to carry out the balance work debiting Contractor with the cost of labour employed and the cost of materials supplied for which a certificate of the Engineer-In-Charge shall be final and conclusive against the Contractor and 10% of costs on above to cover all departmental charges and crediting him with the value of work done at the same rates as if it has been carried out by the Contractor under the terms of his contract. The certificate of Engineer-In-Charge as to the value of the work done shall be final and conclusive against the Contractor.
- c) To measure up the work of the contractor and to take such part thereof as shall be unexecuted out of his hand and give it to another Contractor to complete, the same. in this case the excess expenditure incurred than what would have been paid to the original Contractor, if the whole work had been executed by him, shall be borne and paid by the original Contractor and shall be deducted from any money due to him by the owner under the contract or otherwise and for the excess expenditure, the certificate of the Engineer-In-Charge shall be final and conclusive.

In the event any of the above courses being adopted by the owner, the Contractor shall have no claims for compensation for any loss sustained by him by reason of his having purchased or procured any materials or entered into any agreements or made any advance on account of or with a view to the execution of the work or the performance of the contract.

In purchase the Contractor shall not be entitled to recover or be paid any sum for any work actually performed under this contract unless the Engineer-In-Charge will certify in writing the performance of such work and the value payable in respect thereof and he shall only be entitled to be paid the value so certified.

In the event of the owner putting in force the powers as stated in a, b, c, above vested in him under the proceeding clause, he may, if he so desires, take possession of all or any tools and plant, materials and stores in or upon the works or the site thereof belonging to the Contractor, or procured by him and intended to be used for the execution of the work or any part thereof paying or allowing for the same in account at the contract rates to be certified by the Engineer-In-Charge. The Engineer-In-Charge may give

notice in writing to the Contractor or his representative requiring him to remove such tools, plant, materials or stores from the premises within the time specified in the notice and in the event of the Contractor failing to comply with any such notice, the Engineer-In-Charge may remove them at the Contractor's expenses or sell them by auction or private sale on account of the Contractor and his risks in all respects without any further notice as to the date, time or place of the sale and the certificate of Engineer-In-Charge as to the expense of any such removal and the amount of the proceeds and the expenses of any such sale shall be final and conclusive against the Contractor.

**GC-23            COMPENSATION FOR ALTERATION IN OR RESTRICTION IN WORK**

If at any time from the commencement of the work, the owner shall for any reasons whatsoever not require the whole work or part thereof as specified in the e-Tender to be carried out, the Engineer-In-Charge shall give notice in writing of the fact to the Contractor, who shall have no claim to any payment or compensation whatsoever on account of any profit or advantage which he might have derived from the execution of the work in full but which he did not derive in consequence of full amount of the work not having been carried out. He also shall not have any claim for compensation by reasons of any alterations having been made in original specifications, drawings, designs and instructions which shall involve any curtailment of the work as originally contemplated.

When the Contractor is a partnership firm, the prior approval in writing of the owner shall be obtained before any change is made in the Constitution of the firm. Where the Contractor is an individual or a Hindu Undivided Family or business concern, such approval as aforesaid shall, likewise be obtained before Contractor enters into an agreement with other parties where under, the reconstituted firm would have the right to carry out the work hereby undertaken by the Contractor. In either case, if prior approval as aforesaid is not obtained, the contract shall be deemed to have been allotted contravention of subletting clause hereof and the same action may be taken and the same consequence shall ensue as provided in the subletting clause.

**GC-24            IN THE EVENT OF DEATH OF THE CONTRACTOR :**

Without prejudice to any of the rights or remedies under the contract, if the Contractor dies, the owner shall have the option of terminating the contract without compensation to the Contractor.

**GC-25            MEMBERS OF THE OWNER NOT INDIVIDUALLY LIABLE :**

No official or employee of the owner shall in any way be personally bound or liable for the acts or obligation of the owner under the contract, or answerable for any default or omission in the observance or performance of any acts, matters or things, which are herein, contained.

- GC -26 OWNER NOT BOUND BY PERSONAL REPRESENTATIONS :**  
The Contractor shall not be entitled to any increase on the schedule of rates or any other rights or claims whatsoever by reason of representation, promise or guarantees given or alleged to have been given to him by any person.
- GC -27 CONTRACTOR'S OFFICE AT SITE :**  
The Contractor shall provide and maintain an office at the site for the accommodation of his agent and staff and such office shall remain open at all reasonable hours to receive information, notices or other communications.
- GC -28 CONTRACTOR'S SUBORDINATE STAFF AND THEIR CONDUCT :**
1. The Contractor on award of the work shall name and depute a qualified Engineer having experience of carrying out work of similar nature, whom equipments, materials, if any, shall be issued and instructions for work given. the Contractor shall also provide to the satisfaction of Engineer-In-Charge sufficient and qualified staff, competent sub-agents, foreman and leading hands including those specially qualified by previous experience to supervise the type of works comprised in the contract in such manner as will ensure work of the best quality and expeditious working. If, in the opinion of the Engineer-In-Charge additional properly qualified supervision staff is considered necessary, it shall be employed by the Contractor, without additional charge on account thereof. The Contractor shall ensure to the satisfaction of the Engineer-In-Charge that sub-contractors, if any, shall provide competent and efficient supervision over the work entrusted to them.
  2. If and whenever any of the Contractor's or sub-contractor's agents, sub-agents, assistants, foreman or other employees shall, in the opinion of the Engineer-In-Charge, be guilty of any misconduct or be incompetent or insufficiently qualified or negligent in the performance of their duties or that in the opinion of the owner or Engineer-In-Charge, it is undesirable for administrative or any other reason for person or persons to be employed in the works, the Contractor if so directed by the Engineer-In-Charge, shall at once remove such person or persons from employment thereon. Any person or persons so removed shall not again be re-employed in connection with the works without the written permission of the Engineer-In-Charge. Any person, so removed from the works shall be immediately replaced at the expense of the Contractor by a qualified and competent substitute. Should the Contractor be required to repatriate any person removed from the works he shall do so after approval of Engineer-In-Charge and shall bear all costs in connection therewith.
  3. The Contractor shall be responsible for the proper behavior of all the staff, foreman, workmen and others and shall exercise proper control over them and in particular and without prejudice to the said generality, the Contractor shall be bound to prohibit and

prevent any employee from trespassing or acting in any way detrimental or prejudicial to the interest of the community or of the properties or occupiers of land and properties in the neighborhood and in the event of such employees so trespassing, the Contractor shall be responsible therefore and relieve the owner of all consequent claims, actions for damages or injury or any other ground whatsoever. The decision of the Engineer-In-Charge upon any matter arising under this claim shall be final.

4. If and when required by the owner, the Contractor's personnel entering upon the owner's premises shall be properly identified by badges of a type acceptable to the owner which must be worn at all times on owner's premises.

**GC-29 TERMINATION OF SUB-CONTRACT BY OWNER : (N.A.)**

If any sub-contractor engaged upon the works at the site execute any work which in the opinion of Engineer-In-Charge is not accordance with the contract documents, the owner may by written notice to the Contractor request him to terminate such sub-contract and the Contractor upon the receipt of such notice shall terminate such sub-contracts and the latter shall forthwith leave the works, failing which, the owner shall have the right to remove such sub-contractors from the site.

No action taken by the owner under the above clause shall relieve the Contractor of his liabilities under the contract or give rise to any right to compensation, extension of time or otherwise.

**GC-30 POWER OF ENTRY :**

If the Contractor shall not commence the work in the manner previously described in the contract documents or if he shall at any time, in the opinion of Engineer-In-Charge –

Fail to carry out works in conformity with the contract documents, or

Fail to carry out the works in accordance with the time schedule, or Substantially suspend work or the works for a period of seven days without authority from Engineer-In-Charge, or

Fail to carry out and execute the work to the satisfaction of the Engineer-In-Charge, or

Fail to supply sufficient or suitable construction plant, temporary works, labour, materials or things, or

Commit breach of any other provisions of the contract on his part to be performed or observed or persists in any of the above mentioned breaches of the contract for seven days after notice in writing shall have been given to the Contractor by the Engineer-In-Charge requiring such breach to be remedied, or

Abandon the work, or

During the continuance of the contract becomes bankrupt, make any arrangement or compromise with his creditors, or permit any execution to be levied or go into liquidation whether compulsory or

voluntary not being merely a voluntary liquidation for the purpose of amalgamation or reconstruction then in any such case.

The owner shall have the power to enter upon the works and take possession thereof and of the materials, temporary works, constructional plant and stores therein and to revoke the Contractor's license to use the same and to complete the works by his agents, other Contractor or workmen, to relate the same upon any terms to such other person firm or Corporation as the owner in his absolute discretion may think proper to employ, and for the purpose aforesaid to use or authorize the use of any materials, temporary works, constructional plant, and stores as aforesaid with making payments or allowance to the Contractor for the said materials other than such as may be certified in writing by the Engineer-In-Charge to be reasonable and without making any payment or allowance to the Contractor for the use of said temporary works, constructional plant and stock or being liable for loss or damage thereto. If the owner shall be reason of his taking possession of the works or of the work being got completed by other Contractor incurred excess expenditure be deducted from any money which may be due for the work done by the Contractor under the contract and not paid for. Any deficiency shall forthwith be made good and paid to the owner by the Contractor and the owner shall have power to sell in such manner and for such price as he may think fit all or any of the constructional plant, materials etc., consist constructed by or belonging to and to recoup and retain the said deficiency or any part thereof out of the proceeds of the sale.

**GC-31 CONTRACTOR'S RESPONSIBILITY WITH THE OTHER CONTRACTOR AND AGENCIES :**

Without repugnance to any other conditions, it shall be the responsibility of the Contractor executing the work, to work in close co-operation and co-ordination with other Contractors or their authorized representatives and the Contractor will put a joint scheme with the concurrence of other contractors or their authorized representatives showing the arrangements for carrying his portion of the work to the Engineer-In-Charge and get the approval. The Engineer-In-Charge before approving the joint scheme will call the parties concerned and modify the scheme if required. No claim will be entertained on account of the above. The Contractor shall conform in all respects with the provisions of any statutory regulations, ordinances or bylaws of any local or duly constituted authorities or public bodies which may be applicable from time to time to works or any temporary works. The Contractor s shall keep the owner indemnified against all penalties and liabilities of every kind arising out of non-adherence to such statutes, ordinance, laws, rules, regulations etc.

**GC-32 OTHER AGENCIES AT SITE :**

The Contractor shall have to execute the work in such place and condition where other agencies will also be engaged for other

works, such as site grading, filling and leveling, electrical and mechanical engineering works etc. No claim shall be entertained for works being executed in the above circumstances.

**GC-33 NOTICES :**

Any notice under this contract may be served on the Contractor or his duly authorized representative at the job site or may be served by Registered Post direct to the official address of the Contractor. Proof of issue of any such notice could be conclusive of the Contractor having been duly informed of all contents therein.

**GC-34 RIGHTS OF VARIOUS INTERESTS :**

The owner reserves the right to distribute the work between more than one Contractor. Contractor shall co-operate and afford reasonable opportunity to other Contractor s for access to the works, for the carriage and storage of materials and execution of their works. Whenever the work being done by department of the owner or by other Contractor employed by the owner is contingent upon work covered by this contract, the respective rights of the various interests shall be determined by the Engineer-In-Charge to secure the completion of various portions of the work in general harmony.

**GC-35 PRICE ADJUSTMENTS :**

Prices are firm and fix and no adjustment in price shall be allowed and no price escalation will be allowed for the contract period or extended period, if any.

**GC-36 TERMS OF PAYMENT :**

The payment of bills shall be made progressively according to the rules and practices followed by the Corporation. The progressive payment unless otherwise provided in the contract agreement or subsequently agreed to by the parties shall be made generally monthly on submission of a bill by the Contractor in prescribed form of an amount according to the value of the work performed less the price of materials supplied by owner aggregate of previous progressive payments and as required by Clause GC-37 (Retention of Money) herein. All such progressive payments shall be regarded as payments by way of advance against final payment. Payment for the work done by the Contractor will be based on the measurement at various stages of the work, in accordance with the condition at clause GC-81 (measurement of work in progress).

**GC-37 RETENTION MONEY :**

Pursuance to clause GC-36 (Terms of Payment) any on at money due to the Contractor for work done, Corporation will hold as Retention money five (5) percent of the value of work. The retention money will not normally be due for payment until the completion of the entire work and till such period the work has been finally accepted by the Corporation and a completion certificate



issued by the Corporation in pursuant to Clause-GC 79 (Completion Certificate).

**GC-38 PAYMENTS DUE FROM THE CONTRACTOR :**

All costs, damages or expenses, for which under the contract, Contractor is liable to the Corporation, may be deducted by the Corporation from any money due or becoming due to the Contractor under the contract or from any other contract with the Corporation or may be recovered by action at law or otherwise from the Contractor.

**GC-39 CONTINGENT FEE :**

i) The Contractor warrants that he has not employed a person to solicit or secure the contract upon any agreement for a commission, percentage, and brokerage contingent fee. Breach of this warranty shall give the Corporation the right to cancel the contract or to take any drastic measure as the Corporation may deem fit. The warranty does not apply to commissions payable by the Contractor to establish commercial or selling agent for the purpose of securing business.

ii) No officer, employer or agent of the Corporation shall be admitted to any share or part of this contract or to any benefit that may rise there from.

**GC-40 BREACH OF CONTRACT BY CONTRACTOR :**

If Contractor fails to carry out the work in timely manner as mentioned in GC-20, Rajkot Municipal Corporation may give notice in writing to the Contractor to expedite the progress of work, so that the work can be completed as per time schedule. If Contractor fails to expedite the progress of work within 14 days, Rajkot Municipal Corporation will forfeit the Earnest Money Deposit / Security Deposit and may terminate the contract and put the Contractor in Black List / Debar for the period of three years and the remaining work will be executed through other agency at the risk and cost of the Contractor.

**GC-41 DEFAULT OF CONTRACTOR :**

i) The Corporation may upon written notice of default to the Contractor terminate the contract circumstances detailed as under :

a) If in the opinion of the Corporation, the Contractor fails to make completion of works within the time specified in the completion schedule or within the period for which extension has been granted by the Corporation to the Contractor.

b) If in the opinion of the Corporation, the Contractor fails to comply with any of the other provisions of this contract.

ii) In the event, the Corporation terminates the contract in whole or in part as provided in Article GC-50 (Termination of

the Contract) the Corporation reserves the right to purchase upon such terms and in such manner as it may be deemed appropriate, plant similar to one which is not supplied by the Contractor and the Contractor will be liable to the Corporation for any additional costs for such similar plant and / or for liquidated damages for delay until such time as may be required for the final completion of works.

- iii) If this contract is terminated as provided in this paragraph GC-30 (Power of Entry) (1) the Corporation in addition to any other rights provided in this clause, may require the Contractor to transfer title and deliver to the Corporation.

Any completed works

Such partially completed information and contract rights as the Contractor has specifically produced or acquired for the performance of the contract so terminated.

- iv) In the event, the Corporation does not terminate the contract as provided in the paragraph GC-50 (Termination of Contract) the Contractor shall continue performance of the contract, in which case, he shall be liable to the Corporation for liquidated damages for delay until the works are completed and accepted.

#### **GC -42**

##### **BANKRUPTCY :**

If the Contractor shall become bankrupt or insolvent or has a receiving order made against him, or compound with his creditors, or being the Corporation commence to be wound up not being a member voluntary winding up for the purpose of amalgamation or reconstruction, or carry on its business under a receiver for the benefit of his creditors or any of them, the Corporation shall be at liberty to either (a) terminate the contract forthwith by giving notice in writing to the Contractor or to the receiver or liquidator or to any person or Organization in whom the contract may become vested and to act in the manner provided in Article GC-41 (Default of Contractor) as though the last mentioned notice had been the notice referred to in such article or (b) to give such receiver, liquidator or other persons in whom the contract may become vested the option of carrying out the contract subject to his providing a satisfactory guarantee for the due and faithful performance of the contract up to an amount to be agreed. In the event that the Corporation terminates the contract in accordance with this article, the performance bond shall immediately become due and payable on demand to Corporation.

#### **GC -43**

##### **OWNERSHIP :**

Works hand over pursuant to the contract shall become the property of the Corporation from whichever is the earlier of the following times, namely;

- A) When the works are completed pursuant to the contract.

- B) When the contractor has been paid any sum to which he may become entitled in respect thereof pursuant to Clause GC-36 (Terms of Payment).

**GC-44 DECLARATION AGAINST WAIVER :**

The condemnation by the Corporation of any breach or breaches by the Contractor or an authorized sub-contractor of any of the stipulations and conditions contained in the contract, shall in no way prejudice or affect or be construed as a waiver of the Corporation's rights, powers and remedies under the contract in respect of any breach or breaches.

**GC-45 LAWS GOVERNING THE CONTRACT :**

This contract shall be construed according to and subject to the laws of India and the State of Gujarat and under the jurisdiction of the Courts of Gujarat at Rajkot.

**GC-46 OVER PAYMENT AND UNDER PAYMENT :**

Whenever any claim for the payment of a sum to the Corporation arises out of or under this contract against the Contractor, the same may be deducted by the Corporation from any sum then due or which at any time thereafter may become due to the Contractor under this contract and failing that under any other contract with the Corporation (which may be available with the Corporation), or from his retention money or he shall pay the claim on demand. The Corporation reserves the right to carry out post payment audit and technical examinations of the final bill including all supporting vouchers, abstracts etc. The Corporation further reserves the right to enforce recovery of any payment when detected, notwithstanding the fact that the amount of the final bill may be included by one of the parties as an item of dispute before an Arbitrator, appointed under Article GC-49 (Arbitration) of this contract and notwithstanding the fact that the amount of the final bill figures in the arbitration award. If as a result of such audit and technical examinations any over payment is discovered in respect of any work done by the Contractor or alleged to have been done by him under the contract, it shall be recovered by the Corporation from the Contractor as prescribed above. If any under payment is discovered by the Corporation, the amount due to the Contractor under this contract, may be adjusted against any amount then due or which may at any time thereafter become due before payment is made to the Contractor.

**GC-47 SETTLEMENT OF DISPUTES :**

Except as otherwise specifically provided in the contract, all disputes concerning questions of fact arising under the contract shall be decided by the Engineer-In-Charge subject to a written appeal by the Contractor to the Engineer-In-Charge and those decisions shall be final and binding on the parties hereto. Any disputes or differences including those considered as such by only one of the parties arising out of or in connection with this contract

shall be to the extent possible settled amicably between the parties. If amicable settlement cannot be reached then all disputed issues shall be settled as provided in Article GC-48 (Disputes or differences to be referred to) and Article No.GC-49 (Arbitration).

**GC-48 DISPUTES OF DIFFERENCES TO BE REFERRED TO :**

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

**GC-49 DELETED**

**GC-50 TERMINATION OF THE CONTRACT :**

- i) If the Contractor finds it impracticable to continue operation owing to force majeure reasons or for any reasons beyond his control and/or the Corporation find it impossible to continue operation, then prompt notification in writing shall be given by the party affected to the other.
- ii) If the delay or difficulties so caused cannot be expected to cease or become unavoidable or if operations cannot be resumed within two (2) months then either party shall have the right to terminate the contract upon ten (10) days written notice to the other. In the event of such termination of the contract, payment to the Contractor will be made as follows :
  - a) The Contractor shall be paid for all works approved by the Engineer-In-Charge and for any other legitimate expenses due to him.
  - b) If the Corporation terminates the contract owing to Force Majeure or due to any cause beyond its control, the Contractor shall additionally be paid for any work done during the said two (2) months period including any financial commitment made for the proper performance of the contract and which are not reasonably defrayed by payments under (a) above.
  - c) The Corporation shall also release all bonds and guarantees at its disposal except in cases where the total amount of payment made to the Contractor exceeds the final amount due to him in which case the Contractor shall refund the excess amount within thirty (30) days after the termination and the Corporation thereafter shall release all bonds and guarantees. Should the Contractor fail to refund the amounts received in excess within the said period such

amounts shall be deducted from the bonds or guarantees provided.

- iii) On termination of the contract for any cause the Contractor shall see the orderly suspension and termination of operations, with due consideration to the interests of the Corporation with respect to completion safeguarding of storing materials procured for the performance of the contract and the salvage and resale thereof.

**GC-51 SPECIAL RISKS :**

If during the contract, there shall be an outbreak of war (whether war is declared or not), major epidemic, earthquake or similar occurrence in any part of the world beyond the control of either party to the contract which financially or otherwise materially affects the execution of the contract, the Contractor shall unless and until, the contract is terminated under the provisions of this article use his best endeavors to complete the execution of the contract, provided always that the Corporation shall be entitled at any time after the onset of such special risks, to terminate the contract by giving written notice to the contractor and upon such notice being given this contract shall terminate but without prejudice to the rights of either party in respect of any antecedent breach thereof.

The Contractor shall not be liable for payment of compensation for delay or for failure to perform the contract for reasons of Force Majeure such as acts of public enemy, acts of Government, fires, floods, cyclones, epidemics, quarantine restrictions, lockouts, strikes, freight embargoes and provided that the Contractor shall within 10 (ten) days from the beginning of such delay notify the Engineer-In-Charge in writing, of the cause of delay, the Corporation shall verify the facts and grant such extension as the facts justify.

**GC-52 CHANGE IN CONSTITUTION :**

Where the Contractor is a partnership firm, the prior approval in writing of the owner shall be obtained before any change is made in the constitution of the firm. Where the Contractor is an individual or undivided family business concern such approval as aforesaid shall likewise be obtained before the Contractor enters into any partnership agreement where under the partnership firm would have the right to carry out the works hereby undertaken by the Contractor. If prior approval as aforesaid is not obtained, the contract shall be deemed to have been assigned in contravention of contract.

**GC-53 SUB-CONTRACTUAL RELATIONS (N.A.)**

All works performed for the contract by a sub-contractor shall be pursuant to an appropriate agreement between the Contractor and the sub-contractor, which shall contain provision to –

- a) Protect and preserve the rights of the Corporation and the Engineer-In-Charge with respect to the works to be performed under the sub-contracting party will not prejudice such rights.
- b) Require that such work be performed in accordance with the requirements of contract documents.
- c) Require under such contract to which the contractor is a party, the submission to the Contractor of application for payment and claims for additional costs, extension of time, damages for delay or otherwise with respect to the sub-contracted portions of the work in sufficient time, that the Contractor may apply for payment comply in accordance with the contract documents for like claims by the Contractor upon the Corporation.
- d) Waive all rights the contracting parties may have against one another for damages caused by fire or other perils covered by the property insurance except such rights as they may have to the proceeds of such insurance held by the Corporation as trustee and,
- e) Obligate each sub-contractor specifically to consent to the provisions of this Article.

**GC-54****PATENTS AND ROYALTIES :**

1. Contractor, if licensed under any patent covering equipment, machinery, materials or composition of matter to be used or supplied or methods and process to be practiced or employed in the performance of this contract agrees to pay all royalties and license fees, which may be due with respect thereto. If any equipment, machinery, materials, composition matters, to be used or supplied or methods practiced or employed in the performance of this contract, is covered by a patent under which Contractor is not licensed, then the Contractor before supplying / using the equipment, machinery, materials, compositions, methods of process shall obtain such license and pay such royalties and license fees as may be necessary for performance of this contract. In the event Contractor fails to pay such royalty or to obtain any such license, any suit for infringement of such patents which is brought against the Contractor or the owner as a result of such failure will be defended by the Contractor at his own expenses and the Contractor will pay any damages and costs awarded in such suit. The Contractor shall promptly notify the owner if the Contractor has acquired knowledge of any plant under which a suit for infringement could be reasonably brought because of the use by the owner of any equipment machinery, materials, process methods to be supplied in hereunder. Contractor agrees to and does hereby grant to owner together with the right to extend the same to any of the subsidiaries of the owner an irrevocable royalty fee license to use in any Country, any invention made by the Contractor or his employees in or as a result of the performance of work under contract.

2. With respect to any sub-contract entered into by Contractor pursuant to the provisions of the relevant clause hereof, the Contractor shall obtain from the sub-contractor an understanding to provide the owner with the same patent protection that contracts is required to provide under the provisions of the clause.
3. The Contractor shall indemnify and save harmless the owner from any loss on account of claims against owner for the contributory infringement of patent rights arising out of and based upon the claim that the use by the Corporation of the process included in the design prepared by the Contractor and used in the operation of the plant infringes on any patent rights.

**GC-55****LIEN :**

If, at any time, there should be evidence of any lien or claim for which owner might have become liable and which is chargeable to the Contractor, the owner shall have the right to retain out of any payment then due or thereafter to become due an amount sufficient to completely indemnify the owner against such lien or claim or if such lien or claim be valid the owner may pay and discharge the same and deduct the amount as paid from any money which may be due or become due and payable to the Contractor. If any lien or claims remaining unsettled after all payments are made, the Contractor shall refund or pay to the owner all money that the latter may be compelled to pay in discharging such lien or claim including all costs and reasonable expenses.

**GC-56****EXECUTION OF WORK :**

The whole work shall be carried out in strict conformity with the provisions of the contract document, detailed drawings, specifications and the instructions of the Engineer-In-Charge from time to time. The Contractor shall ensure that the whole work is executed in the most substantial, and proper manner with best workmanship using materials of best quality in strict accordance with the specifications to the entire satisfaction of the Engineer-In-Charge.

**GC-57****WORK I N MONSOON :**

When the work continues in monsoon if required, the Contractor shall maintain minimum labour force required for the work and plan and execute the construction and erection work according to the prescribed schedule. No extra rate will be considered for such work in monsoon. During monsoon and entire construction period, the Contractor shall keep the site free from water at his own cost. However, monsoon period from 1st July to 30th September will be excluded from time limit.

- GC -58 WORK ON SUNDAYS AND HOLIDAYS :**  
No work except curing shall be carried out on Sunday and holidays. However, if the exigencies of the work need continuation of work on Sundays and Holidays, written permission of the Engineer-In-Charge shall be obtained in advance.
- GC -59 GENERAL CONDITIONS FOR CONSTRUCTION WORK :**  
Working hours shall be eight every day. The over time work in two shifts could be carried out with the written permission of the Engineer-In-Charge but no compensation shall be paid for the same. The rate quoted shall include this. The Contractor shall plan his work in such a way that his labourers do not remain idle. The owner will not be responsible for idle labour of the Contractor. The Contractor shall submit to the owner progress report every week. The details and proforma of the report will be as per mutual agreement.
- GC -60 DRAWINGS TO BE SUPPLIED BY THE OWNER : (N.A.)**  
The drawings attached with the e-Tender documents shall be for general guidance of the Contractor to enable him to visualize the type of work contemplated and scope of work involved. Detail working drawings according to which the work is to be done shall be prepared by the Contractor for executing the work.
- GC -61 DRAWINGS TO BE SUPPLIED BY THE CONTRACTOR:**  
Where drawings, data are to be furnished by the Contractor they shall be as enumerated in special conditions of contract and shall be furnished within the specified time. Where approval of drawings has been specified it shall be Contractor's responsibility to have these drawings got approved from T P Branch before any work is taken up with regard to the same. Any changes becoming necessary in those drawings during the execution of the work shall have to be carried out by the Contractor at no extra cost. All final drawings shall bear the certification stamp as indicated below duly signed by both the Contractor and Engineer-In-Charge.
- Certified true for.....Project Agreement  
No.....
- Signed .....
- Contractor
- Engineer-In-Charge  
Drawings will be approved within three (3 weeks of the receipt of the same by the Engineer-In-Charge.
- GC -62 SETTING OUT WORK :**  
The Contractor shall set out the work on the site handed over by the Engineer-In-Charge and shall be responsible for the correctness



of the same. The work shall be carried out to the entire satisfaction of Engineer-In-Charge. The approval thereof or partaking by Engineer-In-Charge or setting out work shall not relieve Contractor of any of his responsibilities. The Contractor shall provide at his own cost all necessary level posts, pegs, bamboos, flags, ranging rods, strings and other materials and labourers required for proper setting out of the work. The Contractor shall provide fix and be responsible for the maintenance of all stakes, templates, level markets, profiles and similar other things and shall take all necessary precautions to prevent their removal or disturbance and shall be responsible for the consequences for such removal or disturbance. The Contractor shall also be responsible for the maintenance of all existing survey marks, boundary marks, and distance marks and centerline marks either existing or face lines and cross lines shall be marked by small masonry pillars. Each pillar shall have distance mark at the center for setting up the theodolite. The work shall not be started unless the setting out is checked and approved by Engineer-In-Charge in writing but such approval shall not relieve the Contractor of his responsibilities about the correctness of setting out. The Contractor shall provide all materials, labour and other facilities necessary for checking at his own cost. Pillars bearing geodetic marks on site shall be protected by the Contractor. On completion of the work, the Contractor shall submit the geodetic documents according to which the work has been carried out.

**GC-63 RESPONSIBILITIES OF CONTRACTOR FOR CORRECTNESS OF THE WORK :**

The Contractor shall be entirely and exclusively responsible for the correctness of every part of the work and shall rectify completely any errors therein at his own cost when so instructed by Engineer-In-Charge. If any error has crept in the work due to non-observance of this clause, the Contractor will be responsible for the error and bear the cost of corrective work.

1. Materials to be supplied by the Contractor:  
Contractor shall procure and provide all the material required for the execution and maintenance of work including M S rods; all tools, tackles, construction plant and equipment except, the materials to be supplied by the owner detailed in the contract documents. Owner, shall make recommendations for procurement of materials to the respective authorities if desired by the Contractor but assumes no responsibility of any nature. Owner shall insist for procurement of materials with ISI marks supplied by reputed firms of the DGS & D list.
2. If however, the Engineer-In-Charge feels that the work is likely to be delayed due to Contractor's inability to procure materials, the Engineer-In-Charge shall have the right to procure materials, from the market and the Contractor will

accept these materials at the rates decided by Engineer-In-Charge.

**GC -64 MATERIALS TO BE SUPPLIED BY THE OWNER :**

1. If the contract provided certain materials or stores to be supplied by the owner, such materials and stores transported by the Contractor at his cost from owner's stores or Railway Station. The cost from Contractor for the value of materials supplied by the owner will be recovered from the R.A.Bill on the basis of actual consumption of materials in the work covered and for which R A Bill has been prepared. After completion of the work, the Contractor has to account for the full quantity of materials supplied to him.
2. The value of store materials supplied by owner to the Contractor shall be charged at rates shown in the contract document and in case any other material not listed in the schedule of materials is supplied by the owner, the same shall be charged at cost price including carting and other expenses incurred in procuring the same. All materials so supplied shall remain the property of the owner and shall not be removed from the site on any account. Any material remaining unused at the time of completion of work or termination of contracts shall be returned to owner's store or any other place as directed by the Engineer-In-Charge in perfectly good condition at Contractor's cost. When materials are supplied free of cost for use in work and surplus and unaccounted balance thereof are not returned to the owner, recovery in respect of such balance will be effected at double the applicable issue rate of the material or the market rates whichever is higher.

**GC -65 CONDITIONS OF ISSUE OF MATERIALS BY THE OWNER:  
(N.A.)**

The materials specified to be issued by the owner to the Contractor shall be issued by the owner at his store and all expenses for it carting site shall be borne by the Contractor will be issued during working hours and as per rules of owner from time to time.

Contractor shall bear all expenses for storage and safe custody at site of materials issued to him before use in work.

Material shall be issued by the owner in standard / non-standard sizes as obtained from manufacturer.

Contractor shall construct suitable godowns at site for storing the materials to protect the same from damage due to rain, dampness, fire, theft etc.

The Contractor should take the delivery of the materials issued by the owner after satisfying himself that they are in good condition. Once the materials are issued, it will be the responsibility of the

Contractor to keep them in good condition and in safe custody. If the materials get damaged or if they are stolen, it shall be the responsibility of the Contractor to replace them at his cost according to the instructions of the Engineer-In-Charge.

For delay in supply or for non-supply of materials to be supplied by the owner, on account of natural calamities, act of enemies, other difficulties beyond the control of the owner, the owner carries no responsibilities. In no case the Contractor shall be entitled to claim any compensation for loss suffered by him on this account.

None of the materials issued to the contractor, shall be used by the Contractor for manufacturing items which can be obtained from the manufacturer's. The materials issued by the owner shall be used for the work only and no other purpose.

Contractor shall be required to execute indemnity bond in the prescribed form for the safe custody and account of materials issued by the owner.

Contractor shall furnish sufficiently in advance a statement of his requirements of quantities of materials to be supplied by the owner and the time when the same will be required for the work, so as to enable Engineer-In-Charge to make arrangements to procure and supply the materials.

A daily account of materials issued by the owner shall be maintained by the contractor showing receipt, consumption and balance on hand in the form laid down by Engineer-In-Charge with all connected paper and shall be always available for inspection in the site office.

Contractor shall see that only the required quantities of materials are got issued and no more. The Contractor shall be responsible to return the surplus materials at owner's store at his own cost.

#### **GC-66**

#### **MATERIALS PROCURED WITH ASSISTANCE OF THE OWNER :**

Notwithstanding anything contained to the contrary in any of the clauses of this contract, where any materials for the execution of the contract are procured with the assistance of the owner either by issue from owner's stock or purchase made under orders or permits or licenses issued materials as trustees for owner, and use such materials not disposed them off without the permission of owner and unserviceable materials that may be left with him after completion of the contract or at its termination for any reason whatsoever on his being paid or credited such price as Engineer-In-Charge shall determine having due regard to the conditions of the materials. The price allowed to Contractor shall not exceed the amount charged to him excluding the storage of breach of the aforesaid condition, the Contractor shall in terms of license or permits and/or for criminal breach of trust be liable to compensate owner at double the rate or any higher rates. In the event of these

materials at that time having higher rate or not being available in the market then any other rate to be determined by the Engineer-In-Charge at his decision shall be final and conclusive.

**GC-67****MATERIALS OBTAINED FROM DISMANTLING :**

If the Contractor, in the course of execution of work, is called upon to dismantle any part of work for reasons other than on account of bad or imperfect work, the materials obtained from dismantling will be property of the owner and will be disposed off as per instructions of Engineer-In-Charge in the best interest of the owner.

**GC-68****ARTICLE OF VALUE OF TREASURE FOUND DURING CONSTRUCTION :**

All gold, silver and other minerals of any description and all precious stones, coins, treasures, relics, antiques and other similar things which shall be found in, under or upon site shall be the property of the owner and the Contractor shall properly preserve the same to the satisfaction of the Engineer-In-Charge and shall hand over the same to the owner.

**GC-69****DISCREPANCIES BETWEEN INSTRUCTIONS:**

If there is any discrepancy between various stipulations of the contract documents or instructions to the Contractor or his authorized representative or if any doubt arises as to the meaning of such stipulation or instructions, the Contractor shall immediately refer in writing to the Engineer-In-Charge whose decision shall be final and conclusive and no claim for losses caused by such discrepancy shall in any event be admissible.

**GC-70****ALTERATIONS IN SPECIFICATIONS & DESIGNS & EXTRA WORK :**

The Architect / Engineer-In-Charge shall have power to make any alterations in, omission from, addition to substitution for, the schedule of rates, the original specifications, drawings, designs and instructions that may appear to him to be necessary or advisable during the progress of work and the Contractor shall be bound to carry out such altered / extra / new items of work in accordance with any instructions which may be given to him in writing signed by Engineer-In-Charge and such alteration omissions, additions or substitutions, shall not invalidate contract and any altered, additional or substituted work shall be carried out by the Contractor on the same conditions of contract. The time of completion may be extended by Architect as may be considered just and reasonable by him. The rates for such additional, altered or substitute work shall be worked out as under :

- a) If the rates for additional, altered or substitutes work are specified in the contract for work, the Contractor is bound to carry out such work at the same rates as specified in the contract.

- b) If the rates for additional, altered or substituted work are not specifically provided in the contract for the work, the rates will be derived from the rates of similar items of work in the contract work. The opinion of Engineer-In-Charge as to whether the rates can be reasonably so derived the items of contract will be final and binding to the Contractors.
- c) If the rates of altered, additional or substitute work cannot be determined as specified in (a) or (b) above, the rate shall be paid as per S.O.R. of RMC and if not available in RMC SOR then it will be paid according to the SOR of R&B / GWSSB. In such case, if contractor's premium quoted in the tender is below, the rate will be paid as per the premium quoted whereas if the premium quoted in the tender is above then it will paid as per the rates of S.O.R. of Rajkot Municipal Corporation and if not available in RMC SOR then it will be paid according to the SOR of R&B / GWSSB.
- d) If the rates of altered, additional or substitute work cannot be determined as specified in (a) or (b) or (c) above, the Contractor shall within seven days of the receipt of order to carry out the work inform the Architect / Engineer-In-Charge of the rate which he intends to charge for such work supported by rate analysis and the Architect / Engineer-In-Charge will determine the rate on the basis of prevailing market rates of materials, labour cost at schedule of labour plus 15% there on as Contractor's supervision overheads and profit. The opinion of Architect / Engineer-In-Charge as to the market rates of materials and the quantity of labour involved per unit of measurement will be final and binding on Contractor.

But under no circumstances, the Contractor suspends work or the plea of non settlement of items falling under this clause.

**GC-71 ACTION WHEN NO SPECIFICAITONS ARE ISSUED :**

In case of any class of work for which no specifications is supplied by the owner in the e-Tender documents, such work shall be carried out in accordance with relevant latest ISS and if ISS do not cover the same, the work shall be carried out as per General Technical Specification for building work; and if not covered in then it is to be with standard Engineering Practice subject to the approval of Engineer-In-Charge.

**GC-72 ABNORMAL RATES :**

Contractor is expected to quote rate for each item after careful analysis of cost involved for the performance of the completed item considering all specifications and conditions of contract.

**GC-73 ASSISTANCE TO ENGINEER-IN-CHARGE :**

Contractor shall make available to Engineer-In-Charge free of cost all necessary instruments and assistance in checking of any work made by the Contractor setting out for taking measurement of work etc.

**GC-74 TESTS FOR QUALITY OF WORK :**

1. All workmanship shall be of the best kind described in the contract documents and in accordance with the instructions of Engineer-In-Charge and shall be subjected from time to time to such tests at Contractor's cost as the Engineer-In-Charge may direct at the place of manufacture of fabrication or on the site or at any such place. Contractor shall provide assistance, instruments, labour and materials as are normally required for examining, measuring and testing of any work of workmanship as may be selected and required by Engineer-In-Charge.
2. All tests necessary in connection with the execution of work as decided by Engineer-In-Charge shall be carried out at an approved laboratory at Contractor's cost.
3. Contractor shall furnish the Engineer-In-Charge for approval when requested or if required by the specification, adequate samples of all materials and finished goods to be used in work sufficiently in advance to permit tests and examination thereof. All materials furnished and finished goods applied in work shall be exactly as per the approved samples.

**GC-75 ACTION AND COMPENSATION IN CASE OF BAD WORKMANSHIP :**

If it shall appear to the Engineer-In-Charge that any work has been executed with materials of inferior description, or quality or are unsound or with unsound, imperfect or unskilled workmanship or otherwise not in accordance with the contract, the Contractor shall, on demand in writing from Engineer-In-Charge or his authorized representative specifying the work, materials or articles complained of, notwithstanding that the same may have been inadvertently passed, certified and paid for, forthwith rectify or remove and reconstruct the work, so specified. In the event of failure to do so within a period to be specified by the Engineer-In-Charge in his aforesaid demand, Contractor shall be liable to pay compensation at the rate of half a percent of the estimated cost of work for every work limited to a maximum of ten (10%) percent of the value of work while his failure to do so continues and in the case of any such failure, the Engineer-In-Charge may on expiry of the notice period rectify and remove and re-execute the work or remove and replace with others at the risk and cost of the Contractor. The decision of the Engineer-In-Charge as to any question arising under this clause shall be final and conclusive.

**GC-76 SUSPENSION WORK :**

Contractor shall, if ordered in writing by Engineer-In-Charge or his representative temporarily suspended the work or any part thereof for such time (not exceeding one month) as ordered and shall not after receiving such written notice proceed with the work until he shall have received a written order to proceed therewith. The Contractor shall not be entitled to claim compensation for any loss or damage sustained by him by reason of temporary suspension of work as aforesaid. An extension of time for completion of work will be granted to the Contractor corresponding to the delay caused by such suspension of work if he applies for the same provided the suspension was not consequent upon any default or failure on the part of the Contractor.

**GC-77 OWNER MAY DO PART OF THE WORK :**

When the Contractor fails to comply with any instructions given in accordance with the provisions of this contract, the owner has the right to carry out such parts of work as the owner may designate whether by purchasing materials and engaging labour or by the agency of another Contractor. In such case the owner shall deduct from the amount which otherwise might become due to Contractor, the cost of such work and materials with then (10) percent added to cover all departmental charges and should the total amount thereof exceed the amount due to contract, Contractor shall pay the difference to owner.

**GC-78 POSSESSION PRIOR TO COMPLETION :**

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

**GC-79 COMPLETION CERTIFICATE :**

As soon as the work has been completed in accordance with contract (except in minor respects that do not effect their use for the purpose for which they are intended and except for maintenance thereof) as per General Conditions of Contract the Engineer-In-Charge shall issue a certificate (hereinafter called completion certificate) in which shall certify the date on which work has been completed and has passed the said tests and owner shall be deemed to have taken over work on the date so certified. If work has been divided in various groups in contract, owner shall be entitled to take over any group or groups before the other or others and there upon the Engineer-In-Charge will issue a completion certificate, which will, however, be for such group or groups so taken over.

In order that Contractor could get a completion certificate, he shall make good will all speed any defect arising from the defective

materials supplied by Contractor of workmanship or any act or omission of Contractor that may have been discovered or developed after the work or groups of works has been taken over. The period allowed for carrying out such work will be normally, one month. If any defect be not remedied within the time specified, owner may proceed to do work at Contractor's (Agency, or Firm) risk and expenses and deduct from the final bill such amount as may be decided by owner. If by reason of any default on the part of the Contractor, a completion certificate has not been issued in respect of every portion of work within one month after the date fixed by contract for completion of work, owner shall be at liberty to use work or any portion thereof in respect of which a completion certificate has been issued, provided that work or the portion thereof so used as aforesaid shall be afforded reasonable opportunity for completion of that work or the portion thereof so used as aforesaid shall be afforded reasonable opportunity for completion of that work for the issue of completion certificate.

#### **GC -80**

#### **SCHEDULE OF RATES :**

1. The rates quoted by the Contractor shall remain firm till the completion of the work and shall not be subject to escalation. Schedule of rates shall be deemed to include and cover all costs, expenses and liabilities of every description and risks or every kind to be taken in executing, completing and handing over the work to owner by Contractor. The contractor shall be deemed to have known the nature, scope, magnitude and the extent of work and materials required though contract documents may not fully and precisely furnish them. He shall make such provision in the Schedule of Rates as he may consider necessary to cover the cost of such items of work and materials as may be reasonable and necessary to complete the work. The opinion of Engineer-In-Charge as to the item of work which are necessary and reasonable for completion of the work shall be final and binding on Contractor although the same may be not shown on drawings or described specifically in contract documents.
2. The Schedule of Rates shall be deemed to include and cover the cost of all constructional plant, temporary work, materials, labour and all other matters in connection with each item in Schedule of Rates and the execution of work or any portion thereof finished complete in every respect and maintained as shown or described in the contract document or as may be ordered in writing during the continuance of the contract.
3. The Schedule of Rates shall be deemed to include and cover the cost of all royalties and fees for the articles and processes, protected by letters patent or otherwise incorporated in or used in connection with work, also all royalties, rents and other payments in connection with



obtaining material of whatsoever kind for work and shall include an indemnity to owner which Contractor hereby gives against all action, proceedings, claims, damages, costs and expenses arising from the incorporation in or use on the works of any such articles, processes or materials. Other Municipal or local Board charges if levied on material, equipment or machineries to be brought to site for use on work shall be borne by the Contractor.

4. No exemption or reduction of custom duties, excise duties, sales tax or any other taxes or charges of the Central or State Government or of any Local Body whatsoever will be granted or obtained and all such expenses shall be deemed to have been included in and covered by Schedule of Rates. Contractor shall also obtain and pay for all permits or other privileges necessary to complete the work.
5. The Schedule of Rates shall be deemed to include and cover risk on account of delay and interference with Contractor's conduct of work which may occur from any cause including orders of owner in the exercise of his powers and on account of extension of time granted due to various reasons.
6. For work under unit rate basis, no alteration will be allowed in the Schedule of Rates by reasons of work or any part of them being modified, altered, extended, diminished or omitted.

#### **GC -81**

#### **PROCEDURE FOR MEASUREMENT OF WORK IN PROGRESS:**

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

**GC-82      RUNNING ACCOUNT PAYMENTS TO BE REGARDED AS ADVANCES :**

1. All running account payments shall be regarded as payments by way of advance against the final payment only and not as payment for work actually done and completed and shall not preclude the requiring of bad, unsound and imperfect or unskilled work to be removed and taken away and reconstructed or rejected or to be considered as an admission of the due performance of contract or any part thereof.
2. Five (5) percent of the gross R A Bill amount shall be retained from each bill as retention amount and the same will be paid with the final bill.

**GC-83      NOTICE FOR CLAIM FOR ADDITIONAL PAYMENT :**

If the Contractor considers that he is entitled to extra payment or compensation or any claim whatsoever in respect of work, he shall forthwith give notice in writing to the Engineer-In-Charge about his extra payment and / or compensation. Such notice shall be given to the Engineer-In-Charge within ten (10) days from the happening of any event upon which Contractor basis such claims and such notice shall contain full particulars of the nature of such claim with full details and amount claimed. Failure on the part of the Contractor to put forward any claim with the necessary particulars as above, within the time above specified shall be an absolute waiver thereof. No omission by owner to reject any such claim and no delay in dealing therewith shall waiver by owner or any rights in respect thereof.

**GC-84      PAYMENT OF CONTRACTOR'S BILL :**

1. The price to be paid by the owner to Contractor for the work to be done and for the performance of all the obligations undertaken by the Contractor under contract shall be based on the contract price and payment to be made accordingly for the work actually executed and approved by the Engineer-In-Charge.
2. Contractor on submitting the bill thereof will be entitled to receive a monthly payment proportionate to the part thereof, approved and passed by Engineer-In-Charge, whose certificate of such approval and passing of the sum so payable shall be final and conclusive against contractor. This payment shall be made after necessary deductions as stipulated elsewhere in the contract documents for materials, security deposit etc. The payment shall be released to the Contractor within two (2) months of submission of the bill duly pre-occupied on proper revenue stamp. Payment due to Contractor shall be made by the owner through ECS mode in Indian currency in the account of contractor. Owner shall not be responsible if the account number is mislaid or misappropriated by unauthorized persons.

**GC-85 FINAL BILL :**

The final bill shall be submitted by Contractor within one (1) month of the date of physical completion of work, otherwise the Engineer-In-Charge's certificate of the measurement and of total amount payable for work shall be final and binding on all parties.

**GC-86 RECEIPT FOR PAYMENT :**

Receipt for payment made on account of work when executed by a firm must be signed by a person holding Power of Attorney in this respect on behalf of Contractor except when described in the e-Tender as a limited company in which case the receipt must be signed in the name of the Company by one of its principal officers or by some person having authority to give effectual receipt for the Company.

**GC-87 COMPLETION CERTIFICATE :**

1. When the Contractor fulfils his obligation as per terms of contract, he shall be eligible to apply for Completion Certificate. Contractor may apply for separate Completion Certificate in respect of each such portion of work by submitting the completion documents along with such application for Completion Certificate.

The Engineer-In-Charge shall normally issue to Contractor the Completion Certificate within one (1) month after receiving an application thereof from Contractor after verifying, from the completion documents and satisfying himself that work has been completed in accordance with and as set out in the construction and erection drawings and the contract documents. Contractor after obtaining the Completion Certificate is eligible to present the final bill for work executed by him under the terms of contract.

2. Within one month of completion of work in all respects Contractor shall be furnished with a certificate by the Engineer-In-Charge of such completion but no certificate shall be given nor shall work be deemed to have been executed until all (i) scaffolding, surplus materials and rubbish is cleaned off site completely, (ii) until work shall have been measured by the Engineer-In-Charge whose measurement shall be binding and conclusive and, (iii) until all the temporary works, labour and staff colonies etc. constructed are removed and the work site cleaned to the satisfaction of the Engineer-In-Charge. If Contractor shall fail to comply with the requirements as aforesaid or before date fixed for the completion of work, the Engineer-In-Charge may at the expense of Contractor remove such scaffolding, surplus materials and rubbish and dispose off the same as he thinks fit.

3. The following documents will form the completion documents:-
 

Technical documents according to which the work has been carried out.

  - b) Three sets of construction drawings showing therein the modifications and corrections made during the course of execution signed by the Engineer-In-Charge.
  - c) Completion Certificate for "Embedded" or "Covered" up work.
  - d) Certificate of final levels as set out for various works.
  - e) Certificate of test performed for various work.
  - f) Material appropriation statement for the materials issued by owner for work and list of surplus materials returned to owner's store duly supported by necessary documents.
4. Upon expiry of the period of defect liability and subject to Engineer-In-Charge being satisfied that work has been duly maintained by Contractor during the defect liability period of fixed originally or as extended subsequently and that Contractor has in all respects made up any subsidence and performed all his obligations under contract, the Engineer-In-Charge (without prejudice to the rights of owner in any way) give final certificate to that effect. The Contractor shall not be considered to have fulfilled the whole of his obligation until final certificate shall have been given by the Engineer-In-Charge.
5. Final Certificate only evidence of completion:  
Except the final certificate, no other certificate of payment against a certificate or on general account shall be taken to be an admission by owner of the due performance of contract or any part thereof of occupancy or validity or any claim by the Contractor.

**GC-88 TAXES, DUTIES, ETC. :**

1. Contractor agrees to and does hereby accept full and exclusive liability for the payment of any and all taxes including Sales Tax, Duties, etc., now or hereinafter imposed, increased or modified from time to time in respect of work and materials and all contributions and taxes for unemployment, compensation, insurance and old age pension or annuities now or hereinafter imposed by the Central or State Government authorities with respect to or covered by the wages, salaries or other compensation paid to the persons employed by Contractor.

If the Contractor is not liable to Sales Tax assessment, a certificate to that effect from the Competent Authority shall be produced without which final payment to the Contractor shall not be made No.P, 'C' and 'D' Form shall

be supplied by the owner, and the Contractor shall be required to pay full tax as applicable.

2. Contractor shall be responsible for compliance with all obligations and restrictions imposed by the labour law or any other law affecting employer-employee relationship.
3. Contractor further agrees to comply and to secure the compliance of all sub contractors with applicable Central, State, Municipal and local laws and regulations and requirement. Contractor also agrees to defend, indemnify the hold harmless the owner from any liability or penalty which may be imposed by Central, State or local authority by reasons of any violation by Contractor or sub Contractor of such laws, regulations or requirements and also from all claims, suits or proceedings that may be brought against owner arising under, growing out of or by reasons or work provided for by this Contract by third parties or by Central or State Government authority or any administrative Sub-Division thereof.

The Sales Tax on work contract will be borne by Contractor.

**GC-89      INSURANCE :**

Contractor shall at his own expenses carry and maintain the reputable Insurance Companies to the satisfaction of owner as follows :

1. Contractor agrees to and uses hereby accept full and exclusive liability for compliance with all obligations imposed by the Employer's State Insurance Act, 1948 and Contractor further agrees to defend, indemnify and hold owner hardness from any liability or penalty which may be imposed by the Central or State Government or local authority by reasons of any assorted violation by Contractor or Sub-Contractor or the Employees State Insurance Act, 1948 and also from all claims, suits or proceedings that may be brought against owner arising under, growing out of or by reasons of the work provided for by this contract whether brought by employees of Contractor by third parties or by Central or State Government authority or any administrative Sub-division thereof.

Contractor agrees to fill in with the Employees State Insurance Corporation, the declaration form and all forms which may be required in respect of Contractor's or sub-Contractor's employees whose aggregate remuneration is Rs.400/- p.m. or less and who are employed in work provided for or those covered by ESI from time to time under the agreement. The Contractor shall deduct and secure the agreement of the sub-Contractor to deduct the employees contribution as per the first schedule of the Employees State Insurance Act from wages. Contractor shall remit and secure the agreement of sub-contractor to remit to the State Bank of Indian Employees State Insurance Accounts, the

employee's contribution as required by the Act. Contractor agrees to maintain all cards and records as required under the Act in respect of employees and payments and Contractor shall secure the agreements of the sub contractors to maintain in such records, any expenses incurred for the contributions, making contributions or maintaining records shall be to Contractors or sub-contractors own account. owner shall retain such sum as may be necessary from the contract value until Contractor shall furnish satisfactory proof that all contribution as required by the Employees State Insurance Act, 1948 have been paid.

2. **Workman's compensation and employees liability insurance:** Insurance shall be effected for all Contractors employees engaged in the performance of this contract. If any part of work is sublet, Contractor shall require the sub-Contractor to provide workman's compensation and employer's liability insurance, which may be required by owner.
3. Other Insurance required under law of regulations or by owner Contractor shall also carry and maintain any and all other insurance which may be required under any law or regulation from time to time. He shall also carry and maintain any other insurance, which may be required by owner.

#### **GC -90**

##### **DAMAGE TO PROPERTY :**

1. Contractor shall be responsible for making good to the satisfaction of owner any loss of and any damage to all structures and properties belonging to owner or being executed or procured or being procured by owner or of other agencies within the premises of all work of owner, if such loss or damage is due to fault and / or the negligence of willful act or omission of Contractor, his employees, agent, representatives or sub-Contractors.
2. Contractor shall indemnify and keep owner harmless of all claims for damage to properties other than property arising under by reasons of this agreement, such claims result from the fault and / or negligence or willful act or omission of Contractor, his employees, agents representative or sub-contractor.

#### **GC -91**

##### **CONTRACTOR TO INDEMNIFY OWNER :**

1. The Contractor shall indemnify and keep indemnified the owner and every member, officer and employee of owner from and against all actions, claims, demands and liabilities whatsoever under the in respect of the breach of any of the above clauses and / or against any claim, action or demand

by any workman / employee of the Contractor or any sub-contractor under any laws, rules or regulations having force of laws, including but not limited to claims against the owner under the workman compensation Act, 1923, the Employee's Provident Funds Act, 1952 and / or the contract labour (Abolition and Regulations) Act, 1970.

2. PAYMENTS OF CLAIMS AND DAMAGES : If owner has to pay any money in respect of such claims or demands aforesaid, the amount so paid and the cost incurred by the owner shall be charged to and paid by Contractor without any dispute not withstanding the same may have been paid without the consent or authority of the Contractor.
3. In every case in which by virtue of any provision applicable in the workman's Compensation Act, 1923 or any other Act, owner be obliged to pay compensation to workmen employed by Contractor the amount of compensation so paid, and without prejudice to the rights of owner under Section-(12) Sub-section-(2) of the said Act, owner shall be at liberty to recover such amount from any surplus due to on to become due to the Contractor or from the security deposit. Owner will not be bound to contest any claim made under Section-(12) Sub-section-(2) of the said act except on written request of Contractor and giving full security for all costs consequent upon the contesting of such claim.

The Contractor shall protect adjoining sites against structural, decorative and other damages that could be caused to adjoining premises by the execution of these works and make good at his cost, any such damage, so caused.

**GC-92 IMPLEMENTATION OF APPRENTICE ACT 1954 :**

Contractor shall comply with the provisions of the apprentice Act 1954 and the orders issued there under from time to time. If he fails to do so, it will be a breach of contract.

**GC-93 HEALTH AND SANITARY ARRANGEMENTS FOR WORKERS:**

Contractor shall comply with all the rules and regulations of the local Sanitary Authorities or as framed by owner from time to time for the protection of health and provide sanitary arrangements of all labour directly or indirectly employed on the work of this contract.

**GC-94 SAFETY CODE :**

General :

Contractor shall adhere to safe construction practice and guard against hazardous and unsafe working conditions and shall comply with owner's rules as set forth herein.

1.0 First Aid and Industrial Injuries :

- 1.1 Contractor shall maintain First-Aid facilities for its employees and those of his sub-contractors.

- 1.2 Contractor shall make outside arrangements for ambulance service and for the treatment of industrial injuries. Name of those providing these services shall be furnished to Engineer-In-Charge prior to start of construction, and their telephone numbers shall be prominently posted in Contractor's field office.
- 1.3 All injuries shall be reported promptly to Engineer-In-Charge and a copy of Contractor's report covering each personal injury requiring the attention of a physician shall be furnished to owner.
- 2.0 General Rules :
  - 2.1 Carrying and striking, matches, lighters inside the project area and smoking within the job site is strictly prohibited. Violators of smoking rules shall be discharged immediately. Within the operation area, no hot work shall be permitted, without valid gas, safety, fire permits. The Contractor shall also be held liable and responsible for all lapses of his sub-Contractors / employees in this regard.
- 3.0 Contractor's Barricades :
  - 3.1 Contractor shall erect and maintain barricades without any extra cost, required in connection with his operation to guard or protect during the entire phase of the operation of this contract for -  
Excavation  
Hoisting areas  
Areas adjudged hazardous by Contractor's OR Owner's inspectors.  
Owner's existing property liable to be damaged by Contractor's operations, in the opinion of Engineer-In-Charge / Site Engineer.
  - 3.2 Contractor's employees and those of his sub-contractors shall become acquainted with owner's barricading practices and shall respect the provisions thereof.
  - 3.3 Barricades and hazardous areas adjacent to but not located in normal routes of travel shall be marked by red lantern at night.
- 4.0 Scaffolding :
  - 4.1 Suitable scaffolding shall be provided for workman for all works that cannot safely be done from ladders. When a ladder is used, an extra mazdoor shall be engaged for holding the ladder and if the ladder is used for carrying materials as well suitable footholds and handholds shall be provided on the ladder and the same shall be given an inclination not steeper than 1 in 4 (1 horizontal and 4 vertical).
  - 4.2 Scaffolding or staging, more than 3.6 M. (12') above the ground or floor, swing or suspended from an overhead support or erected with stationary support shall have a guard rail properly attached, bolted, braced and otherwise fixed at least 1.0 M (3') high above the floor or platform or scaffolding or staging and extending along the entire length of the outside ends thereof with only such openings as may be necessary for the delivery



of materials. Such scaffolding or staging shall be so fastened as to prevent it from swaying from the building or structure.

- 4.3 Working platforms, gangways, and stairways should be so constructed that they should not sag unduly or inadequately and if the height of the platform or the gangway of the stairway is more than 3.6 (12') above ground level or floor level, they should be closely boarded, should have adequate width and should be suitably fastened as described in 4.2 above.
- 4.4 Every opening in the floor of a building or in a working platform be provided with suitable means to prevent the fall of persons or materials by providing suitable fencing or railing whose minimum height shall be 1.0 M (3'.0").
- 4.5 Safe means of access shall be provided to all working platforms and other working places. Every ladder shall be securely fixed. No portable single ladder shall be over 9.0 M. (30') in length while the width between the side rails in rung ladder shall in no case be less than 30 cms (12 inches) for ladder up to and including 3.0 M. (10'), in longer ladders this width would be increased at least 6 mm (1/4") for each addition 30 c.m. (1.0) of length. Uniform step spacing shall not exceed 30 cms. (12"). Adequate precaution shall be taken to prevent danger from electrical equipment. No materials on any of the side of work shall be so stacked or placed as to cause danger or inconvenience to any person or public. The Contractor shall also provide all necessary all necessary fencing and lights to protect the workers and staff from accidents, and shall be bound to bear the expenses of defence of every suit action or other proceedings at law that may be brought by any persons for injury sustained owing to neglect of the above precautions and to pay damages and costs which may be awarded in any such suit or action or proceedings to any such person, or which, may be with the consent of the Contractor be paid to compromise any claim by any such person.
- 5.0 Excavation :
- 5.1 All trenches 1.2 M (4') or more in depth, shall at all time be supplied with at least one ladder.
- 5.2 Ladder shall be extended bottom of the trench to at least 3" above the surface of the ground. The side of the trench which are 1.5 M (5') or more in depth shall be stopped back to give suitable slope, or securely held by timber bracing, so as to avoid the danger of sides to collapse. The excavated materials shall not be placed within 1.5 M (5') of the trench of half of the trench depth whichever is more. Cutting shall be done from top to bottom. Under no circumstances, undermining or under cutting be done.
- 6.0 Demolition :
- 6.1 Before any demolition work is commenced and also during the progress of the work all roads and open area adjacent to the work site shall either be closed or suitably protected.

- 6.2 No electric cable or apparatus which is liable to be a source of danger shall remain electricity charged.
- 6.3 All practical steps shall be taken to prevent danger to persons employed from risk of fire or explosion or flooding. No floor or other part of the building shall be so over loaded with debris or materials as to render it unsafe.
- 7.0 Safety Equipment :
- 7.1 All necessary personal safety equipment as considered necessary by the Engineer-In-Charge should be made available for the use of persons employed on the site and maintained in a condition suitable for immediate use, and the Contractor should take adequate steps to ensure proper use of equipment by those concerned.
- 7.2 Workers employed on mixing asphaltic materials, cement and lime mortars shall be provided with protective footwear and protective gloves.
- 8.0 Risky Place :
- 8.1 When the work is done near any place where there is a risk of drowning, all necessary safety equipment shall be provided and kept ready for use and all necessary steps taken for prompt rescue of any person in danger and adequate provision should be made for prompt first-aid treatment of all injuries likely to be sustained during the course of the work.
- 9.0 Hoisting Equipment :
- 9.1 Use of hoisting machines and tackles including their attachments, and storage and supports shall conform to the following standards or conditions.
- 9.2 These shall be of good mechanical construction, sound material and adequate strength and free from patent defect and shall be kept in good condition and in good working order.
- 9.3 Every rope used in hoisting or lowering materials or as a means of suspension shall be of durable quality and adequate strength and free from patent defects .
- 9.4 Every crane driver or hoisting appliance operator shall be properly qualified and no person under the age of 21 years should be in-charge of any hoisting machine including any scaffolding.
- 9.5 In case of every hoisting machine and of every chain ring hook, shackle, swivel and pulley block used in hoisting or lowering or as means of suspension, the safe working load shall be ascertained by adequate means. Every hoisting machine and all gear referred to above shall be plainly marked with the safe working load and the conditions under which it is applicable shall be clearly indicated. No part of any machine or any gear referred to above in this paragraph shall be loaded beyond the safe working load except for the purpose of testing.
- 9.6 In case of departmental machine, the safe work load shall be notified by the Engineer-In-Charge, as regards Contractor s machine, the Contractor shall, notify, the safety working load of the machine to the Engineer-In-Charge. Whenever the Contractor brings any machinery to site of work he should get it verified by the Engineer-In-Charge concerned.

10.0 Electrical Equipment :

Motors, gears, transmission, electric wiring and other dangerous parts of hoisting appliances shall be provided with efficient safeguards, hoisting appliances should be provided with such means when will reduce to the minimum the risk of accidental descent of the load, adequate precautions shall be taken to reduce to the minimum the risk of any part or a suspended load becoming accidentally displaced. When workers are employed on electrical installations which are already energized, insulating mats, wearing apparel such as gloves, and booths as may be necessary shall be provided. The workers shall not wear any rings, watches and carry keys or other materials which are good conductors of electricity.

11.0 Maintenance of Safety Devices :

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

12.0 Display of Safety Instructions :

The safety provisions should be brought to the notice of all concerned by display on a Notice Board at a prominent place at the work spot. The persons responsible for compliance of the safety code shall be named therein by the Contractor.

13.0 Enforcement of Safety Regulations :

To ensure effective enforcement of the rules and regulations relating to safety precautions, the arrangement made by the Contractor shall be open to inspection by the Welfare Officer, Engineer-In-Charge or Safety Engineer of the owner or their representatives.

14.0 No Exemption :

14.1 Notwithstanding the above clause 1.0 to 13.0 there is nothing to exempt the Contractor from the operations of any other Act or Rules in force in the Republic of India.

14.2 In addition to the above, the Contractor shall abide by the safety code provisions as per C.P.W.D. safety code framed from time to time.

**GC-95 ACCIDENTS :**

It shall be Contractor's responsibility to protect against accidents on the works. He shall indemnify the owner against any claim for damage or for injury to person or property resulting from, and in the course of work and also under the provisions of the workman's compensation Act. On the occurrence of an accident arising out of the works which results in death or which is so serious as to be likely to result in death, the Contractor shall within twenty-four hours of such accident, report in writing to the Engineer-In-Charge, the facts stating clearly and in sufficient details the circumstances of such accident and the subsequent action. All other accidents on the works involving injuries to person or damage to property other than that of the Contractor shall be promptly reported to the Engineer-In-Charge, stating clearly and in sufficient details the facts

and circumstances of the accidents and the action taken. In all cases, the Contractor shall indemnify the owner against all loss or damage resulting directly or indirectly from the Contractor's failure to report in the manner aforesaid. This includes penalties or fines, if any, payable by the owner as a consequence of failure to give notice under the Workman's Compensation Act, or failure to conform to the provisions of the said act in regard to such accidents.

In the event of an accident in respect of which compensation may become payable under the Workman's Compensation Act VIII of 1923 including all modification thereof, the Engineer-In-Charge may retain out of money due and payable to the Contractor such sum of sums of money as may in the opinion of Engineer-In-Charge be sufficient to meet such liability. On receipt of award from the Labour Commissioner in regard to quantum of compensation, the difference in amount will be adjusted.

**Addl.Asstt.Engineer,  
Municipal Corporation  
Rajkot.**

**Dy.Ex.Engineer,  
Muni. Corporation  
Rajkot.**

**Addl. City Engineer  
Municipal Corporation  
Rajkot.**

**Signature of Contractor.**

## **SPECIFICATIONS OF MATERIALS**

1. Material:

M-1 Water:

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 alkalis, salts, organic matter and other deleterious material which will either weaken the mortar of concrete or cause efflorescence or attack the steel in RCC container for transport, storage and handling of water shall be clean. Water shall conform to the standards specified in I.S. 456 - Latest edition.

If required by the engineer-in-charge, it shall be tested by comparison with distilled water. Comparison shall be made by means of standard cement tests for soundness, change in time of setting and mortar strength as specified in I.S. 269 (Latest edition). Any indication of unsoundness, change in time of setting by 30 minutes or more or decrease of more than 10 per cent in strength of mortar prepared with water sample when compared with the results obtained with mortar prepared with distilled water shall be sufficient cause for rejection of water under test.

Water for curing mortar, concrete or masonry should 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 surface.

Hard and bitter water shall not be used for curing.

Potable water will generally be found suitable for curing mortar of concrete.

M-2 Lime:

Lime shall be hydraulic lime as per IS 712 - Latest Edition. Necessary tests shall be carried out as per IS 6932 9 (Parts I to X) Latest edition.

The following field tests for limes are to be carried out:

- i) 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 are the unburnt lime stone.
- ii) Acid tests for determining the carbonate content in lime, lime Excessive amount of impurities and rough determination of lime.

Storage shall comply with IS 712 - Latest Edition. 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, and weather and extraneous materials mixing with it. All lime that has been damaged in any way shall be and all rejected materials shall be removed from site of work.

Field testing shall be done according to IS 269 (latest edition) to show the acceptability of materials.

M-3 Cement:

Cement shall be ordinary portland cement Grade-53 as per IS 269 or IS 455 or IS 1489 (P-I) or (P-II) or IS 8041 or IS 8043, IS 8812 or IS 12330, IS 12269 (All Latest edition).

**M-4 White Cement:**

The white cement shall conform to IS 8042-E Latest edition.

**M-5 Colored Cement:**

Color cement shall be with white or grey portland cement as specified in the item of the work.

The pigments used for colored 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 color and shade. The pigments shall have such properties as to provide for durability under exposure to sunlight and weather.

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

**M-6 Sand:**

Sand shall be natural sand, clean well graded, hard strong, durable and gritty particles free from injurious amounts of dust, clay, kankar nodules, soft or flaky particles Shale, alkali, salts organic matter, loam, mica or other deleterious substances and shall be got approved from the engineer-in-charge. The sand shall not contain more than 8 percent of silt as determined by field test. If necessary, the sand shall be washed to make it clean.

**Coarse Sand:**

The fitness modules 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	Percentage by weight passing sieve	IS Sieve Designation	percentage by weight	age passing sieve.
4.75 mm	100	600 Micron		30-100
2.36 mm	90 to 100	300 Micron		5-70
1.18 mm	70-100	150 Micron	0-50	

**Fine Sand:**

The fineness modules shall not exceed 1.0 The sieve analysis of fine sand shall be as under:

I.S. Sieve Designation	Percentage by weight passing sieve	IS Sieve Designation	percentage by weight	age passing sieve.
4.75 mm	100	600 Micron		40-85
2.36 mm	100	300 Micron		5-50
1.18 mm	75-100	150 Micron	0-10	

**M-7 Stone Dust:**

This shall be obtained from crushing hard black trap 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 fields test is given as under:

A sample of stone dust to be tested shall be placed without drying in 200 mm measuring cylinder. The quantity if the sample shall be such that it fills the cylinder upto 100 mm mark, the clean water shall be added upto 150 mm mark. The mixture shall be stirred vigorously and content allowed to settle for 3 hours.

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 containing more than 8% silt shall be washed so as to bring the content within the allowable limit.

The fitness nodules of stone dust shall not be less than 1.80

**M-8 Stone Grit:**

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 IS 383 (Latest Edition). Unless special stone of particular quarries is mentioned, grit shall be obtained from the best black trap or equivalent hard stone as approved by the engineer-in-charge. The grit shall have no deleterious reaction with cement.

The grit shall conform to the following gradation as per sieve analysis:

I.S. Sieve Designation	Percentage passing through sieve	IS Sieve Designation	percentage passing through sieve
12.50 mm	100%	4.75 mm	0-20%
10.00 mm	85-100%	2.36 mm	0-25%

The crushing strength will be such as to allow the concrete in which it used to build up the specified strength of concrete.

The necessary tests for grit shall be carried out as per the requirements of I S 2386 (Part I to VIII) Latest edition as per instruction of engineer-in-charge. The necessity of test will be decided by the engineer-in-charge.

**M-9 Cinder:**

Cinder is well burnt furnace residue which has been fused or sintered into lumps of varying sizes.

Cinder aggregates shall be well burnt furnaces residue obtained from furnace using coal fuel only. It shall be sound clean and free from clay, dirt, ash or other deleterious matter.



The average grading for cinder aggregate shall be as mentioned below :

I.S. Sieve Designation	Percentage passing	IS Sieve Designation	percentage passing
20 mm	100%	4.75 mm	70
10 mm	86	2.36 mm	52

M-10 Lime Mortar:

**Lime:** Lime shall conform to specification M-2. **Water:** Water shall conform to specification M-1. **Sand:** Sand shall conform to specification M-6.

Proportion of Mix:

Mortar shall consist of such proportions of slaked lime and sand as may be specified in item. the slaked lime and sand shall be measured by volume.

Preparation of Mortar:

Lime mortar shall be prepared by process as per IS 1625 Latest edition. Power drive 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 a sufficient water. Water shall be added as required during grinding (care being taken not to add more water) that will 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.

Storage:

Mortar shall always be kept damp, protected from sun and rain till used up, covering it by tarpaulin or open sheds.

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

M-11 Cement Mortar:

Water shall conform to specification M-1. Cement: Cement shall conform to specifications M-3. Sand: Sand shall conform to M-6.

Proportion of Mix:

Cement and sand shall be mixed to specified proportion, sand being measured by measuring boxes. The proportion of cement will be by volume on the basis of 50 kg/Bag of cement being equal to 0.342 Cu.M. The mortar may be hand mixed as directed.

Proportion of Mortar:

In hand mixed mortar, cement and sand in the specifications shall be thoroughly mixed dry on a clean impervious platform by turning over at least 3 times or more till a homogeneous mixture of uniform color 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 still plastic mass of uniform

color 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.

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.

Coarse aggregate shall be of machine crushed stone of black trap or equivalent and be hard, strong, dense, durable clean and free from skin and coating likely to prevent proper adhesion of mortar.

The aggregate shall generally be cubical in shape. Unless special stones of particular quarries are mentioned, aggregates shall be machine crushed from the best black trap or equivalent hard stone as approved. Aggregate shall have no deleterious reaction with cement. The size of the coarse aggregate for plain cement concrete and ordinary reinforced cement concrete shall generally be as per the table given below, however, in case of reinforced cement concrete the maximum limit may be restricted to 6 mm, less than the minimum lateral clear distance between bars of 6 mm less than the cover whichever is smaller.

IS Sieve designation	Percentage passing for single sized aggregates of nominal size			IS 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	--	0.30
40 mm	85-100	100	--	4.75 mm	--	0.20	0.5
20 mm	0-20	85-100	100	2.35 mm	--	0.50	--
16 mm			8-100	--	--	--	--

Note:

This percentage may be the engineer-in-charge when considered necessary for obtaining better density and strength of concrete.

The grading test shall be taken in the beginning and at the change of source of materials. The necessary tests indicated in IS 383 Latest edition and IS 456 Latest edition shall have to be carried out to ensure the acceptability. The aggregates shall be stored separately and handled in such a manner as to prevent the intermixing of different aggregates. If the aggregates are covered with dust, they shall be washed with water to make them clean.

#### M-13 Black Trap or Equivalent Hard Stone Coarse:

Aggregate for Design Mix concrete:

Coarse aggregate shall be of machine crushed stone of black trap or equivalent hard stone and be hard strong, dense, durable, clean and free from skin and coating likely to prevent proper adhesion of mortar.

The aggregates shall generally be cubical in shape. Unless special stones of particular quarries are mentioned, aggregates shall be machine crushed from the best, black trap or equivalent hard stones as approved. Aggregate shall have no deleterious reaction with cement.

The necessary tests indicated in IS 383 Latest edition and IS 456 Latest edition shall have to be carried out to ensure the acceptability of the material.

If aggregate is covered with dust, it shall be washed with water to make it clean.

**M-14 Brick Bats Aggregate:**

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 under burnt or over burnt brick bats shall not be allowed.

The brick bats shall be measured by suitable boxes as directed.

**M-15 Bricks:**

The bricks shall be hard or machine moulded and made from suitable soils and burnt. They shall be free from cracks and flaws and nodules of free lime. They shall have smooth rectangular faces with sharp corners and shall be of uniform colors.

The bricks shall be moulded with a frog of 100 mm x 40 mm and 10 mm to 20 mm deep on one of its flat sides. The bricks shall not break when thrown on the ground from a height of 600 mm.

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

The size of the conventional bricks shall be as under:

(9" x 4.3/8" x 2,3/4") 225 x 110 x 75 mm

Only bricks of one standard size shall be used in one work. The following tolerances shall be permitted in the conventional size adopted in a particular work.

Length  $\pm 1/8"$  (3mm) width :  $\pm 1/16"$  (1.5mm)

Height:  $\pm 1/16"$  (1.5 mm)

The crushing strength of the brick shall not be less than 35 kg/sq.cm. The average water absorption shall not be more than 20 percent by weight. Necessary tests for crushing strength and water absorption etc., shall be carried out as per IS: 3495 (Part I to IV) - latest edition.

**M-16 Stone:**

The stone shall be of the specified variety such as granite / trap stone / quartzite or any other type of good hard stones. The stones shall be obtained only from the approved quarry and shall be hard, sound, durable and free from defects like cavities cracks, sand holes flaws, injurious reins, patches of loose or soft materials etc. and weathered portion and other structural defects or imperfection tending to affect their soundness and strength. The stone with round surface shall not be used. The percentage of water absorption shall not be more than 5% dry or wet. When tested in accordance with I.S. 1124 - Latest edition. The minimum crushing strength of the stone be 200 kg/sq.cm unless otherwise specified.

The samples of the stone to be used shall be got approved before the work is started.

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

Laterite stone shall be obtained from the approved quarry. It shall be compacted, in texture, sound, durable and free from soft patches. Its shall have minimum crushing strength of 10 Kg/sq.cm in its dry condition. It shall not absorb water more than 20 % of its own weight, when immersed for 24 hours in water After quarrying, the stone shall be allowed to weather for some time before using in work. '

The stone shall be dressed into regular rectangular blocks so that all faces are free from waviness and unevenness, and the edges true and square.

Those types of stone in which white clay occurs should not be used.

Special corner stones shall be provided where so directed.

#### M-18 Mild Steel Bars:

Mild steel bars reinforcement for RCC work shall conform to IS 432 (Part-II) Latest edition and shall be of tested quality. It shall also comply with relevant part of IS 456 Latest edition. All the reinforcement shall be clean and free from dirt, paint, grease, mill scale or loose or thick rust at the time of placing.

For the purpose of payment, the bar shall be measured correct upto 10 mm length and weight payable worked out at the rate specified below:

1	6 mm	0.22 Kg/Rmt	8	20 mm	2.47 Kg/Rmt
2	8 mm	0.39 Kg/Rmt	9	22 mm	2.98 Kg/Rmt
3	10 mm	0.62 Kg/Rmt	10	25 mm	3.85 Kg/Rmt
4	12 mm	0.89 Kg/Rmt	11	28 mm	4.83 Kg/Rmt
5	14 mm	1.21 Kg/Rmt	12	32 mm	6.31 Kg/Rmt
6	16 mm	1.58 Kg/Rmt	13	36 mm	7.99 Kg/Rmt
7	18 mm	2.00 Kg/Rmt	14	40 mm	9.86 Kg/Rmt

#### M-19 High Yield Strength Steel Deformed Bars:

High yield strength steel deformed bars shall be either cold twisted other rolled and shall conform to IS 1786 Latest edition and IS 1139 Latest edition respectively.

Other provisions and requirements shall conform to specification No.M-18 for Mild Steel Bars.

#### M-20 High Tensile Steel Wires:

The high tensile wires for use in prestressed concrete work shall conform to IS 2090 Latest edition.

The tensile strength of the high tensile steel bars shall be as specified in the item. In absence of the given strength the minimum strength shall be taken as per part 6-1 of the IS 1785 Latest edition. Testing shall be done as per IS requirements.

The high tensile shall be free from loose mill scale, rust, oil grease, or any other harmful matter. Cleaning of steel bars may be carried out immersion in solvent solution, wire brushing or passing through a pressure box containing carborundum.

The high tensile wire shall be obtained from manufacturer in coil having diameter not less than 350 times the diameter of wire itself, so that wire springs back straight on being uncoiled.

**M-20(A) Plain Carbon Drawn Steel Wires:**

The plain carbon drawn steel wires for use in precast concrete work shall be conform to IS 1785 (Part-II) Latest edition.

The tensile strength of the P C steel bars shall be as specified in the item. In absence of the given strength, the minimum strength shall be taken as per IS:1785 Latest edition. Testing shall be done as per IS requirements.

The P C steel bars shall be free from loose mill scale, rust, oil grease, or any other harmful matter. Cleaning of steel bars may be carried out immersion in solvent solution, wire brushing or passing through a pressure box containing carborandum.

**M-21 Mild Steel Binding Wire:**

The mild steel wire shall be of 1.63 mm, 22 mm (16 or 18 gauge) diameter and shall conform to IS 280 Latest edition.

The use of black wire will be permitted to binding reinforcement bars. It shall be free rust, oil paint, grease, loose mill scale or any other undesirable coating which may prevent adhesion of cement mortar.

**M-22 Structural Steel:**

All structural steel shall conform to IS 226 Latest edition. The steel shall be free from the defects mentioned in IS 226 Latest edition and shall have a smooth finish. the material shall be free from loose mill scale, rust pits or other defects affecting the strength and durability. River bars shall conform to IS 1148 Latest edition.

When the steel is supplied by the contractor, test certificate of the manufacturer shall be obtained according to IS 226 Latest edition and other relevant Indian Standards.

**M-23 Galvanized Iron Sheets :**

The galvanized iron sheets shall be plain or corrugated sheets of gauges as specified in item. The G.I. Sheets shall conform to I.S. latest edition. 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 bends, holes, rust or white powdery deposit.

The length and width G.I. sheet shall be as directed as per site condition.

M-23-A : G.I. Valleys gutter, ridges :

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

Valleys gutters and flashings shall also be of galvanized sheets of thickness as specified in item. Valleys shall be 900 mm. wide overall and flashing shall be 380 mm. wide overall. They shall be bent to the required shape without damage to the sheet in the process of bending.

M-24. Asbestos Cement Sheets :

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

Ridge & Hips :

Ridge 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 location.

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. latest edition for Class AA or class A type as specified in item. Sample of the tiles to be provided shall be got approved from the Engineer-in-charge. Necessary tests shall be carried out as directed.

M-26 Shuttering:

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

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 live load of men working over it and other incidental load associated with it. The shuttering shall have smooth and even surface. Its joints shall not permit leakage of cement grout.

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 and adequately rigid form work. The complete form work shall be got inspected by and got approved from the engineer-in-charge before the reinforcement bars are placed in position.

The props shall consist of bullies having 100 mm minimum dia. measurement at mid length and 80 mm 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.

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

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

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

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 manufacturer may be applied in place of soap solution. In case of steel shuttering either soap solution or raw linseed oil shall be applied after thoroughly cleaning the surface. Under no circumstances, black or brunt oil shall be permitted.

The shuttering for beams and slabs shall have camber of 4 mm per meter (1 in 250) or as directed by the engineer-in-charge, so as to offset the subsequent deflection for cantilevers, the camber of free end shall be 1/50 of the projected or as directed by the engineer-in-charge.

M-27. Expansion joints - Premoulded filler:

The item provides 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.

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

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

Premoulded bituminous joint filler shall conform to I.S. Latest edition.

M-28. Expansion joints Copper strips & hold fasts :

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

Copper sheet shall be of 1.25 mm thick and of 1.25 mm width and the "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 emvidded 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 :

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.

Teak 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 fibres as far as possible. It shall be free from rot, decay, harmful fungi and other defects of harmful nature, which will affect the strength, durability or its usefulness for the purpose for which it is required. The colour shall be uniform as far as possible. Any effort like painting, using any adhesive resinous materials made to hide the defects shall render the pieces liable to rejection by the Engineer-in-Charge.

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

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

First class teak wood :

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

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. Specification 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, Sissoo will be used for door where as only Kalai, Halda, Sires, Kalam etc. will be permitted for shutters after proper seasoning and chemical treatment, The non-teak wood shall be free from large, loose dead or cluster knots, flows, shakes, warps, bends or any other defects. 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 nature which will effect the straight durability or its usefulness for the purpose for which it is required. The colour of wood shall be uniform as far as possible. The scantlings planks etc. shall be saw in straight lines and planes in the direction of grain and of uniform thickness. The department will use the Agency to produce certificate from Forest Department in event of 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) :

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. Latest edition. 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 in which they occur may be permitted. Pitch pockets, 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: latest edition.

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 cross-bands and face veneers. The lipping, rebating, opening of glazing; venetian etc. shall be provided if specified in the drawing.

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

The shutters shall be tested for

- (1) **End immersion test** : The test shall be carried out as per I.S. latest edition. There shall be no delamination at the end of the test.
- (2) **Knife test** : The face panel when tested in accordance with I.S. latest edition shall pass the test.
- (3) **Glue adhesion test** : The flush door shall be tested for glue adhesive test in accordance with I.S.: latest edition. 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 occurred in the assembly glue lines between the plywood face and the stile and rail. Delamination at the corner shall be measured continuously around the corner. Delamination at the knots, knot holes and other permissible wood defects shall not be considered in assessing the sample.

The tolerance in size of solid core type flush door shall be as under:  
In Nominal thickness  $\pm 1.2$  mm in Nominal height  $\pm 3$  mm.

The thickness of the shutter shall be uniform throughout with a permissible variation of not more than 0.8 mm: when measured at any two points.

M-31. Aluminum doors, windows, ventilators :

Aluminum alloy used in the manufacture of extruded window sections shall conform to I.S. designation HEA-WP of I.S. : latest edition and also to I.S. Designation WVG-.WP of I.S. latest edition. The section shall be as specified in the drawing and design. The fabrication shall be done as directed.

The hinges shall be cast or extruded aluminum hinges of same type as in window but of larger size.

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 from outside or inside shall be provided. In double, shutter door, the first closing shutter shall have concealed aluminum alloy bolt at top and bottom,

### M-32. Rolling Shutters.

The rolling shutters shall conform to I.S. latest edition. 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 upto 3.5 m, width not less than 1.25 m, thick and 80 mm. wide for shutter 3.5 m in width and above unless otherwise specified,

Hood covers shall be of mild steel deep channel section and of rolled pressed or build up (fabricated) jointless construction. The thickness of sheet used shall not be less than 3.5 mm.

Hood covers shall be made of M S Sheets not less than 0.90 mm. thick. For shutters having width 3.5 Meter and above, the thickness of M.S. sheet for the hood cover shall be not less than 1.25 mm.

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 all position. The springing pipe shaft etc, shall be supported on strong M.S. or malleable C.I. brackets. The brackets shall be fixed on or under the lintel as specified with rawl plugs and screws bolts etc.

The rolling shutters shall be of self rolling upto 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, than gear operated type shutters shall be used

The locking arrangement shall be provided at the bottom of shutter at both ends. The shutters shall be opened from outside,

The shutters completed with door suspension shafts, locking arrangements, pulling hooks handles and other accessories.

### M-33. Collapsible Steel Gate :

The collapsible steel gate shall be in one or two leaves and size as per approved drawings or as specified. The gate shall be fabricated from best quality mild steel channels, flats etc. Either steel pulleys or ball - bearings shall be provided in every doubly channel, Unless otherwise specified the particulars of collapsible gate shall be as under :

(a) **Pickets** : These shall be of 20 mm. M.S. channels of heavy sections unless otherwise shows on drawings. The distance center to center of pickets shall be 12 cms with an opening of 10 Cms.

(b) Pivoted M.& flats shall be 20 mm x 6 mm.

(c) Top and bottom guides shall be from tee or flat iron of approved size.

(d) 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

Welded steel wire fabric for general purpose shall be manufactured from cold drawn steel wire "as drawn" or galvanized steel conforming to LS. Latest edition with longitudinal and transverse wire securely connected at every intersection by a process of electrical

resistance welding and conforming to I.S. latest edition. It shall be fabricated and finished in workmanlike manner and shall be free from injurious defects and shall be rust proof. The type of mesh shall be oblong or square as directed. The mesh sizes and size 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 :**

The expanded metal sheets shall be free from flaws, joints, broken strands, laminations and other harmful surface defects. Expanded metal steel sheet shall conform to I.S. latest edition, except that blank sheets need not be with guaranteed mechanical properties. The size of the diamond mesh of expanded metal and dimensions of strands (width and thickness) shall be as specified. The tolerance on nominal weight of expanded metal sheets shall be of 10 percent.

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) :**

Mild steel wire may be galvanized, 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 splits, surface flaws, rough jagged and imperfect edges and other harmful surface defect and shall conform to I.S. latest edition.

**M-37. Plywood**

The plywood for general purpose shall conform I.S. latest edition. Plywood is made by cementing together thin boards or sheets of wood into panels. There are always an odd number of layers, 3, 5, 7, 9 ply etc. The plies are placed so that grain of each layer is at right angle to the grain in the adjacent layer.

The chief advantages 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 splitting with change in moisture content.

Usually synthetic resins are used for gluing, 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 and a pressure of 11 to 14 Kg/Sq. Cm. on the wood. The time of heating may be anything from 2 to 60 minutes depending upon thickness.

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 an atmosphere of controlled humidity until the proper amount of moisture has been absorbed.

According to I.S. Latest edition, the plywood for general purpose shall be of the grades namely BWR; WWR and CWR, depending upon the adhesives used for bonding the veneers, and it will be further classified into six type namely AA, AB, AC, BB, BC and CC,

based on the quality of the two faces, each face being moisture content not less than 8 percent and not more than 16 percent.

### 37.8. Thickness of plywood boards

Board	Thickness	Board	Thickness	Board	Thickness	Board	Thickness
3 ply	3 mm	3 ply	5 mm	3 ply	9 mm	3 ply	16 mm
	4 mm		6 mm		13 mm		19 mm
	5 mm		8 mm		16 mm		19 mm
	6 mm		9 mm		13 mm		25 mm

### M-38 Glass :

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 shall be as under:

#### Sheet Glass:

In 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 upto 600 mm x 500 mm.

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

Sheet glass shall be patent flattened glass of best quality and of glazing and framing purposes shall conform to I.S. latest edition. Sheet glass of the specked colour used, if so shown on detailed drawings or so specified. For important buildings and for panes with any dimension over 900 mm. plate glass of specified thickness shall be used.

#### Plate Glass :-

When plate glass is specked, it shall be "Polished patent plate glass" of best quality. It shall have both the surface ground flat and parallel and polished to obtain clear undisturbed 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 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.

#### Obscured Glass:

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 specked as required. The thickness and type of glass shall be as per details on drawings or as specified or as directed.

#### Wired Glass :

Glass shall be with wire netting embedded in a sheet of plate glass. Electrically welded 13 mm. Georgian 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 :

Acrylic sheet shall be of thickness as specified in the item and of an specked shape size as the case maybe. Panels may be flat or curved. It should be light in weight. It shall be colourless or coloured or opaque as specified in the item. Colourless sheet shall be as transparent as the finest optical glass. Its light transmission rate shall be about 95%. Transparency shall not be affected for the sheets thickness of it shall be extremely resistant to sunlight, weather and 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 should be of such quality that they can be cut, bent and jointed, as desired. Solution or the joints shall be used as per the requirement of manufacturer.

#### M-40. Particle board :

The particle boards used for face panels shall of best quality free from any defects. The particle boards shall be made with phenolamaldehyde adhesive. The particle boards shall conform to IS latest edition "Specification for wood particle board for general purpose" *The size and* the thickness shall be as indicated.

#### M-41. Expanded polystyrene or tamed styroper slabs

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

#### M-42. Resign bonded fiber glass :

The resign bonded fiber glass tiles or rolls shall be of approved make and shall be followed.

For test of Mineral wool thermal insulation Blanker IS. : latest edition shall be of sizes, thickness and finish as indicated.

Insulation wood blanket shall be with the following coverings on one or both side as indicated.

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

#### M- 43. Fixtures and fastenings

##### General

The fixtures and fastenings, that is butt, hinges, tee and strap hinges sliding door bolts tower bolts, door latch, bath-room latch, handleless door stoppers, casement window fasteners, casement stays and ventilators catch shall be made of the metal as specked in the item or its specification.

They shall be of iron, brass, aluminium, chromium plated iron, chromium plated brass, copper oxidized iron, copper oxidized brass or anodized aluminum as specified.

The fixtures shall be heavy, medium or light type. The fixtures and fastenings shall be smooth finished and shall be such as will ensure ease of operations.

The sample of fixture and fastenings shall be got approved as regards, quality and shape before providing them in position.

Brass and anodized aluminum fixtures and fastening shall be bright finished.

Holdfasts :

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- diameter holes, 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:

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

Tee and strap hinges shall be manufactured from M.S. Sheet

Siding door-bolts (Aldrops):

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

Tower bolts (Barrel Type):

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

Door Latch

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

Bathroom Latch

Bathroom latch shall be similar to tower bolt.

Handle

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

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

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 the 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 hinges

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 Fastener

Casement window fastener for single leaf window shutter shall be left or right handed as directed.

#### Casement stays (Straight Peg Stay) :

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 300mm as directed.

#### Ventilator Catch

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

#### Pivot

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

#### M-44. 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 of specified shade or tint is not available while ready mixed paint with approved stain will be allowed. In such a case, the contractor shall ensure that the shade of the paint so allowed shall be uniform.

All the paints shall meet with the following general requirements

- (i) Paint shall not show excessive setting in a freshly opened full can and shall easily be redispersed with a 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 paints as received shall brush easily, Possess good leveling properties and show no running or sagging tendencies.
- (iii) The paint shall not skin within 48 hours in a three quarters filled closed container.
- (iv) The paint shall dry to a smooth uniform finish free from roughness, grit, unevenness and other imperfections:

#### Enamel Paints:

The enamel paint shall satisfy in general requirements in specification of oil paints: Enamel paint shall conform to IS : latest edition.

#### 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) Chandras
- (iii) Pigment.

The French polish so prepared shall conform to IS: Latest edition.

M-46 Marble chips for marble mosaic terrazzo :

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.

The size of various colour of marble chips ranging from the smallest upto 20 mm. shall be used where the thickness of top wearing layer is 6 mm. 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.

The marble chips shall be machine crushed. They shall be free from foreign matter, dust etc, except as above, the chips shall conform to IS latest edition.

M-47. Flooring Tiles :

(A). Plain Cement tiles

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.

The tiles shall be manufactured from a mixture of cement and natural aggregates by pressure process. During manufacture, the tiles shall be subjected to pressure of not less than 140 Kg/Sq. Cm. The proportion of cement to aggregate in the backing of the tiles shall be not less than 1:3 by weight. The wearing face though the tiles are of plain cement, shall be provided with stone chips of 1 to 2 mm. size. The proportions of cement to aggregate in the wearing layer of the tiles shall be three parts of cement to one parts 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 kept in moist condition continuously at least for seven days and subsequently, if necessary, for such long periods would ensure their conformity to requirements of IS. Latest edition regarding strength resistance to wear and water absorption.

The wearing face of the tiles shall be plane, 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.

The size of tiles shall generally be square shape 24.85 Cm. x 24.85 Cm: or 25 Cm. x 25 Cm. The thickness of tiles shall be 20 mm.

Tolerance of length and breadth shall be plus or minus one millimeter. Tolerance on thickness plus 5 mm.

The tiles shall satisfy the tests as regards transverse strength, resistance to wear and water absorption as per I.S. : Latest edition.

(B) Plain Coloured Tiles:



These tiles shall have the same specification 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. Latest edition.

The pigments used for colouring cement shall not exceed 10 percent by weight of cement used in the mix. The pigments, synthetic or otherwise, used for colouring tiles shall have permanent colour and shall not contain materials detrimental to concrete.

The colour of the tiles shall be specified in the item or as directed.

(C) Marble Mosaic Tiles:

The tiles same specification as per plain cement tiles except the requirements as stated below:

The marble mosaic tiles shall conform to I.S. latest edition. The wearing face of the tiles shall be mechanically ground and filled. The wearing face of tiles shall be free from projections, depressions and cracks and shall be reasonably parallel to the back face of the tiles. All angles shall be right angles and all edges shall be sharp and true.

Chips used in the tiles be from smallest upto 20 mm. size. The minimum thickness of wearing layer of tiles shall be 6 mm. For pattern of chips to be had 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.

Any particular samples, if found suitable shall be approved by the Engineer- in-charge, or he may ask for a few more samples to be presented. The samples shall have to be made by the contractor till a suitable sample is 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.

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

(D) Chequered Tiles :

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

The tiles shall be of nominal size of 250 mm. X 250 mm. if specified. The centre to centre distance of chequer shall not be less than 25 mm. and not more than 50 mm. The overall thickness of the tiles shall be 22 mm.

The grooves in the chequers shall be uniform and straight. The depth of the grooves shall not be less than 3 mm. 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 6 mm. The tiles shall be given the first grinding with machine before delivery to site.

Tiles shall conform to relevant IS: latest edition.

(E) Chequered Tiles For Stair Cases :

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

(1) The length of a tile including nosing shall be 330 mm: (2) The minimum thickness shall be 28 mm: (3) The nosing shall have also the same wearing layer as at the top: (4) The nosing edge shall be rounded. (5) The front portion of the tiles for minimum length of 75 mm. from and including the nosing shall have grooves running parallel to nosing and at centers not exceeding 25 mm. Beyond that the tiles shall have normal chequer pattern.

#### M-48. Rough Kotah Stone :

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 shall not be use. They shall be without any soft veins, cracks or flaws.

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

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

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.

When machine cut edges are specified, the exposed 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 :

Polished kotah stone shall have the same specification as per rough kotah stone except as mentioned below:

The stones shall have machine polished 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 dado, skirting, sink, veneering, sills, steps, etc, where machine polishing after the stone are fixed in situ is not possible shall be double polished.

#### M-50. Dholpur Stone Slab :

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 of uniform colour.

The size of the stone shall be as specified in the item or detailed drawing of as approved by the Engineer-in-charge. The thickness of the stone shall be as specified in the item of work with the permissible tolerance of plus or minus 2 mm. the provisions in respect of polishing as for polished kotah stone shall apply to polished Dholpur stone also. All angles and edges of the face of the stone slab shall be fine chiselled or polished as specified in the item of work

and all the four edges shall be machine out. All angles and edges of the stone slab shall be true and plane.

The sample of stone shall be got approved by the Engineer-in-charge for a particular work. It shall be ensured that 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 slab shall be white or of other and of best quality as approved by the Engineer-in-charge.

Slabs shall be hard close, uniform and homogeneous in texture. They shall have even crystalline grain and free from defects and cracks. The surface shall be machine polished to an even and perfect plane surface and edges machine cut true and square. The rear face shall be rough to provide key for the mortar.

Marble slabs with nature veins, if selected shall have to be laid as per the pattern given by the Engineer-in-charge. Size of the slab minimum 460 mm. X 450 mm: and preferably 600 mm. X 600 mm. However smaller sizes will be allowed to be used to the extent of maintaining required pattern.

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

Except as above, the marble slabs shall conform to IS : Latest edition.

#### M-52. Granite Stone slab :

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 any soft veins, cracks or flaws.

The thickness of the stone shall be as specified in item.

All exposed faces shall be double polished tender truly smooth and even reflecting surface. The exposed edges and corners shall be rounded off as directed. The exposed edges shall be machine cut and shall have uniform thickness.

#### M-53. PVC Flooring

PVC sheet for PVC, floor covering shall be of homogenous flexible type, conforming to I.S. Latest edition. The PVC covering shall neither develop any toxic effect while put to use for shall give off any disagreeable odour.

Thickness of flexible type covering Tiles shall be as specified in the description of the item.

The flexible shall be backed with hessian or other woven fabric. The following tolerances shall be applicable on the nominal dimensions of the rolls or tiles :

(a) Thickness  $\pm$  15 mm.

(b) Length of Width :

1. 300 mm. square tiles  $\pm$  0.20 mm
2. 600 mm. Square tiles  $\pm$  0.40 mm.
3. 900 mm, square tiles  $\pm$  0.60 mm,
4. Sheets and roll  $\pm$  0.10 percent.

**Adhesive:**

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

**M-54 Facing Tiles**

The facing tiles (burnt clay facing bricks) shall be free from cracks and nodules of free lime. They shall be thoroughly burnt and shall have plane rectangular faces with parallel sides and sharps straight right angled faces.. The texture of the finished surface that will be exposed when in place shall conform to an approved sample consisting not less than four stretch bricks each representing the texture desired. The facing tiles shall have a pleasing appearance sufficient resistance to penetration by rain and greater durability than common bricks. The tiles shall conform to I.S.Latest edition.

**I**

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 IS: Latest edition.

The permissible tolerance in dimensions specified above shall be as follows :

Size	Tolerance for	
	1st class brick	2nd class brick
19	± 6 mm	± 10 mm
9	± 3 mm	± 7 mm
4	± 1.5 mm	± 3 mm
The tolerance for distortion or warpage of face or edges of individual brick form 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
--do-- above 19 mm		Max 3.0 mm

The average compressive strength obtained as a sample of five tiles when tested in accordance with the procedure laid as per IS: Latest edition shall be not less than 175 Kg/Sq. Cm. The average compressive strength of any individual bricks shall be not less than 160 Kg/Sq. Cm.

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

The brick tiles when tested in accordance with IS: Latest edition, the rate of efflorescence shall not be more than "Slightly effloresced"

**M-55. White glazed tiles**

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

Variation from the stated sizes, other than the thickness of tile shall be plus or minus 1.5 mm. The thickness of tile shall be 6 mm. Except as above the tiles shall conform to I.S. Latest edition.

**M-56. Galvanized Iron Pipes and Fittings:**

Galvanized iron pipe shall be of the medium type and of required diameter and shall comply with IS: latest edition. The specified diameter of the pipes shall refer to the inside diameter of the bore. Clamps, screw and all galvanized iron fittings shall be of the standard 'R' or equivalent make.

**M-57. Bib cock and stop cock:**

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

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 IS: latest edition and they shall be of best Indian make. They shall be polished bright.

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

Diameter	Bib cock	Stop cock	Diameter	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:**

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 IS: latest edition.

**M-59. White glazed porcelain wash basin:**

Wash basin shall be of white porcelain first quality best Indian make and it shall conform to IS: latest edition. The size of the wash basin shall be as specified in the item. 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 revated or beveled internally with 65 mm diameter 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.

White glazed pedestal of the quality and color 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 wash pipe. It shall be capable of supporting the basin rigidly and adequately and shall be so designed as to make the height from the floor to top of the rim of basin 750 mm to 800 mm as directed.

**M-60. European type water closet with low level flushing:**

The European type water closet shall be white glazed porcelain first quality and shall be of wash down type conforming to IS: latest edition.

'S' trap shall be provided as required with water seal not than 50 mm. The solid plastic seal and cover shall be of best Indian make conforming to IS: latest edition. 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 surface defects and shall have chromium plated brass hinges and rubber buffer of suitable size.

M-61. Orissa type water closet:

The specification of Orissa type white glazed water closet of first quality shall conform to IS: latest edition and relevant specification of Indian type water closet except that pan will be with the integral squatting pan of size 580 x 440 mm with raised footrest.

M-62. Indian type water closet:

The Indian type white glazed water closet of first quality shall be of size as specified in the item and conforming to IS: latest edition. Each pan shall have integral flushing. It shall also have an inlet at back or 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 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.

M-62 A Foot Rests

A pair of white glazed earthen ware rectangular foot 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 earthen ware sink shall be of specified size, colour and quality. The sink shall conform to I. S. latest edition. The brackets for sinks shall conform to IS: latest edition.

The pipes shall conform to I.S. latest edition 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 shall be flat. back or corner type as specified in the item and shall conform to IS: Latest edition. 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 1st quality free from any defects, cracks etc.

M. 65. Low level enamel flushing tank

The low level enamel flushing tank shall be of 15 litres capacity. It shall conform to IS: latest edition. 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 WC. Pan by lead pipe or PVC pipe as specified. The flushing cistern shall be provided with inlet and outlet for fixing G.I. inlet pipes and overflow 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. latest edition.

M-66. Cast iron flushing cistern.

The cast iron flushing cistern shall be of 15 litres capacity. It conform to IS. latest edition, The flushing cistern shall be of best quality free from any defects, The flushing cistern shall have outlet of 32 mm. diameter. The lead pipe shall conform IS: latest edition. For fixing G.I. inlet pipes and overflow pipe 20 mm dia inlet and outlet shall be got provided. The flushing, cistern shall be provided with galvanized 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 anti-corrosive paint and two coats of paints. The flushing cistern shall be fixed on two C.I. brackets. The C.I. bracket shall conform to IS: latest edition.

#### 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 Standard.

#### M-68 Cast iron pipes and fittings.

All soil, water, vent and antisiphonage pipe and fitting shall conform to IS: latest edition. The pipe 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 pinholes or other imperfection and shall be neatly dressed and carefully settled.

The end of pipes and fittings shall be, reasonable square to their axis.

The sand cast iron pipes shall be of the diameter as specified in the description and shall be in lengths of 1.5 M, 1.8 M. and 2 M. including socket ends of the pipe unless shorter lengths are either specified or required at junctions etc. The pipes and fittings shall be supplied without ears unless specified or directed otherwise.

#### Tolerances

The standard weights and thickness of pipes shall be as shown in the following table:

Sr No	Nominal dia. of bore	Thickness	Overall	Weight of pipe	Excluding ears
1	75 mm	5.0 mm	1.5 m long 12.83 kg	1.8 m long 16.52 kg	2 m long 18.37 kg
2	100 mm	5.0 mm	18.14 kg	21.67 kg	24.15 kg

A tolerance upto minus 15 percent in thickness and 20 mm in length will 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-69. Nahni Trap:

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

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

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

**M-70. Gully Trap:**

The gully trap shall conform to IS: latest edition. 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 will also have a water tight C.I. cover with frame inside dimension 300 mm x 300 mm. The cover with frame inside dimensions 300 mm x 300 mm 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 engineer-in-charge. The pipe shall be of best quality manufactured from stoneware of fire clay, salt glazed thoroughly burnt through the whole thickness, of a close even texture, free from air blows, fire blisters, cracks and other imperfections, which affect the serviceability. The inner and outer surfaces shall be smooth and perfectly glazed. the pipe shall be capable to withstand pressures of 1.5 m lead without showing sign of leakage. The thickness of the wall shall not be less than 1/12th of the internal dia. the depth of socket not be less than 38 mm. The socket shall be sufficiently large to allow a joint of 6 mm around the pipe.

The pipes shall generally conform to relevant IS latest edition.

**M-72. Wall Peg Rail:**

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

**M-73. G.I. Water Spot:**

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

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

**M-74. Asbestos Cement Pipe (A.C. Pipe)**

The asbestos cement pipe of diameter as specified in the description of the item shall conform to I.S. latest edition. Special like bends, shoes, corks 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 dimension shall be as per IS: latest edition.



**M-75. Crydon Ball valve**

Ball valve of screwed type including polythene float and necessary level etc. shall be of the size as mentioned in the description of item and shall conform to IS: latest edition.

**M-76. Bitumen Felt For Water Proofing And Damp Proofing**

Bitumen felt shall be on the fiber bases and shall be of type 2, self finished felt grade-2 and shall conform to IS: latest edition.

**M-77. Selected Earth**

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.

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 expensive 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 arrangement at his own cost for land for borrowing selected earth. The stacking of material 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.

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

**M-78. Barbed Wire.**

The barbed wire shall be of galvanized steel and it shall generally conform to IS: latest edition. The barbed wire shall be of type-I whose nominal diameter for line wire shall be 2.5 mm and point wire 2.24 mm. The nominal distance between two barbs shall be 75 mm, unless otherwise specified in the item. The barbed wire shall be formed by twisting together two line wires, one containing the barbs. The size of the line and point wires and barb spacing shall be as specified above. The permissible deviation from the nominal diameter of the line wire and point wire shall not exceed 0.08 mm.

The barbs shall carry four points and shall be formed by twisting two point wires, each two turns, lightly round one line wire, making altogether four complete turns. The barbs shall be so finished that the four points are set and locked at right angles to each other. The barbs shall have a length of not less than 13 mm. and not more than 18 mm. The point shall be sharp and cut at an angle not greater than 35 degree of the axis of the wire forming the barbs.

The line and point wires shall be circular section, free from scale and other defects and shall be uniformly galvanized. The line wire shall be in continuous length and shall not contain any

welds other than those in the rod before it is drawn. The distance between two successive splices shall not be less than 15 meters.

The lengths per 100 Kg. of barbed wire IS: type I shall be as under : Nominal 1000 meters.  
Minimum 934 Meter. Maximum 1066 Meter.

Addl.Asst.Engineer  
Rajkot Muni. Corporation

Dy.Ex.Engineer  
Rajkot Muni. Corporation

Addl. City Engineer  
Rajkot Muni. Corporation

Signature of Contractor.

## **Rajkot Municipal Corporation**

### **:: TECHNICAL SPECIFICATIONS ::**

**Item No.1:**

**Excavation of Foundation in Soft Murrum, Soil or Sand from 0.0 mtr. to 1.50 mtr depth including lifting and laying in designated area as instructed**

**Item No.2:**

**Excavation of Foundation in Soft Murrum, Soil or Sand from 1.51mtr. to 3.0 mtr depth including lifting and laying in designated area as instructed**

**1.0 General:**

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

**2.0 Cleaning 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 obtain shall be property of the government and shall be conveyed and stacked as directed within RMC limit. The roots of the tree coming in the sides shall be cut and coated with a asphalt.

**2.2** The rate of site 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 center lines will be given by the engineer-in-charge. The contractor shall assume full responsibility for alignment, elevation and dimension and of each and all parts of the work. Contractor shall supply labors, materials, etc required for setting out the referencø marks and bench 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 strutting or providing necessary slopes to a safe angle, at his own cost. The bottom of the excavated area shall be leveled both longitudinally and transversely 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 upto 1.5 mt depth shall be measured under this item.

**Removal of Excavated Stuff and Laying within the sites specified in Notification as directed by Engineer-in-Charge**

After Refilling the pipe / chamber trenches by the excavated stuff is 15 cm thick layer, including ramming, watering and consolidating up to possible extent as specified in excavation & refilling item, the surplus stuff shall be disposed off at the following sites as directed within the prescribed limits of Notification as directed by the engineering in charge.

1. Beside Kotharia Police Station near Stone Quarry
2. All Quarry areas of Raiya Smart City

The excavated material of black cotton soil and other useful materials should be stacked at the location specified by the engineer.

If the contractor fails to dispose the excavated stuff as specified, penalty will be imposed by Rajkot Municipal Corporation as per the Notification for C&D waste,

After refilling surplus earth shall have to carted by the contractor within specified limit including loading transporting unloading spreading.

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

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.

The balance of the excavated quantity shall be removed by the contractor from the site of work to a place as directed.

The rate will be paid for a unit of one cubic meter.

#### **Item No.3:**

#### **Foundation filling with CC work in proportion of 1:2:4 using 1.5 cm to 2.0 cm aggregate including Raming, Curing etc.**

##### 1.0. Materials

1.1 Water shall conform to M-1. Cement shall conform shall conform to M-3. Sand shall conform to M-6. Stones aggregate 20 mm. nominal size shall conform to M-12.

##### 2.0 Workmanship

##### 2.1 General

2.1.1 Before starting concrete the bed of 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 aggregate; and shall be measured by volume.

##### 2.3. Mixing

2.3.1. The concrete shall be mixed in a mechanical mixer at the site of work. Hand mixing may however be allowed for smaller quantity of work if approved by the Engineer-in-charge. When hand mixing is permitted by the Engineer-in-charge in case of break-down of machineries and in the interest of the 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 a 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 minute 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 cms.

2.5. Compacting:

2.5.1 The concrete shall be rammed with heavy iron rammers and rapidly to get the required compaction and to allow 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 ponding 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 for its length, breadth, and depth, limiting dimensions to those specified on plan or as directed.

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

**Item No.4**

**CC work M-25 for RCC footing using aggregate of size 10-20 mm, centring, curing, finishing etc. complete (without reinforcement)**

**Item No.5**

**CC work M-25 for Column using aggregate of size 10-20 mm, centring, curing, finishing etc. complete (without reinforcement)**

**Item No.6**

**CC work M-25 for Beam using aggregate of size 10-20 mm, centring, curing, finishing etc. complete (without reinforcement)**

**Item No.7**

**CC work M25 for RCC slab using aggregate of size 10-20 mm, centring, curing, finishing etc. complete (without reinforcement)**

**Item No.8**

**CC work M-25 for Lintel using aggregate of size 10-20 mm, centring, curing, finishing etc. complete (without reinforcement)**

**Item No.9**

**CC work M-25 for Chhajja using aggregate of size 10-20 mm, centring, curing, finishing etc. complete (without reinforcement)**

**Item No.22**

**CC work M-25 for Stair Case using aggregate of size 10-20 mm, centring, curing, finishing etc. complete (without reinforcement)**

**1.0 Materials:**

Water shall conform to M-1, cement shall conform to M-1.5, Sand shall conform to M-3, 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 tests. The proportion of concrete mix shall be 1:1.5:3 (1 Cement: 1.5 coarse sand: 3 graded stone aggregate 20 mm nominal size) and 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 IS correspond approximately to 1:3:6, 1:2:4, 1:1<sup>1</sup>/<sub>2</sub>:3 and 1:1:2 nominal mix of ordinary concrete by volume respectively.
- 2.3 The ingredients required for ordinary concrete containing one bag of cement of 50 Kg 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, max.	Proportion of fine aggregate to coarse aggregate	Quantity of water per 50 Kgs of cement maximum
M-100 (1:3:6) M-150 (1:2:4) M-200 (1:1 <sup>1</sup> / <sub>2</sub> :3) M-250 (1:1:2)	300 Litres 220 Litres 160 Litres 100 Litres	Generally 1.2 for fine aggregate to coarse aggregate by volume but subject to an upper limit of 1:1.1/2 and lower limit 1:3	34 Litres 32 Litres 30 Litres 27 Litres

- 2.4 The water cement ratio shall not be more than specified in the above table. The cement concrete 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 water cement ratio specified on the table is not exceeded.
- 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 compacted without difficulty with the means available.
- 2.6 The maximum size of coarse aggregate shall be as large as possible within the limits specified but in no case greater than one fourth of minimum thickness of the member, provided that the concrete can be placed without difficulty so as to 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 main beams, the nominal maximum size of coarse aggregate should usually be restricted to 5 mm, less than the minimum the distance between the main bars, or 5 mm less than the minimum cover to the reinform or 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 greater as or greater than the minimum cover.
- 2.10 Admixture may be used in concrete only with approval of engineer-in-charge based upon the evidence that with the passage of time, neither the compressive strength of concrete is reduced nor are other requisite qualities of concrete and steel impaired by the use of such admixtures.

**3.0 Workmanship:****3.1 Proportioning:**

Proportioning shall be done by volume, except cement which shall be measured in terms of bags of 50 kg. weight the volume of one such bag being taken as 0.0342 cu.metre. Boxes of suitable size shall be used for measuring sand aggregate. the size of boxes (internal) shall be 30 x 30 cms, and 38 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 along with 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 color of the entire mass is obtained and each individual particle of the coarse aggregate shows complete coating of mortar containing its proportionate amount of cement. In no case shall the mixing be done for less than 2 minutes after all ingredients have been put into the mixer.

3.2.2 When hand mixing is permitted by the engineer-in-charge for small jobs or for certain other reasons, it shall be done on the smooth water tight platform large enough to allow efficient turning over the ingredients of concrete before and after adding water. Mixing platform shall be so arranged that no foreign material gets 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 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 color. 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 thorough 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 the methods of vibration of concrete, shall be determined by regular slump tests in accordance with IS 1199 - Latest edition. 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 fineness but such inspection shall not relieve the contractor of his responsibility for the safety of men, machinery, materials and for results obtained. Immediately before concreting, all forms shall be thoroughly cleaned.

3.4.2 Centering design and its erection shall be got approved from the engineer-in-charge. One carpenter with helper shall invariably be kept present throughout the period of concreting. Movement of labor and other persons shall be totally prohibited for reinforcement laid in position. For access to different parts suitable mobile platforms shall be provided so that steel reinforcement in position is not disturbed. For ensuring proper cover, mortar blocks of suitable size shall be cast and tied to the reinforcement. Timber, kapachi or metal pieces shall not be used for this purpose.

### **3.5. Transporting and Laying:**

3.5.1 The method of transporting and placing concrete shall be as approved. Concrete shall be so transported and placed that no contamination, segregation or loss of its constituent material takes place. All form work shall be cleaned and made free from standing water, dust, snow 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 mixer. 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 in to 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 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 of 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 corners and close spots.

3.5.4 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 concreting under water where vibrators cannot be used. Sufficient vibrators in serviceable condition shall be kept at site so that spare equipment is always available in the event of breakdowns. Concrete shall be judged to be compacted when the mortar fills the spaces between the coarse aggregate and begins to cream up to form an even surface mixture. During compaction, it shall be observed that needle vibrators are not applied on reinforcement which is likely to destroy the bond between concrete and reinforcement.

### **3.6 Curing:**

Immediately after compaction, concrete shall be protected from weather including rain, running water, shocks, vibration, traffic, rapid temperature changes, frost and drying out process. It shall be covered with wet sacking, hessian 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. Masonry 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 IS 1199 - Latest edition, and cubes shall be made cured and tested at 7 days or 28 days as per requirements in accordance with IS 516 - Latest edition. 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 concrete in the work.	No. of samples
1-5 cmt	1	16-30 cmt	3
6-15 cmt	2	31-50 cmt	4
51 and above	4 ± one additional for each additional 50 m or part thereof		

**NOTE:-** At least 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 days of the concreting as per above frequency. The number of specimens may be suitably increased as deemed necessary by the engineer-in-charge when procedure of tests given above reveals a poor quality of concrete and in other special cases.

3.7.2. The average strength of the group of cubes cast for each day shall not be less than the specified cube strength of 150 Kg/Cm<sup>2</sup> for concrete 1:2:4 and 200 Kg/cm<sup>2</sup> for concrete 1:1<sup>1</sup>/<sub>2</sub>:3 at 28 days. 20% of the cubes cast for each day may have value less than the specified strength. Such concrete shall be classified as belonging to the appropriate lower grade. Concrete made in accordance with the proportion given for a particular grade shall not, however, be placed in a higher grade on the ground that the test strength are higher than the minimum specified.

### 3.8 Stripping:

3.8.1. The engineer-in-charge shall be informed in advance by the contractor of his intention to strike the form work. While fixing the time for removal of form, 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 below for respective item of work.

#### Stripping Time:

In normal circumstances and where ordinary cement is used forms may be struck after expiry of following periods:

- a) Side 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 upto 4.5 m - 10 days
  - ii) Spanning over 4.5 m - 14 days
- d) Removal of props for beams and arches
  - i) Spanning upto 6 m - 14 days
  - ii) Spanning over 6 m - 21 days

- 3.8.2. All form work shall be removed without causing any shock or vibration as would damage the concrete. Before the soffit and struts 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 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 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 work and shuttering, the Addl. City Engineer shall inspect the work and satisfy by random checks that concrete produced is of good quality.
- 3.8.3. Immediately after the removal of forms, all exposed bolts etc. passing through the cement concrete member and used for shuttering or any other purpose shall be cut inside the cement concrete member to a depth of at least 25 mm below the surface of the concrete and the resulting holes be filled by cement mortar. All fins caused by form joints, all cavities produced by the removal of form ties and all other holes and depressions, honeycomb spots, broken edges or corners and other defects, shall be thoroughly cleaned, saturated with water and carefully pointed and rendered true with mortar of cement and fine aggregate mixed in proportions used in the grade of concrete that is being finished and of as dry consistency as is possible to use. Considerable pressure shall be applied in filling and pointing to ensure thorough filling in all voids. Surfaces which are pointed shall be kept moist for a period of 24 hours. If pockets / honeycombs 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 structure affected.
- (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 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 requisite cover of concrete over the reinforcement. In case of cantilevered or doubly reinforced beams or slabs, the main reinforcing bars shall be held in position by introducing chain spacers or supports bars 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 templates slots accurately cut in them, the templates shall be removed after concreting has been done below it. The bars may also suitably be tied by means of annealed steel wires to the shuttering to maintain position during concreting.
- 1.2. All bars, projecting from pillars, Columns beams, slabs etc, to which other bars and concrete are to be attached or bounded to later on, shall be protected with a coat of thin neat cement grout, if the bars are not likely to be incorporated with succeeding mass of concrete within the following 10 days, This coat of thin neat cement shall be removed before concreting.
- 4.0. Mode of measurements & payment.**
- 4.1. The consolidated cubical contents of concrete, 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 dissimilar materials such as joints, beams, posts, girders, rafters, purline trusses, corbels and steps etc. upto 500 sq.cm. in section,
- (b) Opening upto 0.1 Sq. M.

- 4.2. The rate includes cost of all materials labour, tools and plant required for mixing, placing in position, vibrating and compacting, finishing, as directed. curing and all other incidental expenses for producing concrete of specified strength. The rate excludes the cost of form work.

#### FORM WORK.

The form work shall conform to the shape lines and dimension as shown on the plans and be so constructed as to remain sufficiently rigid during the placing and compacting of the concrete. Adequate arrangements shall be made by the contractor to safe-guard against any settlement of the form work during the course of concreting and after concreting. The form work of shuttering, centering, scaffolding bracing etc. shall be as per design.

Cleaning & Treatment of forms :- All rubbish, particularly chippings shaving and saw dust shall be removed from the interior of the Form before the concrete is placed and the form work in contact with concrete shall be cleaned and thoroughly Welled or treated. The surface shall be then coated with soap solution applied before concreting is done. Soap solution for the purpose shall be prepared by dissolving yellow soap in water to get consistency of Paint. Alternatively a coat of raw linseed oil or form oil of approved manufacture may be applied in case steel Shuttering is used. Soap solution or raw linseed oil shall be applied after thoroughly cleaning the surface. Care shall be taken that the coating does not get on construction joint surface and reinforcement bars.

Stripping time:- 1 In normal circumstances and where ordinary cement is used forms may be struck after expiry of following periods. :

In normal circumstances and where ordinary cement is used forms may be struck after expiry of following periods. :

- a) Sides of walls columns and vertical faces of beam -24 to 48 hours.
- (b) Beam softies; (Props left under) -7 days.
- (c) Removal of props slabs.
- (i) Slabs spanning up to 4.5m. -----7days.
- (ii) Spanning over 4.5 mm. -----14 days.
- (d) Removal of props to beams and Arches
- (i) Spanning up to 6 ----- 14 days,
- (ii) Spanning over 6 m. - ----- 21 days

Procedure when removing the form work:- All form work shall be removed without such shock or vibrations as would damage the reinforced concrete surface. Before the softies form work and struts are removed, the Softies and the concrete surface shall be exposed' where necessary in order to ascertain that the concrete has sufficiently hardened.

Centering: The centering to be provided shall be got approved. It shall be sufficiently strong to ensure absolute safety of the form work and concrete work before, during and after pouring concrete. Watch should be kept to see that behavior of centering and form work is satisfactory during concreting. Erection should also be such that it would allow removal of forms in proper sequence without damaging either the concrete or the forms to be removed.

The props of centering shall be provided on firm foundation or base of sufficient strength to carry the loads without any settlement. The centering and form work shall be inspected and approved by the Engineer-in-charge before Concreting. But this will not relieve the contractor of his responsibility for strength, adequacy and safety of Form work and centering. If there is a failure of form work or centering, contractor shall be responsible for the Damages to the work, injury to life and damage to property.

Scaffolding: AH scaffolding, hoisting arrangements and ladders etc. required for the

facilitating of concreting shall be provided and removed on completion 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.

### 3.7 Concrete

#### 3.7.1 General

In concrete grade M15, M20, M25, M30 etc. the number represents the specified characteristic compressive strength of 150 mm cube at 28 days, expressed in N/sq. mm as per IS: 456. Concrete in the works shall be "DESIGN MIX CONCRETE" or "NOMINAL MIX CONCRETE". All concrete works of grade M5, M7.5 and M10 shall be NOMINAL MIX CONCRETE whereas all other grades, M15 and above, shall be DESIGN MIX CONCRETE.

#### 3.7.2 Design Mix Concrete

##### (a) Mix Design & Testing

For design mix concrete, the mix shall be designed according to IS: 10262 and SP: 23 to provide the grade of concrete having the required workability and characteristic strength

not less than appropriate values given in IS: 456. The design mix shall in addition to

such that it is cohesive and does not segregate and should result in dense and durable concrete and also capable of giving the finish as specified. For water retaining structure, the mix shall also result in water tight concrete. The Contractor shall exercise great care while designing the concrete mix and executing the workers to achieve the desired result.

Unless otherwise specially mentioned, the minimum cement content and maximum water cement ratio for Design Mix Concrete shall be as given below :

Grade of Concrete	Minimum cement Content in Kg/Cum of concrete	Maximum W/C ratio
M20	360	0.55
M25	380	0.50
M30	400	0.45

The minimum cement content stipulated above shall be adopted irrespective of whether the Contractor achieves the desired strength with less quantity of cement. The CONTRACTOR's quoted rates for concrete shall provide for the above eventuality and nothing extra shall become payable to the CONTRACTOR in this account. Even in the case where the quality of cement required is higher than that specified above to achieve desired strength based on an approved mix design, nothing extra shall become payable to the CONTRACTOR.

It shall be the Contractor's sole responsible to carry out the mix designs at his own cost. He shall furnish to the Engineer-in-charge at least 30 days before concreting operations, a statement of proportions proposed to be used for the various concrete mixes ascertained on 150 mm cubes as per IS:516 shall comply with the requirements of IS:456.

Grade of Concrete	Minimum compressive strength N/Sq.mm	Specified characteristic compressive
M15	10.0	15.0
M20	13.5	20.0
M25	17.0	25.0
M30	20.0	30.0
M35	23.5	35.0
M40	27.0	40.0

A range of slump which shall generally be used for various types of construction unless otherwise instructed by the Engineer-in-charge is given below :

Structure/Member	Slump in	
	Maximum	Minimum
Reinforced foundation walls and footings	75	25
Plain footings, caissons and substructure walls	100	25
Slabs, Beams and reinforced walls Pump & miscellaneous	75	25
Foundations	100	25
Building Column	50	25
Pavements	50	25
Heavy mass construction	50	25

**(b) — Batching & Mixing of Concrete**

~~Proportions of aggregates and cement, as decided by the concrete mix design, shall be by weight. These proportions shall be maintained during subsequent concrete batching by means of weigh batchers capable of controlling the weights within one percent of the desired value. Amount of water added shall be such as to produce dense concrete of required consistency, specified strength and satisfactory workability and shall be so adjusted to account for moisture content in the aggregates. Water cement ratio specified~~

~~for use by the Engineer-in-charge shall be maintained. Each time the work stops, the mixer shall be cleaned out, and while recommencing, the first batch shall have 10% additional cement to allow for sticking in the drum.~~

~~Arrangement should be made by the Contractor to have the cubes tested in an approved laboratory or in field with prior consent of the Engineer-in-charge. Sampling and testing of strength and workability of concrete shall be as per IS: 1199, IS: 516 and IS: 3370.~~

**(c) Ready Mix Concrete**

Minimum cement consumption shall be as specified in tender document. However, necessary computer print out for consumption of all materials and admixtures if permitted shall be made available as and when required in any frequencies as directed by Engineer-in-charge.

Necessary slump requirements at the pouring places shall be made available with ready mix concrete.

Concrete mix shall be design for 33% higher strength than the grade of concrete

specified. The proportions for ingredients chosen shall be such that concrete has adequate workability for condition prevailing on the work in question and can be properly compacted with the means available. Use of cementitious material like Fly ash etc. shall not be permissible.

Except where it can be shown to the satisfaction of the Engineer-in-charge that a supply of properly graded aggregate of uniform quality can be maintained till the completion of work, grading of aggregate should be strictly controlled. The different sizes shall be stocked in separate stock piles. Required quality of material shall be stock-piled several hours, preferably a day, before use. Grading of coarse and fine aggregate shall be checked as frequently as possible, frequency for a given job being determined by the Engineer-in-charge to ensure that the suppliers are maintaining the uniform grading as approved for samples use in the design mix.

The quantity of both cement and aggregate shall be determined by weight. Water shall either be measured by volume in calibrated tanks or weighed. All measuring equipment shall be maintained in a clean and serviceable condition. Their accuracy shall be periodically checked.

It is most important to keep the specified water – cement ratio constants and its correct value. To this end, the 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, IS: 2386 (Part-III) shall be referred to. Suitable adjustments shall also be made in the weights of aggregates to allow for the variation in weights of aggregates due to variation in their moisture content.

The special Conditions / Specification regarding **Ready Mix Concrete** are as follows. The details like locations, capacity, experience, delivery schedule etc. of the **Ready Mix Concrete** agency shall be submitted by the successfully tenderer for prior approval of the undersigned.

The **Ready Mix Concrete** shall be conforming to IS :4926 with its latest amendments.

All the responsibility of **Ready Mix Concrete** i.e. procurement for all materials, operation of plant and machinery, transit mixers, pumping machineries relevant

pipings etc. shall be on the account of the contractor.

The Rajkot Municipal Corporation shall not be held responsible for any delay /

damage / loss due to deployment of **Ready Mix Concrete** for this project.

The octroi for the **Ready Mix Concrete** shall have to be borne by the contractor as per prevailing rates.

**Ready Mix Concrete** process shall be fully automatic and computerized

When a transit mixer is used for transportation of concrete, no extra water should be added to the concrete from elsewhere after initial introduction of mixing water from the batch, except when on arrival at the site of the work, the slump of the concrete is less than that specified : such additional water to bring the mixer under such pressure and direction of flow that requirements for uniformity are met.

Records and certificates : The contractor shall keep from the manufacture batch records of the quantities by mass of all mixing and of the results of all tests. If required by the Rajkot Municipal Corporation, the contractor shall furnish certificates, at agreed intervals, giving this information.

**The contractor shall supply the following information for guidance of the manufacturer :**

The type of cement to be used

Details Specification of aggregates to be used.

Type of admixture to be used. If specified.

Min. acceptable strength

Slump of concrete or compaction factor

Ages at which the test cubes or beams are to be tested and the frequency and number of test to be made.

Any other requirement.

**Tolerance** : Unless otherwise agreed to between the Rajkot Municipal Corporation

(RMC) and the contractor, the concrete shall be deemed to comply with the requirements of this, if these results of tests where applicable lie within the tolerance specified below.

**Consistency of workability** : The slump average of two tests shall not differ from the specified value by + 10 mm for a specified slump of 75 mm. The compacting factor average of two tests shall be within + 0.03 of the value specified. If any other method of determining consistency to be used a suitable tolerance shall be agreed to be between the purchaser and the manufacturer. The tests for consistency or workability shall be complete within 15 minutes of the time of receipt of the ready mix concrete at the site.

**Aggregate** : When tested in accordance with IS 2386 (Part-I) 1963, the quantity of aggregate larger than the max size specified by the purchaser shall not exceed 5% of the qty. of coarse aggregate and all such pass sieve of next higher size.

### 3.7.3 Nominal Mix concrete.

#### (a) Mix design and testing

Mix design and preliminary test are not necessary for Nominal Mix concrete. However works test shall be carried out as per IS : 456. Proportions for Nominal Mix Concrete and w/c ratio may be adopted as per Table 3 of IS : 456. However it will be the Contractor's sole responsibility to adopt appropriate nominal mix proportions to yield the specified strength.

#### (b) Batching & Mixing of Concrete

Based on the adopted nominal mixes, aggregates shall be measured by volume. However cement shall be by weight only.

### 3.8 Formwork

formwork shall be all inclusive and shall consist of but not be limited to shores, bracing's sides of footing, walls, beams and columns, bottom of slabs etc. including ties, anchors, hangers, inserts, false work, wedges etc.

The design and engineering of the formwork as well its construction shall be the responsibility of the Contractor. However, if so desired by the Engineer-in-charge the DRAWING and calculating for the design of the formwork shall be submitted to the Engineer-in-charge for approval.

Formwork shall be designed to fulfill the following requirements:

- (a) Sufficiently rigid and tight to prevent loss of grout or mortar from the concrete at all stages and appropriate to the method of placing and compacting.
- (b) Made of suitable materials.
- (c) Capable of providing concrete of the correct shape and surface finish within the specified tolerance limits.
- (d) Capable of withstanding without deflection the worst combination of self weight, reinforcement and concrete weight, all loads and dynamic effects arising from construction and compacting activities, wind and weather forces.
- (e) Capable of easy striking out without shocks, disturbance or damages to the concrete.
- (f) Soffit forms capable of imparting a camber if required.

- (g) Soffit forms and supports capable of being left in position if required.
- (h) Capable of being cleaner and/or coated if necessary immediately prior to casting the concrete; design temporary openings where necessary for these purposes and to facilitate the preparation of construction joints.

The formwork may be of timber, plywood, steel, plastic or concrete depending upon the approval of the Engineer-in-charge. Timber of formwork shall be well seasoned, free sap, shakes, loose knots, worm holes, warps and other surface defects. Joints between formwork and formwork and between formwork and structures shall be sufficiently tight to prevent loss of slurry from concrete, using seals if necessary.

The faces of formwork coming in contact with concrete shall be cleaned and two coats of approved mould oil applied before fixing reinforcement. All rubbish, particularly chippings, sailings, sawdust, wire pieces cut etc. shall be removed from the interior of the forms before the concrete is placed. Where directed, cleaning of forms shall be done by blasting with a jet of compressed air at no extra cost.

Forms intended for reuse shall be treated with care. Forms that have deteriorated shall not be used. Before reuse, all forms shall be thoroughly scraped, cleaned, nails removed, holes suitably plugged, joints repaired and warped lumber replaced to the satisfaction of the Engineer-in-charge. The Contractor shall equip himself with enough shuttering to allow for wastage so as to complete the job in time.

Permanent formwork shall be checked for its durability and compatibility with adjoining concrete before it is used in the structure. It shall be properly anchored to the concrete.

Wire ties passing through beams, columns and walls shall not be allowed. In their place bolts passing through sleeves shall be used. Formwork spacers left in situ shall not impair the desired appearance or durability of the structure by causing spalling, rust staining or allowing the passage of moisture.

For liquid retaining structures, sleeves shall not be provided for through bolts nor shall through bolts be removed if provided. The bolts, in the latter case, shall be cut at 25 mm depth from the surface and the hole made good by cement mortar of the same proportion as the concrete just after striking the formwork.

Where specified all corners and angles exposed in the finished structure shall have chamfers or fillets of 20 mm X 20 mm size.

Form for substructure may be omitted when, in the opinion of the Engineer-in-charge, the open excavation is firm enough (in hard non-porous soils) to act as a form, such excavation shall be larger, as approved by the Engineer-in-charge that required as per DRAWING to compensate for irregularities in excavation.

The Contractor shall provide adequate props carried down to a firm bearing without overloading any of the structure.

The shuttering for beams and slabs shall be so erected that the side shuttering of beams can be removed without disturbing the bottom shuttering. If the shuttering for a column is erected for the full height of the column, one side shall be build up in sections as placing of concrete proceeds or windows left for placing concrete from the side to limit the drop of concrete to 1.0 m or as approved by the Engineer-in-charge. The Contractor shall temporarily and securely fix items to be cast (embodiment's/inserts) in a manner that will not hinder the striking of forms or permit loss of grout.

Formwork showing excessive distortion, during any stage of construction, shall be repositioned and strengthened. Placed concrete affected by faulty formwork, shall be entirely removed and formwork corrected prior to placement of new concrete at



Contractor's cost.

The striking time for formwork shall be determined based on the following requirement:

- a) Development of adequate concrete strength;
- b) Permissible deflection at time of striking form work;
- c) Curing procedure employed -its efficiency and effectiveness;
- d) Subsequent surface treatment to be done;
- e) Prevention of thermal cracking at re-entrant angles;
- f) Ambient temperatures;
- g) Aggressiveness of the environment (unless immediate adequate steps are taken to prevent damage to the concrete).

Under normal circumstances (generally where temperatures are above 20<sup>0</sup> C) forms may be struck after expiry of the time period given in IS:456 unless approved otherwise by Engineer-in-charge, it is the Contractor's responsibility to ensure that forms are not struck until the concrete has developed sufficient strength to support itself, does not undergo excessive deformation and resist surface damage and any stresses arising during the construction period.

### 3.9 Reinforcement Workmanship

Reinforcement bars supplied bent or in coils shall be straightened cold without damage. No bending shall be done when ambient temperature is below 5<sup>0</sup>C. Local warming may be permitted if steel is kept below 5<sup>0</sup>C.

All bars shall be accurately bent gradually and according to the size and shapes shown on the DRAWING schedules or a directed by Engineer-in-charge.

Re-bending or straightening incorrectly bent bars shall not be done without the approval of the Engineer-In -Charge.

Reinforcement shall be accurately fixed and maintained firmly in the correct position by the use of blocks, spacers, chairs, binding wire etc. to prevent displacement during placing and compaction of concrete. The tied in place reinforcement shall be approved by the Engineer-in-charge prior to concrete placement. Spacers shall be of such materials and design as will be durable, not lead to corrosion of the reinforcement and not cause spalling of the concrete cover.

Binding wire shall be 16 gauges soft annealed wire. End of the binding wire shall be bent away from the concrete surface and in no case encroach into the concrete cover.

Substitution of reinforcement; laps/splices not shown on Drawing shall be subject to Engineer-in-charge's approval.

### 3.10 Tolerances

Tolerance for formwork and concrete dimensions shall be as per IS: 456 unless specified otherwise.

Tolerances specified for horizontal or vertical building lines or footings shall not be construed to permit encroachment beyond the legal boundaries.

The formwork shall be designed and constructed to the shapes, lines and dimensions shown on the Drawings within the tolerances given below:

(a)	Deviation from specified dimensions of cross section of columns and beams	-6 mm
-----	---	-------

(b)	Deviations from dimensions of footings (tolerances apply to concrete dimensions only, not to positioning of vertical reinforcing steel or dowels)	+12 mm
1.	Dimension in plan	-12 +50 mm
2.	Eccentricity	0.02 times the width of the footing in the direction of deviation but not more than
3.	Thickness	+0.05 times the specified thickness

### 3.114 Preparation Prior to Concrete Placement

Before concrete is actually placed in position, the inside of the formwork shall be cleaned and mould oil applied, insert and reinforcement shall be correctly positioned and securely held, necessary openings, pockets, etc. provide.

All arrangements formwork, equipment and proposed procedure, shall be approved by the Engineer-in-charge, Contractor shall maintain separate Pour card for each pour as per the format enclosed.

### 3.12 Transporting, Placing and Compacting Concrete

Concrete shall be transported from the mixing plant to the formwork with minimum time lapse by methods that shall maintain the required workability and will prevent segregation, loss of any ingredients or ingress of foreign matter or water.

In all cases concrete shall be deposited as nearly as practicable directly in its final position. To avoid segregation, concrete shall not be rehandled or cause to flow. For locations where direct placement is not possible and in narrow forms the Contractor shall provide suitable drops and "Elephant Trunks". Concrete shall not be dropped from a height of more than 1.0 m

Concrete shall not be placed in flowing water. Under water, concrete shall be placed in position by termite or by pipeline from the mixer and shall never be allowed to fall freely through the water.

#### Concreting under water :

When it is necessary to deposit concrete under water, the methods, equipments, and materials of the mix to be used shall be got approved from the Engineer-in-charge before any work is started. Such concreting be considered as controlled concrete i.e. design mix.

Concrete shall not be placed under temperature below 50 degree centigrade. The temperature of concrete, when deposited, shall be however not less than 50 centigrade nor more than 40 degree centigrade.

Concrete to be placed under water shall contain ten percent more cement than that required for the same mix placed in the dry.

The slump shall not be less than 100 mm nor more than 180 mm. The slump shall be tested as per I. S. 516.

Coffer-dams or forms shall be water tight to ensure still water conditions if practicable and in any case to reduce the flow of water to less than 3 meters per minute through the space into which concrete is to be deposited. The forms in still

water shall be sufficiently tight to prevent loss of mortar through the joints in the walls. Pumping shall not be done while concrete is being placed, or until 24 hours thereafter.

Concrete shall continue to be deposited until it has been brought to the required height. The top surface shall always be kept as wet as far as possible and formation of seams avoided. For concrete any one of the following methods may be used.

**(a) Tremie :**

When concrete is to be deposited under water by means of tremie, the top section of the tremie shall be a hopper large enough to hold one full batch mix or the entire contents of the transporting bucket. The tremie pipe shall not be less than 200 mm dia. and also shall be large enough to allow a free flow of concrete and strong enough to withstand the external pressure of water in which it is suspended, even if a partial vacuum develops inside the pipe. Preferably, flanged steel pipe of adequate strength for the job shall be used. A separate lifting device shall be provided for each tremie pipe with its hopper at the upper end. Unless the lower end of the pipe is equipped with an approved automatic check valve, the upper end of the pipe shall be plugged with a wedging by use of gunny sacks or other approved material before delivering the concrete to the tremie pipe through the hopper, so that when the concrete is forced down from the hopper to the pipe, it will force the plug (and along with it any water in the pipe) down the pipe and out of the bottom end. Thus establishing a continuous stream of concrete. It will be necessary, to raise slowly the tremie in the order to allow a uniform flow of concrete, but it shall not be emptied so that water enters above the concrete in the pipe.

At all times after the placing of concrete is started and until all the requirement quantity has been placed, the lower end of the tremie pipe shall be kept below the top surface of the plastic instead of flowing out over the surface, and thus avoid formation of layers of laitance. If the charge in the tremie is lost while depositing, the tremie shall be raised above the concrete surface, and unless sealed by a check valve it shall be re-plugged at the top end, as at the beginning before refilling for depositing further concrete.

**(b) Drop Bottom Bucket :**

The top of the bucket shall be closed. The bottom doors shall move freely downward and outward when tripped. The bucket shall be filled completely and lowered slowly to avoid backwash. It shall not be dumped until it rests on the surface upon which the concrete is to be deposited and when discharged shall be withdrawn slowly until well above the concrete.

To minimize the formation of laitance, great care shall be exercised to disturb the concrete as far as possible while it is being deposited.

**While placing concrete the Contractor shall proceed as specified below and also ensure the following.**

- a) Continuously between construction joints and pre-determined abutments.
- b) Without disturbance to forms or reinforcement.
- c) Without disturbance to pipes, ducts, fixing and the like to be cast in: ensure that such items are securely fixed. Ensure that concrete cannot enter open ends of pipes and conduits etc.
- d) Without dropping in a manner that could cause segregation or shock.
- e) In deep pours only when the concrete and formwork designed for this purpose and by using suitable chutes or pipes.
- f) Do not place if the workability is such that full compaction cannot be achieved.
- g) Without disturbing the unsupported sides of excavations; prevent contamination of concrete with earth. Provide sheeting if necessary. In supported excavations, withdraw the lining progressively as concrete is placed.

- h) If placed directly on to hardcore or any other porous material, dampen the surface to reduce loss of water from the concrete.;
- i) Ensure that there is no damage or displacement to sheet membranes.
- j) Record the time and location of placing structural concrete.

Concrete shall normally be compacted in its final position within thirty minutes of leaving the mixer. Concrete shall be compacted during placing with approved vibrating equipment without causing segregation until it forms a solid mass free from voids thoroughly worked around reinforcement and embedded fixtures and into all corners of the formwork. Immersion vibrators shall be inserted vertically at points not more than

450 mm apart and withdrawn slowly till air bubbles cease to come to the surface, leaving no voids. When placing concrete in layers advancing horizontally, care shall be taken to ensure adequate vibration blending and melting of the concrete between successive layers. Vibrators shall not be allowed to come in contact with reinforcement, formwork and finished surfaces after start of initial set. Over-vibration shall be avoided.

Concrete may be conveyed and placed by mechanically operated equipment after getting the complete procedure approved by the Engineer-in-charge. The slump shall be held to the minimum necessary for conveying concrete by this method. When concrete is to be pumped, the concrete mix shall be specially designed to suit pumping. Care shall be taken to avoid stoppages in work once pumping has started.

Except when placing with slip forms, each placement of concrete in multiple lift work shall be allowed to set for at least 24 hours after the final set of concrete before the start of subsequent placement. Placing shall stop when concrete reaches the top of the opening in walls or bottom surface of slab, in slab and beam construction, and it shall be resumed before concrete takes initial set but not until it has had to settle as approved by the Engineer-in-charge. Concrete shall be protected against damage until final acceptance.

### **3.13 Mass Concrete Works**

Sequence of pouring for mass concrete works shall be as approved by the Engineer-in-charge. The Contractor shall exercise great care to prevent shrinkage cracks and shall monitor the temperature of the placed concrete if directed.

### **3.14 Curing**

Curing and protection shall start immediately after the compaction of the concrete to protect it from:

- a) Premature drying out, particularly by solar radiation and wind;
- b) Leaching out by rain and flowing water;
- c) Rapid cooling during the first few days after placing;
- d) High internal thermal gradients;
- e) Low temperature or frost;
- f) Vibration and impact which may disrupt the concrete and interfere with its bond to the reinforcement.

All concrete, unless approved otherwise by the Engineer-in-charge shall be cured by use

of continuous sprays or ponded water or continuously saturated coverings of sacking, canvas, hessian or other absorbent material for the period of complete hydration with a minimum of 7 days. The quality of curing water shall be the same as that used for mixing.

Where a curing membrane is approved to be used by the Engineer-in-charge, the same shall be of a non-wax base and shall not impair the concrete finish in any matter. The curing component to be used and shall be applied with spraying equipment capable of a smooth, even textured coat.

Curing may also be done by covering the surface with an impermeable material such as polyethylene, which shall be sealed and fastened.

### **3.15 Construction Joints and Keys**

Construction joints will be shown on the DRAWING or as approved by the Engineer-in-charge. Concrete shall be placed without interruption until completion of work between construction joints. If stopping of concreting becomes unavoidable anywhere, a properly formed, construction joints shall be made with the approval of the Engineer-in-charge.

Dowels for concrete work, not likely to be taken up in the near future, shall be coated with cement slurry and encased in lean concrete as indicated on the DRAWINGS or as approved by the Engineer-in-charge.

Before resuming concreting on a surface which has not fully hardened, all laitance and loose stone shall be thoroughly removed by wire brushing/hacking and surface washed with high pressure water jet and treated with thin layer of cement slurry for vertical joints and horizontal layers.

When concreting is to be resumed on a surface which has not fully hardened, all laitance shall be removed by wire brushing the surface wetted, free water removed and a coat of cement slurry applied. On this, a layer of concrete not exceeding 150 mm thickness shall be placed and well rammed against the old work. Thereafter work shall proceed in the normal way.

### **3.16 Foundation Bedding**

All earth surfaces upon which or against which concrete is to be placed, shall be well compacted and free from standing water, mud or debris. Soft or spongy areas shall be cleaned out and back filled with either soil-cement mixture, lean concrete or clean sand

compacted as approved by the Engineer-in-charge. The surfaces of absorptive soils shall be moistened.

Concrete shall not be deposited on large sloping rock surfaces. The rock shall be cut to form rough steps or benches by picking, barring or wedging. The rock surface shall be kept wet for 2 to 4 hours before concreting.

### **3.17 Finishes**

#### **3.17.1 General**

The formwork for concrete works shall be such as to give the finish as specified. The

Contractor shall make good any unavoidable defects as approved consistent with the type of concrete and finish specified. Defects due to bad workmanship (e.g. damaged or misaligned forms, defectives or poorly compacted concrete) will not be accepted. The Contractor shall construct the formwork using the correct materials and meet the requirements of the design and to produce finished concrete to required dimension, plumbs, planes and finishes.

#### **3.17.2 Surface Finish Type F1**

The main requirement is that of dense, well compacted concrete. No treatment is required except repair of defective areas filling all form tie holes and cleaning up of loose or adhering debris. For surface below grade which will receive waterproofing treatment the concrete shall be free of surface irregularities which would interfere with proper and effective application of waterproofing material specified for use.

#### **3.17.3 Surface Finish Type F2**

The appearance shall be that of a smooth dense, well-compacted concrete showing the slight marks of well fitted shuttering joints. The Contractor shall make good any blemishes.

#### **3.17.4 Surface Finish Type F3**

This finish shall give an appearance of smooth, dense, well-compacted concrete with no shutter marks, stain free and with no discoloration, blemishes, air holes etc. only

lined or coated plywood with very tight joints shall be used to achieve this finish. The

panel size shall be uniform and as large as practicable. Any minor blemishes that might occur shall be made good by the Contractor.

#### **3.17.5 Integral Cement Finish on Concrete Floor**

In all cases where integral cement finish on a concrete floor has been specified, the top layer of concrete shall be screeded off to proper level and tamped with tamper having conical projections so that the aggregate shall be forced below the surface. The surface shall be finished with a wooden float and a trowel with pressure. The finish shall be continued till the concrete reaches its initial set. No cement or cement mortar finish shall be provided on the surface. Where specified, a floor hardener as approved by the Engineer-in-charge shall be supplied and used as recommended by the manufacturer.

#### **3.18 Repair and Replacement of Unsatisfactory Concrete**

Immediately after the shuttering is removed, all the defective areas such as honeycombed surfaces, rough patches and holes left by form bolts etc. shall be inspected by the Engineer-in-charge who may permit patching of the defective areas or reject the concrete work.

All through holes for shuttering shall be filled for full depth and neatly plugged flush with surface.

Rejected concrete shall be removed and replaced by the Contractor at no additional cost of the Owner.

For patching of defective areas all loose materials shall be removed and the surface shall be prepared as approved by the Engineer-in-charge.

Bonding between hardened and fresh concrete shall be done either by placing cement mortar or by applying epoxy. The decision of the Engineer-in-charge as to the method of repair to be adopted shall be final and binding on the Contractor. The surface shall be saturated with water for 24 hours before patching is done with 1:1 cement sand mortar. The use of epoxy for rebinding fresh concrete shall be carried out as approved by the Engineer-in-charge.

#### **3.19 Vacuum dewatering of Slabs**

Where specified floor slabs, either grade or suspended, shall be finished by vacuum dewatering including all operations such as poker vibration, surface vibration, vacuum processing, flatting and trowelling as per equipment manufacturers recommendation.

The equipment to be used shall be subject to the Engineer-in-charge.

#### **3.20 Hot Weather Requirements**

Concrete during hot weather shall be carried out as per IS: 7861(Part I).

Adequate provisions shall be made lower concrete temperatures which shall not exceed 40°C at the time of placement of fresh concrete.

Where directed by the Engineer-in-charge, the Contractor shall spray non-wax based curing compound on unformed concrete surfaces at no extra costs.

### **3.21 Cold weather Requirement**

Concreting during cold weather shall be carried out as per IS: 7861 (Part II).

The ambient temperature during placement and up to final set shall not fall below 5 deg.C. Approved antifreeze/accelerating additives shall be used where directed.

For major and large scale concreting works the temperature of concrete at times of mixing and placing, the thermal conductivity of the formwork and its insulation and stripped period shall be closely monitored.

### **3.22 Liquid Retaining Structures**

The Contractor shall take special care for concrete for liquid retaining structures, underground structures and those others specifically called for to guarantee the finish and water tightness.

The minimum level of surface finish for liquid retaining structures shall be Type F2. All such structures shall be hydro-tested.

The Contractor shall make all arrangement for hydro-testing of structure, all arrangements for testing such as temporary bulk heads, pressure gauges, pumps, pipe lines etc.

The Contractor shall also make all temporary arrangements that may have to be made to ensure stability of the structures during construction.

Any leakage that may occur during the hydro-test or subsequently during the defects liability period or the period for which the structure is guaranteed shall be effectively stopped either by cement/epoxy pressure grouting, guniting or such other methods as may be approved by the Engineer-in-charge. All such rectification shall be done by the CONTRACTOR to the entire satisfaction of the Engineer-in-charge at no extra cost to the OWNER.

### **3.23 Testing Concrete Structures for Leakage**

Hydro-static test for water tightness shall be done at full storage level or soffit of cover slab, as may be directed by the Engineer-in-charge as described below:

In case of structures whose external faces are exposed, such as elevated tanks, the requirements of the test shall be deemed to satisfied if the external forces show no sign

off leakage or sweating and remain completely dry during the period of observation of seven days after allowing a seven day period for absorption after filling with water.

In the case of structures whose external faces are buried and are not accessible for inspection, such as underground tanks, the structures shall be filled with water and after the expiry of seven days after the filling; the level of the surface of the water shall be recorded. The level of water shall be recorded again at subsequent intervals of 24 hrs. over a period of seven days. Backfilling shall be withheld till the tanks are tested. The total drop in surface level over a period for seven days shall be taken as an indication of the water tightness of the structure. The Engineer-in-charge shall decide on the actual permissible nature of this drop in the surface level, taking into account whether the structures are open or closed and the corresponding effect it has on evaporation losses. Unless specified otherwise, a structure whose top is covered shall be deemed to be water tight if the total drop in the surface level over a period of seven days does not exceed 40 mm.

Each compartment/segment of the structure shall be tested individually and then

all together.

For structures such as pipes, tunnels etc. the hydrostatic test shall be carried out by filling with water , after curing as specified ,and subjecting to the specified test pressure for specified period .If during this period the loss of water does not exceed the equivalent of the specified rate, the structure shall be considered to have successfully passed the test.

### 3.24 Optional Tests

If the Engineer-in-charge feels that the materials i.e. cement, sand, coarse aggregates, reinforcement and water are not in accordance with the Specifications or if specified concrete strengths are not obtained, he may order tests to be carried out on these materials in laboratory, to be approved by the Engineer-in-charge as per relevant IS Codes. Contractor shall have to pay for these tests.

In the event of any work being suspected of faulty material or workmanship requiring is removal or if the works cubes do not give the stipulated strengths, the Engineer-in-charge reserves the right to order the Contractor to take out cores and conduct tests on them or do ultrasonic testing or load testing of structure ,etc. The Engineer-in-charge also reserves the right to ask the Contractor to dismantle and re-do such unacceptable work, at no cost to the Owner. Alternately Engineer-in-charge also reserves the right to ask the CONTRACTOR to dismantle and re-do such unacceptable work at the cost of CONTRACTOR.

### 3.25 Grouting

#### 3.25.1 Standard Grout

Grout shall be provided as specified on the DRAWINGS.

The proportion of Standard grout shall be such as to produce a flow able mixture consistent with minimum water content and shrinkage. Surfaces to be grouted shall be thoroughly roughened and cleaned. All structural steel elements to be grouted shall be cleaned of oil, grease, dirt etc. The use of hot, strong caustic solution for this purpose will be permitted. Prior to grouting, the hardened concrete shall be saturated with water and just before grouting, water in all pockets shall be removed. Grouting once started shall be done quickly and continuously. Variation in grout mixes and procedures shall be permitted if approved by the Engineer-in-charge. The grout proportions shall be limited as follows:

Sr no	Use	Grout Thickness	Mix Proportions	W/C Ratio
a)	Fluid mix	Under 25 mm	One part Portland Cement to one part sand	0.44
b)	General mix	25 mm and over but less than 50 mm	One part Portland Cement to two part sand	0.53
c)	Stiff mix	50 mm and over	One part Portland Cement to 3 part sand	0.53

#### 3.25.2 Non-Shrink Grout

Non-shrink grout where required shall be provided in strict accordance with the manufacturer's instructions/specifications on the DRAWINGS.

#### General

##### Inspection

All materials, workmanship and finished construction shall be subject to continuous inspection and approval of Engineer-in-charge. Material rejected by Engineer-in-charge, shall be expressly removed from site and shall be replaced by Contractor immediately.



**Clean-up**

Upon the completion of concrete work, all forms, equipment, construction tools, protective coverings and any debris, scraps of wood, etc. resulting from the work shall be removed and the premises left clean.

**Acceptance Criteria**

Any concrete work shall satisfy the requirements given below individually and collectively for it to be acceptable.

- a) Properties of constituent material;
- b) Characteristic compressive strength;
- c) Specified mix proportions;
- d) Minimum cement content;
- e) Maximum free-water/cement ratio;
- f) Workability;
- g) Temperature of fresh concrete;
- h) Density of fully compacted concrete;
- i) Cover to embedded steel;
- j) Curing;
- k) Tolerances in dimension;
- l) Tolerance in levels;
- m) Durability;
- n) Surface finishes;
- o) Special requirements such as;
  - i) Water tightness
  - ii) Resistance to aggressive chemicals
  - iii) Resistance to freezing and thawing
  - iv) Very high strength
  - v) Improved fire resistance
  - vi) Wear resistance
  - vii) Resistance to early thermal cracking

The Engineer-in-charge decision as to the acceptability or otherwise of any concrete work shall be final and binding on the Contractor.

For work not accepted, the Engineer-in-charge may review and decide whether remedial measures are feasible so as to render the work acceptable. The Engineer-in-charge shall in that case direct the Contractor to undertake and execute the remedial measures.

These shall be expeditiously and effectively implemented by the Contractor. Nothing extra shall become payable to the contractor by the Owner for executing the remedial measures.

**3.26 Water stops****3.26.1 Material**

The material for the PVC water stops shall be a plastic compound with the basic resin of polyvinyl chloride and additional resins, plasticizers, inhibitors, which satisfies the performance characteristics specified below as per IS: 12200. Testing shall be in accordance with IS: 8543.

a)	Tensile strength	3.6 N/mm <sup>2</sup> minimum
b)	Ultimate elongation	300% minimum
c)	Tear resistance	4.9 N/mm <sup>2</sup> minimum
d)	Stiffness in flexure	2.46 N/mm <sup>2</sup> minimum
e)	Accelerated extraction	
	I) Tensile strength	10.50% N/mm <sup>2</sup> minimum
	II) Ultimate elongation	250% minimum

f)	Effect of Alkali i) Weight increase ii) Weight decrease	7 days 0.10% maximum 0.10% maximum ±5 points
g)	Effect of Alkali i) Weight increase ii) Weight decrease	28 days 0.40% maximum 0.30% maximum ±1 %

PVC water stops shall be either of the bar type, serrated with centre bulb and grips for use within the concrete elements or of the surface (Kicker) type for external use.

PVC water stops shall be of approved manufacture. Samples and the test certificate shall be got approved by the Engineer-in-charge before procurement for incorporation in the works.

### 3.26.2 Workmanship

Water stops shall be cleaned before placing them in position. Oil or grease shall be removed thoroughly using water and suitable detergents.

Water stops shall be procured in long lengths as manufactured to avoid joints as far as possible. Standard L or T type of intersection pieces shall be procured for use depending on their requirement. Any non-standard junctions shall be made by cutting the pieces to profile for jointing. Lapping of water stops shall not be permitted. All jointing shall be of fusion welded type as per manufacturer's instructions.

Water stops shall be placed at the correct location/level and suitably supported at intervals with the reinforcement to ensure that it does not deviate from its intended position during concreting and vibrating. Care shall also be taken to ensure that no honey-combing occurs because of the serrations/end grips, by placing concrete with smaller size aggregates in this region. Projecting portions of the water stops embedded in concrete shall be thoroughly cleaned of all mortar/concrete coating before resuming further concreting operations. The projecting water stops shall also be suitably supported at intervals with the reinforcement to maintain its intended position during concreting so as to ensure that it does not bend leading to formation of pockets. In addition, smaller size aggregates shall be used for concreting in this region also.

## 3.27 Preformed Fillers and Joint Sealing Compound

### 3.27.1 Materials

Preformed filler for expansion/isolation joints shall be non-extruding and resilient type of bitumen impregnated fibers conforming to IS: 1838 (Part I)

Bitumen coat to concrete/masonry surfaces for fixing the preformed bitumen filler strip shall conform to IS: 702. Bitumen primer shall conform to IS: 3384

Sealing compound for filling the joints above the preformed bitumen filler shall conform to Grade "A" as per IS: 1834

### 3.27.2 Workmanship

The thickness of the preformed bitumen filler shall be 25 mm for expansion joints and 50 mm for isolation joints around foundation supporting rotatory equipments.

Contractor

shall procure the strips of the desired thickness and width in length as manufactured.

Assembly of small pieces/thickness of strips to make up the specified size shall not be permitted.

The concrete /masonry surface shall be cleaned free from dust and any loose particles. When the surface is dry, one coat of industrial blown type bitumen of grade

85/25 conforming to IS: 702 shall be applied by brushing at the rate of 1.20Kg/sq.m. When the bitumen is still hot the performed bitumen filler shall be pressed at held in position till completely adheres. The surface of the filler against which further concreting/masonry work is to be done shall similarly be applied with one coat of hot bitumen at the rate of 1.20Kg/sq.m.

Sealing compound shall be heated to a pouring consistency for enabling it to run molten in a uniform manner into the joint. Before pouring the sealing compound, the vertical faces of the concrete joint shall be applied hot with a coat of bitumen primer conforming to IS: 3384 in order to improve the adhesive quality of the sealing compound.

Expansion joints between beams/slabs shall be provided with 100 mm wide x 4 mm thick mild steel plate at the soffit of RCC beams/slabs to support and prevent the performed joint filler dislodging. This plate shall be welded to an edge angle of IS A 50x50x6 mm/slabs, by intermittent fillet welding. Steel surfaces shall be provided with 2 coats of red oxide zinc chrome primer and 3 coats of synthetic enamel paint finish.

<b>CONCRETE POUR CARD</b>				
POUR NO:		DATE:		
DRG NO:		STRUCTURE:		
CONCRETE GRADE QUALITY:		MAX. AGGREGATE		
SIZE:				
Sr no.	Item			Remarks if any
1.	BEFORE CONCRETIN	Centerlines checked	Yes/No.	
2.		Form work and Staging checked for accuracy, strength & finish	Yes/No.	
3.		Reinforcement checked	Yes/No.	
4.		Cover to reinforcement checked	Yes/No.	
5.		Verified test certificate for cement/steel	Yes/No.	
6.		Adequacy of materials/equipment for pour	Yes/No.	
7.		Embedded parts (location & plumb)	Yes/No.	
8.	SOFFIT(S) & POUR TOP (T) LEVELS CHECKED BEFORE (B) & AFTER (A) FORM REMOVAL (ONLY OF BEAMS OF OVER 10 M SPAN & IMPORTANT		S(B) T(B) S(B) T(B)	
9.	CONSTRUCTION JOINTS LOCATION & TIME (IF NOT AS PER DRAWING)			
10.	CEMENT CONSUMPTION IN KGS.			
11.	NUMBER OF CUBES AND IDENTIFICATION			
12.	TEST CUBE RESULTS (7 DAYS/28 DAYS)			
13.	CONCRETE CONDITION ON FORM REMOVAL		Very good / good/fair / poor	

Notes: - Each pour to have separate cards, in triplicate one each for Owner/client, Contractor & site office.

Under remarks indicate deviations from drawings & specifications, congestion in reinforcement if any, unusual occurrences such as failure of equipment's,

sinking of supports/Props, heavy rains affecting concreting, poor compaction, improper curing, other deficiencies, observation etc.

### **3.28 MODE OF MEASUREMENT AND PAYMENT**

The unit rate for concrete work under various categories shall be all inclusive and no claims for extra payment on account of such items as leaving holes, embedding inserts, etc. shall be entertained unless separately provided for in the schedule of quantities. No

extra claim shall also be entertained due to change in the number, position and / or dimensions of holes, slots or openings, sleeves, inserts or on account of any increased lift, lead of scaffolding etc. All these factors should be taken into consideration while quoting the unit rates. Unless provided for in the Schedule of Quantities the rates shall also include fixing inserts in all concrete work, whenever required.

Payments for concrete will be made on the basis of unit rates quoted for the respective items in the Schedule of Quantities. No deduction in the concrete quantity will be made for reinforcements, inserts etc. and opening less than 0.100 of a sq.m in areas where concrete is measured in sq.m and 0.010 cu.m where concrete is measured in cu.m. Where no such deduction for concrete is made, payment for shuttering work provided for such holes, pockets, etc. will not be made. Similarly the unit rates for concrete work shall be inclusive or exclusive of shuttering as provided for in the Schedule of Quantities.

Payment for beams will be made for the quantity based on the depth being reckoned from the underside of the slabs and length measured as the clear distance between supports. Payment for columns shall be made for the quantity based on height reckoned upto the underside of slab / beams.

The unit rate for precast concrete members shall include formwork, mouldings, finishing, hoisting and setting in position including setting mortar, provision of lifting arrangement etc. complete. Reinforcement and inserts shall be measured and paid for separately under respective item rates.

Only the actual quantity of steel embedded in concrete including laps as shown on drawings or as approved by Engineer shall be measured and paid for, irrespective of the level or height at which the work is done. The unit rates for reinforcement shall include lap chairs, spacer bars etc.

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

#### **Item No.10**

#### **Brick Masonry work with cement mortar 1:6 complete:**

##### **Materials:**

Water shall conform to M-1.

##### **Cement:**

Cement shall conform to M-3.

##### **Brick :**

The bricks shall be hard or machine moulded and made from suitable soils and burnt. They shall be free from cracks and flaws and nodules of free lime. They shall have smooth rectangular faces with sharp corners and shall be of uniform colors.

The bricks shall be moulded with a frog of 100 mm x 40 mm and 10 mm to 20 mm deep on one of its flat sides. The bricks should not be broken when thrown

on the ground from a height of 600 mm.

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

The size of the conventional bricks shall be as under:  
(9" x 4.3/8" x 2,3/4") 225 x 110 x 75 mm

Only bricks of one standard size shall be used in one work. The following tolerances shall be permitted in the conventional size adopted in a particular work.

Length  $\pm 1/8$ " (3mm) width :  $\pm 1/16$ " (1.5mm)  
Height:  $\pm 1/16$ " (1.5 mm)

The crushing strength of the bricks shall not be less than 35 kg/sq.cm. The average water absorption shall not be more than 20 percent by weight. Necessary tests for crushing strength and water absorption etc., shall be carried out as per IS: 3495 (Part I to IV) - latest edition.

**Workmanship:**

**i) Proportion:**

The proportion of the cement mortar shall be 1:6 (1-Cement, 6-Fine sand) by volume.

**Wetting of bricks:**

The bricks required for masonry shall be thoroughly wetted with clean water for about two hours before use or as directed. The cessation of bubbles, when the bricks are wetted with water is an indication of thorough wetting of bricks.

**Laying:**

Bricks shall be laid in English bond unless directed otherwise. Half or cut bricks shall not be used except when necessary to complete the bond; closer in such case shall be cut to required size and used near the ends of walls.

A layer of mortar shall be spread on full width for suitable length of the lower course. Each brick shall first be properly bedded and set true by gently tapping with handle of trowel or wooden mallet. Its inside face shall be flushed with mortar before the next brick is laid and pressed against it. On completion of course the vertical joints shall be fully filled from the top with mortar.

The work shall be taken up truly in plumb. All courses shall be laid truly horizontal and all vertical joint shall be truly vertical. Vertical joints in alternate course shall generally be directly one over the other. the thickness of brick course shall be kept uniform.

The brick shall be laid with frog upwards. A set of tools comprising of wooden straight edges, mason's spirit level, square half meter rub, and pins, string and plumb shall be kept on site of work for frequent checking during the progress of work.

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 meter 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.

All fixtures, pipes, outlets of water, hold fasts of doors and windows etc. which are required to be built in wall shall be embedded in cement mortar.

**Joints:**

Bricks shall be so laid that all joints are quite flush with mortar. Thickness of joints shall not expose 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.

The face of brick shall be cleaned the very day on which the work is laid and all mortar dropping removed.

**Curing:**

Green work shall be protected from rain suitably. Masonry work shall be kept moist on all the faces for a period of seven days. The top of masonry work shall be kept well wetted at the close of the day.

**Mode of measurement & Payment:**

The measurement of this item shall be taken for the brick masonry fully completed in foundation upto plinth. The limiting dimensions not exceeding those shown on the plans or as directed shall be final. Battered tapered and curved position shall be measured net.

The rate shall be for a unit of one cubic meter.

The testing of material is to be carried out at the cost of the contractor.

**Item No.11**

**Half brick masonry in common burnt clay building brick having crushing strength not less than 35 kg/ sq.cm. in cement mortar 1:4 (1 cement: 4 coarse sand) for super-structure above plinth level upto floor two level with conventional bricks.**

**Materials.**

Bricks shall conform to M-15. Water shall conform to M-1. Cement shall conform to M-3. Sand shall conform to M-6. Cement mortar shall conform to M-11.

**Workmanship**

The relevant specifications be followed for bricks, wetting, laying of bricks, joints, curing, shall conform to Item No.6.19(A) except that the bricks to be used shall be conventional bricks instead of modular bricks

Cement mortar used in masonry work shall be in proportion of 1 part of cement and 4 parts of sand by volume.

All bricks shall be laid stretcher wise, breaking joints with those in the upper and lower courses. The wall shall be taken truly plumb. All courses shall be laid truly horizontal and all vertical joints 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.

**Mode of measurements and payment**

The limiting dimensions shall not exceed those shown in the plan or as directed. Any work done extra over specified dimensions shall be ignored.

The rate shall be for a unit of one square meter.

**Item No.12 :**

**Supply and fixing of Broken Glazed (China Mosaic) tiles size 5-6 mm thick of different size and shade (approved crazy pattern) in C M 1:2 and joint filling with white cement / coloured cement including ramping, watering, curing etc complete:**

The work is to be carried out with supply and fixing of Broken Glazed (China Mosaic) tiles of size 5-6 mm thick of different size and shade (approved crazy pattern) in C M 1:2 and joint filling with white cement / coloured cement including ramping, watering, curing etc complete with 25 mm bedding of cement mortar 1:6 with required slope. The whole work of this item is to be carried out and completed as per the instructions of engineer in charge.

The rate shall be for a unit of one square meter basis

**Item No.13 :**

**Providing water proofing treatment to be done by Dr.Fixit Touchshield-P31 60, 3.00 mm thick or as per I S Specifications and as approved engineer in charge.**

**Material:**

As per the instructions and as approved by engineer in charge .

**Workmanship:**

Method of Application

Horizontal Joints

Clean the construction joint of loose mortar and dust.

Apply primer as directed (refer section on application of primer), wait for about half and hour until the primer dries a little and becomes "sticky".

Clean hands of dust, oil or grease and dry it.

Unroll the water bar coil slowly and carefully on the joint without pulling and stretching it. Press it to ensure that it sticks to the concrete surface and hugs the profile of the concrete surface.

Remove the protective wrap and pour the concrete .

Apply primer as directed (refer section on application of primer). Wait for about half an hours until the primer dries a little and becomes "sticky".

Clean hands of dust, oil or grease and dry it.

Unroll the water bar coil slowly and carefully on the joint without pulling and stretching it. Press it to ensure that it sticks to the concrete surface and hugs the profile of the concrete surface.

If primer cannot be applied for some reason, hang the waterbar strip from the top by bending over about 150 mm of the waterbar horizontally on the top of the retaining wall. If this is not possible, tie the end of the water bar with binding wire or string to any available projecting rebar and hang the water vertically in position.

The rate for the work will be paid on one square meter basis.

**Item No.14:****Plywood flush door 25 mm thick with color complete**

**Providing and fixing flush door shutter solid core of 25 mm thickness with wooden frame with polishing or oil paint. Plywood in doors & windows used must be of KITPLY, CENTURY, DECORA, EVEREST.**

**Wooden flush door shutters (solid core) :**

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. Latest edition. 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 in which they occur may be permitted. Pitch pockets, 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: latest edition.

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 cross-bands and face veneers. The lipping, rebating, opening of glazing; venetian etc. shall be provided if specified in the drawing.

All edges of the door shutters shall be square. The shutters shall be free from twist of warp in its plant Both faces of the shutters shall be sand papered to smooth even texture.

The shutters shall be tested for

- (1) **End immersion test** : The test shall be carried out as per I.S. latest edition. There shall be no delamination at the end of the test.
- (2) **Knife test** : The face panel when tested in accordance with I.S. latest edition shall pass the test.
- (3) **Glue adhesion test** : The flush door shall be tested for glue adhesive test in accordance with I.S.: latest edition. 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 occurred in the assembly glue lines between the plywood face and the style and rail. Delamination at the corner shall be measured continuously around the corner. Delamination at the knots, knot holes and other permissible wood defects shall not be considered in assessing the sample.

The tolerance in size of solid core type flush door shall be as under:

In Nominal thickness  $\pm 1.2$  mm in Nominal height  $\pm 3$  mm.

The thickness of the shutter shall be uniform throughout with a permissible variation of not more than 0.8 mm: when measured at any two points.

This wooden shutter must be framed with steel section.

**2.0. Workmanship**

The relevant specifications shall be followed except that the shutters be non decorative type and block board core with face veneer or plywood, with 25 mm thickness.



Readymade shutters shall be of correct size and shall fit into the door or other openings without excessive scrapping of edges. Adding of battens etc., to make up to the size shall not be allowed.

The rate shall be for a unit of one sq. meter.

**Item No.15:**

**FRP Door supply all fitting and fixture complete**

Providing and fixing 28 mm thick single shutter door with flush depressed panel design with core material PU foam done in situ & sandwich panel of 4 mm thick plywood & moulded in wooden blocks for fixtures. FRP thickness to be 1.50 mm to 2.00 mm including providing and fixing FRP moulded section frame of section size 100 mm x 50 mm chamfered type with FRP thickness of 2.00 mm and core of rigid polyurethane foam having density 32 Kg/ cmt to 36 Kg/cmt., compressive strength 3.5 Kg./sqcm to 4.5 Kg./sqcm. and fire retardant grade, PU foam shall be done situ with Canadian Ponderosa wooden blocks for fixtures. In built holdfast arrangement to use fasteners for fixing with masonry or R.C.C. The whole section of frame and shutter shall be waterproof, acid / alkali resistant & well coat colour. the frame and shutter shall be fixed with all necessary stainless steel fixtures and fastenings etc. complete as per direction of engineer in charge.

**Materials:-**

Frame materials shall be of fire extinguishing grade FRP skin having section 100 mm x 50 mm chamfered type with thickness of 1.50 mm to 2.00 mm and core material shall be fire extinguishing grade rigid polyurethane foam having density 32 Kg/ cu.cm to 36 Kg/ cu.cm, flexural strength 1.8 Kg / Sqcm to 2.00 Kg / Sqcm and compressive strength 3.5 Kg / Sqcm to 4.5 Kg / Sqcm. Whole frame shall be water proof, weather proof, termite proof and mild acid / alkali resistance. P.U foam shall be done in situ with plantation wooden pieces embedded inside for holding fixtures and stiffening. Frame shall be straight in line, level and having three joint-less pieces. Frame shall be fixed in masonry / R.C.C with Mild Steel hold fast or with 115 mm long screws as hold fast with sleeve in position and finished in colour cement. 28 mm thick shutter in depressed panel design shall be having 1.5 mm to 2.0 mm thickness fire extinguishing grade FRP skin, sand-witch panel of 4 mm thick plywood and embedded wooden pieces for stiffening as well as holding hinges and fixture, all molded into a one piece shutter. Core material shall be injected fire extinguishing grade rigid polyurethane foam done in situ having density 32 Kg / Cucm to 36 Kg / Cucm compressive strength 1.8 Kg / Sqcm to 2.00 Kg / Sqcm, flexural strength 3.5 Kg / Sqcm to 4.5 Kg / Sqcm. Whole shutter shall be water proof, weather proof, termite proof and mild acid/alkali resistance. 28 mm thick depressed panel FRP shutter shall be joint-less. It shall be straight and smooth and of standard shape finished in gel coat. All necessary fixture and fastening shall be fixed where wooden pieces are provided.

**Workmanship:**

Frame shall be fixed in masonry/R.C.C member. Shutter shall be fixed in true line; level and proper manner having 2.0 to 3.0 ply i.e. air space for smooth and easy working. Pull handles, Door stopper, Door stopper, bearing hinges & S.S self tapping Philips cross head special screws conforming to anti corrosive high grade AISI 304 stainless steel of standard make or as equivalent approved by Engineer-in-charge conforming to anti corrosive high grade AISI 304 stainless steel only, & Tower bolt of the make Orbit or as equivalent approved by Engineer-in-charge conforming to standards of ORBIT & anti corrosive high grade AISI 304 stainless steel only.

All fixtures and fastenings of standard make shall conform to AISI 304 Grade Stainless Steel.

The following table presents main elements (forming the Chemical composition) of AISI 316 Grade Stainless Steel.

- It can withstand the corrosion caused by atmospheric / environmental or major chemical reactions.
- It can resist high temperatures without going under any deformity which makes it highly recommended for fire safety doors in any building.
- It shall have remarkable creep strength and Rupture strength.
- It shall be repelled the Bacteria & shall be made higher degree of hygiene.
- It shall be of natural finish, it shall not required regular cleaning or maintenance making it most suitable for public places.
- It shall tolerate forceful and intense use.
- Specially developed fixing stud and grubs shall be used to ensure accurate fitting of elements and eliminates shaking of elements.

#### Fixtures & Fastenings:

Following fixtures and fastening shall be used for single shutter. All fixtures and fastening of the make shall be of anti corrosive high grade AISI 304 stainless steel in Glossy & satin combination finish only. Fixtures and fastening of standard make shall be fixed by skill person only.

The rate shall include anti corrosive high grade AISI 304 stainless pull handle, hinges, door stopper in Glossy & satin combination finish of the standard make including fixing with S.S self tapping Philips cross head special screws and Stainless steel tower bolt of the make Orbit. The size and number of hinges shall be as per table given above  $\pm 1.50$  mm tolerance will be allowed in thickness of shutter and  $\pm 1.20$  to 2.00 mm for size of frame.

#### Mode of measurements & payment:

The rate for shutter includes cost of anti corrosive high grade AISI 304 stainless pull handle, Door stopper, hinges, S.S self tapping Philips cross head special screws in Glossy & satin combination finish of standard make, tower bolt of the make orbit. The dimensions of the door shall be measured clear size of the opening made for fixing of door with frame.

The rate shall be for a unit of one sq. metre.

#### **Item No.16**

**Cement Plaster 12 mm thick using Cement:Mortar in proportion 1:3 with Niru Finishing curing, etc. or white cement puti as per engineer instruction etc. complete**

##### **Material:**

Water shall confirm to M-1.

Cement Mortar shall confirm to M-11

##### **Workmanship:**

12 mm thick cement plaster in single coat in CM 1:3 (1-cement : 3-sand) with a floating coat of neat cement slurry.

##### **Scaffolding:**

Wooden bullies, bamboos, planks, treatles and other scaffolding shall be sound. These shall be proper examined before erection and use. Stage scaffolding shall be provided for ceiling plaster which shall be independent of the walls.

This kind of Plaster is normally for interior side or as specified location by Consultant to be applied as above. NORMAL CEMENT PLASTER and the surface shall be rubbed smooth after coating it with a thick coat of pure Portland cement

slurry while the base coat is still fresh. If Neeru plus cement finish is specified floating with neat cement will not be required.

**Mode of Measurement & Payment:**

The rate shall include the cost of all materials labour and scaffolding etc. involved in the operations described under workmanship.

All plaster shall be measured in square meter unless otherwise specified length, breadth or height shall be measured correct to a centimeter.

Thickness of the plaster shall be exclusive of the thickness of the key i.e. grooves 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 this surface.

This item includes plastering up to floor two level.

The measurement of wall plastering shall be taken between the walls or partition (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.

Soffits of stairs shall be measured as plastering on ceilings. Elowigns soffits shall be measured separately.

For jambs, soffits, sides, etc. for openings not exceeding 0.5 sq.mt. each in area for ends of joints, beams, posts girders, steps etc. not exceeding 0.5 sq.mt. each in area and for openings exceeding 0.5 sq.mt. and not exceeding 3.00 sq.mt. in each area deductions and additions shall be made in the following manner:

- a) No deductions shall be made for ends of joints, beams, posts etc. and openings not exceeding 0.5 sq.mt. each and no addition shall be made for reverse, jambs, soffits, side etc. of these openings, for finish to plaster around ends of joints, beams, posts etc.
- b) Deductions for openings exceeding 0.5 sq.mt. but not exceeding 3.00 sq.mt. each shall be made as following and no addition shall be made for reverse, joints, soffits, sides, etc. of these openings.
  - i) When both faces of all walls are plastered with same plaster. Deductions shall be made for one face only.
  - ii)
    - For openings having door squares equal to or projecting beyond the thickness of wall. Full deduction for opening shall be made from each plastered face of the wall.
    - In case of openings of area above 3 dq.mt. each deduction shall be made for opening but Jambs, soffits and slits shall be measured.
    - The rate shall be for a unit of square meter.

**Item No.17 :**

**Decorative Malhar Plaster Work of 8mm thick in proportion of 1:1.5 as specification and design with Groove and Base Coat 15mm thick in proportion of 1:3**

External Sand Faced Plastering with groove and patta as per given drawing detail etc. of 5 to 10, 10 to 15 cm thick in two coats on brick, concrete, parapet wall for exterior plastering of 12 mm thick backing coat in C.M. 1 :3 (1 Cement : 3 Sand) and 8 mm thick finishing coat of C.M. 1:2 (1 Cement : 2 Sand) and sponge the

surface to obtain an even and granular surface including curing etc. complete as directed by engineer-in-charge / consultant.

The rate for Item No.25 shall be paid for a unit of one Square Meter.

### **Item No.18**

**20 mm. thick sand face cement plaster on walls and RCC structure up to height of 10 mt. 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 C.M. 1:2 (1 cement: 2 sand) etc. complete.**

#### **1.0. Materials**

1.1. Water shall confirm to M-1 . Cement mortar shall confirm to M-11.

#### **2.0 Workmanship**

2.1. The work shall be carded out in the coats. The backing coat (base coat) shall be 12 mm. thick in C.M. 1:3. 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 day, 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 C.M. 1:2 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. This item includes scaffolding cost.

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 measurements & payment**

3.1. The relevant specifications of the item shall be followed 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. metre.

### **Item No.19**

**Plastic Emulsion paint (two coats) (Asian Paint, ICI, Dulux, Nerolac, Berger, etc. of approved type (with prime coat):**

#### **Materials:**

The enamel paint shall satisfy in general requirements in specifications of oil paints. Enamel paint shall confirm to I S Latest edition.

#### **Workmanship:**

The materials required for work of painting work shall be obtained directly from approved manufacturer or approved dealer and brought to the site in maker's drum, bags etc. with seal unbroken.

All materials not in actual use shall be kept properly protected, lids of containers shall be kept closed and surface of paint in open or partially open containers covered with a thin layer of turpentine to prevent formation of skin. The materials which have become state or flat due to improper and long storage shall not be used. The paint shall be stirred thoroughly in its container before pouring into small containers. While applying also, the paint shall be continuously stirred in

smaller container. No left over paint shall be put back into store tins. When not in use, the containers shall be kept properly closed.

If for any reasons, thinning is necessary, the brand of thinner recommended by the manufacturer shall be used.

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 surfaces shall be thoroughly dry before painting work is started.

**Application of paint:**

Brushing operations are to be adjusted to the spreading capacity advised by the manufacturer of particular paint. 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 the surface hard for the first time over and then brushing alternately in opposite directions two or three times and then finally brushing lightly in a direction at right angels 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 of will constitute one coat.

Each coat shall be allowed to dry completely and lightly rubbed with very fine grade of san paper and loose partides brushed off before next coat is applied. Each coat shall vary slightly in shade and shall be got approved from the engineer-in-charge before next coat is started.

Each coat except the last coat shall be lightly rubbed down with sand paper of fine pumice stone and deared of dust before the next coat is applied. No hair marks from the brush or clogging of paint puddles in the corners of panels, angles of moulding etc. shall be left on the work.

Special care shall be taken while painting over bolts, nuts, rivets, overlaps etc. Approved best quality brushes shall be used.

**Mode of measurement and payment:**

The new steel and other metal surface shall be measured under this item.

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 meter.
- b) Areas shall be worked out to the nearest 0.01 meter.

No deductions shall be made for openings not exceeding 0.5 sq.m. each and no addition shall be made for painting to beddings, moulding, edges, jambs, soffits, sills etc of such opening.

In case of fabricated structural steel and iron work, priming coat of paint shall be included with fabrication. In case of trusses, if measured is sq.m compound griders, stanchions, lattices, girder and similar work, actual are shall be measured 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 site.

The different surfaces shall be grouped into one general item, areas of uneven surfaces being converted into equivalent plain areas in accordance with the table given as per Annexure-II for payment.

The rate is including priming coat.  
The rate shall be for a unit of one square meter.

**Item No.20**

**Apex Color work on Outer side of Wall (Two coats) (with Base Coat)**

**FINISHES**

**EXTENT AND INTENT**

The Contractor shall supply all materials, labour, tools, ladders, scaffolding and other equipment necessary for the completion and protection of all painting / finishing work. Painting & finishing, as herein specified shall be applied to all surfaces requiring painting / finishing throughout the interior and exterior of the buildings as given in the schedule of finishes or elsewhere. The painting / finishing shall be carried out by a specialist workers, approved by the Engineer-in-charge of RMC for this work.

**STORAGE**

Storage of materials to be used on the job shall be, only in a single place approved by the Engineer-in-charge of RMC for this work. Such storage place shall not be located within any of the buildings included in the contract.

**MATERIALS**

Materials used in the work shall be of manufacture approved by the Engineer-in-charge of RMC for this work, Ready mixed paints, varnishes, enamels, lacquers, stains, paste fillers, distempers and other materials must be delivered to the job site in the original containers, with the seals unbroken and labels intact. Each container shall give the manufacturer's name, type of paint, color of paint and instructions of reducing. Thinning shall be done only in accordance with directions & manufacturer's specification. Remove rejected materials immediately from the premises.

**SHADES**

All shades, as provided in the shade schedule, shall be approved by the Engineer-in-charge of RMC for this work. The Contractor shall as far as possible use pre-mixed manufacturer's shades and shall prepare sample of the shades selected and submit same for approval by the Engineer-in-charge of RMC for this work. No work is to proceed until the Engineer-in-charge of RMC for this work has given his approval, preferably in writing, of the shade samples.

**COMMENCEMENT OF WORK**

Painting / finishing shall not be started until the surfaces to be painted / finished are in a condition fit to receive painting / finishing and so certified by the Engineer-in-charge of RMC for this work.

Painting / finishing work shall be taken in hand only after all other civil work is completed.

Buildings where painting / finishing work is to commenced shall be thoroughly swept and cleaned up before commencement of painting / finishing.

**SCAFFOLDING**

Only double scaffolding having two sets of vertical supports shall be provided for all, painting / finishing work. The supports shall be tied together with horizontal pieces over which the scaffolding planks shall be fixed.

All the vertical and horizontal members of the scaffolding shall be placed sufficiently away from the surfaces to be painted to ensure proper and unobstructed application.

#### **WORKMANSHIP**

The workmanship shall be of the very best; all materials evenly spread and smoothly flowed as without running sags, using good quality tools, brushes, etc., as required. Only skilled painters / applicators shall be employed. A properly qualified foreman shall be constantly on the job whilst the work is proceeding. All surfaces to be painted / finished shall be cleaned free of all loose dirt and dust before painting / finishing is started. All work where a coat of material has been applied must be inspected and approved before application of the succeeding specified coat. Each undercoat shall be distinct shade of the approved color.

Before painting / finishing, remove hardware, accessories, plates and similar items or provide protection to all such items. Upon completion of each space, replace all fixtures removed. Remove doors if necessary to paint bottom edge. Use only skilled mechanics for the removal and replacement of above items.

#### **CONCEALED SURFACES**

All interior and exterior trim, door frames, doors, shelving, cabinet work shall be thoroughly and carefully back painted as all surfaces and edges which will be concealed when installed. Such surfaces shall be clean, dry, sanded and properly prepared to receive the paint. Tops, bottom and edges of doors shall be finished same as the rest of the door.

#### **PROTECT AND CLEAN**

The agency shall protect not only his own work at all times, but shall also protect all adjacent work and materials by suitable covering during progress of his work. Upon completion of his work, he shall remove all paint and varnish spots from floors, glass and other surfaces. Any defaced surfaces shall be cleaned and the original finish restored. He shall remove from the premises all rubbish and accumulated material and shall leave the work in clean, orderly and acceptable conditions.

### **10. PREPARATION OF SURFACES**

**PLASTER WORK:** Fill all holes, cracks and abrasions with plaster of paris / cement slurry as directed, properly prepared and applied and smoothed off to match adjoining surfaces. Do not use sand paper on plaster surfaces. Plaster shall be allowed to dry for at least 12 (twelve) weeks before the application of paint / finishes.

**STEEL AND IRON:** All surfaces shall be washed with mineral spirits to remove any dirt or grease before applying paint. Where rust or scale is present, it shall be wire brushed and sand papered clean. All cleaned surfaces shall be given one coat of approved phosphate before prime coat in accordance with the manufacturers' Instructions. Shop coats of paint that have become marred shall be cleaned off, wire brushed, and spot primed over the affected areas.

### **11. APPLICATION**

The paint shall be continuously stirred in the container so that its consistency is kept uniform throughout.

The painting / finishing shall be laid on evenly and smoothly by means of crossing and laying off, the latter in the direction of the grain of the wood. The crossing and laying off consists of covering the area with paint, brushing the surface hard for the first time and then brushing alternatively in opposite directions, 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.

Where so stipulated, the painting / finishing shall be carried out using spray machines suited for the nature and location of the work to be carried out. Only skilled and experienced workmen shall be employed for this class of work. Paints used shall be brought to the requisite consistency by adding a suitable thinner. Spraying shall be carried out only in dry conditions. No exterior painting / finishing shall be done in damp foggy or rainy weather. Surface to be painted shall be clean, dry, smooth and adequately protected from dampness. Each coat shall be applied in sufficient quantity to obtain complete coverage, shall be well brushed and evenly worked out over the entire surface and into all corners, angles and crevices allowed to thoroughly dry. Second coat shall be of suitable shade to match final color, and shall be approved by the Engineer-in-charge of RMC for this work before final coat is started. Allow at least 48 hours drying time between coats for interior and 7 days for exterior work, and if in the judgment of the Engineer-in-charge of RMC for this work more time is requested it shall be allowed. Finished surfaces shall be protected from dampness and dust until completely dry. Finished work shall be uniform of approved color, smooth and free from runs, sags, defective brushing and clogging. Make edges of paints adjoining materials of colors sharp and clean, without overlapping.

In order to achieve a superior finished surface, putty paste fillers shall be used on, all surfaces to be painted. To fill pores, dents, etc. The putty / paste fillers shall be approved quality and manufacture and shall be applied to the surface with a knife or other sharp edged tools after the priming coat as well as after each undercoat. The surface, after filling with putty / paste tiller, shall be rubbed down with fine sand paper and dusted off before the application of the subsequent coat.

Paste wood filler when set shall be wiped across the grains of the wood and then with the grain to secure a clean surface. Surface to be stained shall be covered with uniform coat of stain wiped off if required.

FINISH: The painted surfaces shall be finished to require texture. Matt finish shall be achieved by use of sponge rollers or stippling brushes as called for.

The rate shall be paid for a unit of one square meter basis.

#### **Item No.21**

**Providing and laying glazed tiles (1ST Quality) of 6 mm thick of approved quality of required size jointed with cement paste on 12 mm thick cement plaster 1:3 (1-cement3-Coarse sand) pointing white cement and jointed with white cement slurry**

#### **MATERIALS**

##### **Glazed Tiles**

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

Variation from the stated sizes, other than the thickness of tile shall be plus or minus 1.5 mm. The thickness of tile shall be 6 mm. Except as above the tiles shall conform to I.S. Latest edition.



**BEDDING**

The sub-grade 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 equal on it.

The Color 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 shall be no hard lumps that would interfere with the evenness of bedding. The base shall be cleared and well wetted. The mortar shall then be spread in thickness not less than 10mm at any place and average 12mm thickness. The proportion of the cement mortar shall be as specified in the item.

**FIXING TILES**

The tiles before laying shall be soaked in water for at least two hours. Neat grey cement grout at 3.3 Kg. / Cement / Sq. Mt. of honey like consistency shall be spread over the mortar bedding as directed. The edges of the tiles are 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 thin as possible in straight line or as per pattern.

The tiles shall not have staggered joints. The joints shall be true to centre line both ways. The Nahni trap coming in the flooring shall be so positioned that its grating shall replace only one tile as far as possible. Where full size tiles cannot be fixed, they 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 5mm and loose material removed. White cement shall be used for pointing the joints. After fixing the tile finally in an even plane the flooring shall be kept wet and allowed to nature undisturbed for 7 days.

**CLEANING**

The surplus cement grout that may have come out of the joints shall be cleared off before it sets. Once the floor has set, it shall be carefully washed, cleared by dilute acid and dried. Proper precaution and measures shall be taken to ensure that the tiles are not damaged many ways till the completion of the construction.

The rate for this item will be paid on one square meter basis.

**Item No.23:**

**Supply & Fixing of Polished Kota Stone steps and risers work of length 0.90 to 1.45 mtr and thickness 20-25 mm to be fixed in Lime:Mortar 1:2 and Cement slurry and as instructed**

**Item No.24:**

**Supply & Fixing of Polished of Kota Stone of required size & thickness as instructed to fixed in Platform / CupBoard etc**

**Item No.32:**

**Supply, Fixing & Polishing of Kota Stone work thickness 20-25 mm to be fixed in Lime:Mortar 1:2 and liquid Cement and as instructed**

**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 this item but not less than 20 mm at any place.
- 2.2. Bedding for the Kota stone slabs shall be of cement mortar 1:6 (1 cement : 6 coarse sand) of average thickness 20 mm. Sub grade shall be cleaned, wetted and mopped. Mortar of the specified mix and thickness shall be spread on an area sufficient to receive one kota stone slab. The slab shall then be washed clean before laying. It shall be laid on top 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 honey like consistency shall be applied. 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 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 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 stone 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 help 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 other fittings shall be made without any extra cost.
- 2.6. The kota stone for platform and c.b. shall be supplied and fixed with two side polished and the work shall have to be completed as per requirement and instructions of engineer in-charge.

## **3.0. Mode of measurements & payment**

- 3.1. The rate shall include the cost of all materials and labour involved in all the operations described above. The kota stone flooring shall be measured in square meters 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 for shall be for a unit of one sq. meter

**Item No.25:****Supply and fixing of Kota stone for urinal curtain**

The kota stone for urinal curtain shall have to be provided as per requirement and fitting and fixing work with necessary material shall have to be carried out as per the instructions of engineer in charge to his complete satisfaction  
The rate for this item will be paid on one square meter basis

**Item No.26:****Supplying and fixing aluminium frame 62.50 x 25 mm. size and 37.50 x 18mm size shutter with sliding frame 2-track of standard company etc. with 4-5mm Glass and anodising work ( All material must be branded & with all Fitting)**

Providing and fixing Aluminium work for doors, windows, ventilators and partitions with extruded built up standard tubular sections/ appropriate Z sections and other sections of approved make conforming to IS: 733 and IS : 1285, fixed with rawl plugs and screws or with fixing clips, or with expansion hold fasteners including necessary filling up of gaps at junctions, at top, bottom and sides with required PVC/neoprene felt etc. Aluminium sections shall be smooth, rust free, straight, mitred and jointed mechanically wherever required including deat angle, Aluminium snap beading for glazing / panelling, C.P. brass / stainless steel screws, S.S. Hinges & Handles etc all complete as per architectural drawings and the directions of Engineer-in-charge. (Glazing and panelling to be paid for separately): (Alu section of Hindalco or Jindal or other equivalent). All the Fixtures and accessories shall be of Dorma or other equivalent as directed by engineer in charge.

**Aluminium Sections:**

Aluminium sections used for fixed windows, ventilators, partitions, frame work & doors etc. shall be suitable for use to meet architectural designs to relevant works and shall be subject to approval of the Engineer-in-Charge for technical, structural, functional and visual considerations. The aluminium extruded sections shall conform to IS 733 and IS 1285 for chemical composition and mechanical properties. The stainless steel screws shall be of grade AISI 304. The permissible dimensional tolerances of the extruded sections shall be as per IS 6477 and shall be such as not to impair the proper and smooth functioning/operation and appearance of door and windows. Aluminium glazed doors, windows etc. shall be of sizes, sections and details as shown in the drawings. The details shown in the drawings may be varied slightly to suit the standards adopted by the manufacturers of the aluminium work, with the approval of Engineer-in-Charge. Before proceeding with any fabrication work, the contractor shall prepare and submit, complete fabrication and installation drawings for each type of glazing doors, windows, ventilators and partition etc. for the approval of the Engineer-in-Charge. If the sections are varied, the contractor shall obtain prior approval of Engineer-in- Charge and nothing extra shall be paid on this account.

**Anodising**

Standard aluminium extrusion sections are manufactured in various sizes and shapes in wide range of solid and hollow profiles with different functional shapes for architectural, structural glazing, curtain walls, doors, window & ventilators and various other purposes. The anodizing of these products is required to be done before the fabrication work by anodizing/electro coating plants which ensures uniform coating in uniform colour and shades. The extrusions are anodized up to 30 micron in different colours. The anodized extrusions are tested regularly under strict quality control adhering to Indian Standard.

It is mandatory that all aluminium members shall be wrapped with self adhesive non - taining PVC tape, approved by Engineer-in-Charge .

**Measurement:**

All the aluminium sections including snap beading fixed in place shall be measured in running meter along the outer periphery of composite section correct to a millimeter. The weight calculated on the basis of actual average (average of five samples) weight of composite section in kilogram correct to the second place of decimal shall be taken for payment. (Weight shall be taken after anodizing). The weight of cleat shall be added for payment. Neither any deduction nor anything extra shall be paid for skew cuts.

**Rate:**

The rate shall include the cost of all the materials like Alum sections, snap beading, Fixtyres, SS hinges, cylindrical lock, Handles, door stopper, labours involved in all the operations as described in nomenclature of item and particular specification.

**3.1.** The rate shall be for a unit of one sq. meter

**Item No.27 :**

**Collapsible Gate work :**

For this work, new steel channel of size 3.4" of 1.9 to 2.0 cm as well as strip of 3/4" x 3/16" shall be used. The gap between the two channel while the door is closed shall be maximum 10 cm as well as the joint of strip shall be revited. In the work of door, at the top and bottom on the track of size 1-1/2" x 3/8" the steel track of size 1.5 cm to 1/8" shall be fixed in the wall and the girder shall be fixed on it so as to get the door open/closed easily. The said gate shall be fixed in line level and plumb in the wall as per the instructions of the engineer-in-charge.

In the door, necessary handle, locking arrangement shall be done as per the instructions of the engineer-in-charge.

On completion of the work, first two coats of red lead shall be done and two coats of silver or as per the selection of shade of oil paint shall be done on it.

The rate for this work will be paid per square meter basis.

**Item No.28**

**Iron Work as per Instructions:**

All structural steel shall confirm to IS 266 - Latest edition. The steel shall be free from the defects mentioned in IS 226 (Latest edition) and shall have a smooth finish. The material shall be free from loose mill scale, rust, pits or other defects affecting the strength and durability. River bars shall confirm to IS 1148 Latest edition. When the steel is supplied by the contractor, test certificate of the manufacturer shall be obtained according to IS 226 Latest edition and other relevant Indian Standards. The design should be made as per the instructions of engineer-in-charge. The rate includes supplying and welding (along with labours), transportation and fixing in position of the steel work.

The rate shall be for a unit of one Kilogram.:

**Item No.29**

**Providing and fixing to wall ceiling and floor 4 kgs/Sq. CM. workings rigid PVC pipes of 160 mm outside diameter 6 inch, having ISI Mark, complete with special flange compression type fittings wall clips etc. including making good the wall/ceiling and floor. :**

1.1. The low density PVC pipe of specified diameter with 6 Kg/Sq. cm. working pressure shall conform to IS. latest edition. The specials and fittings required shall be of best quality.

**2.0. Workmanship**

2.1. The PVC. pipes of specified diameter shall be fixed as directed: Due to thermal expansion of rigid PVC 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 PVC; pipe should be undertaken after preparations are observed for their protection against direct sun rays and mechanical damage.

2.3. The rigid PVC. pipe lines should not be kept exposed above ground when it passes through public places, railway lines, road side and foot paths.

2.4. PVC.pipes shall be supported at the following intervals:

- 20 mm. dia. 500 mm.      - 25 mm. dia. 750 mm.      - 32 mm. dia 900 mm:

2.5. Close 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. PVC pipes shall be fixed with suitable C I 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 PVC care must be taken to avoid applying excessive cement to the inside of pipe sockets as any surplus cement cannot be wiped off after jointing. Empty solvent cement tins, brushes, rags, or paper unregnated with cement should not be buried in the trenches. They should be gathered not left scattered about, as 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.

**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 of packings etc.

3.2. The length shall be measured on running meter basis of finished work. The length shall be taken along the centre line of the pipe and fittings. The pipes fixed to walls, ceiling; floors etc. shall be measured and paid under this item.

3.3. All the work shall be measured in decimal system as fixed in its place, subject to tolerance given below unless otherwise stated.

(i) Dimension shall be measured to the nearest 0.01 metre.

- (ii) Area shall be worked out to the nearest 0.01 sq. meter
- 3.4 All measurements of cutting shall unless otherwise stated be 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 galvanized steel tubing with screwed socket joints, together with all fittings (such as bends, sockets, springs, elbows, tees, crosses, short pieces, clamps and plugs unions etc.) and fixing complete with clamping wall-hooks, wooden plugs etc. and also cutting, 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 cutting through walls, floors etc. and their making good and painting exposed threads with anti-corrosive paint as above and testing. Where tubes are to be fixed to wall, ceiling and flooring, 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 meter.

**Item No.30:**

**European type w/c with seat, cover fixing with comp. standard quality**

**1.0 Materials:**

- 1.1. Water closet squatting pan (European 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 & payment**

- 3.1. The rate shall include the cost of all materials and labours 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.

**Item No.31:**

**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 fittings, vitreous china flat back wash basin 560 mm. x 410 mm in white colour.**

**1.0: Materials :**

- 1.1. The white glazed earthenware wash basin shall be 560 mm. x 410 mm. of 1<sup>st</sup> quality and make as approved by the Engineer-in-charge. The wash basin shall conform to M-59 .

**2.0. Workmanship :**

- 2.1. The wash basin shall be fixed on the wall as and where directed. The wash basin shall be supported on a pair of R.S. or C.I. brackets fixed in C.M.1:3. (1 cement : 3 sand). The bracket shall conform to I.S. : latest edition. The wall plaster on the rear shall be cut to rest the 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 suitably bent towards the wall and which shall discharge into an open drain leading to a gully trap. or direct in to 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; CP Grass waste trap waste pipe, stop cock, chain with rubber plug etc. shall be fixed.
- 2.6. The payment of fittings shall be made separately under separate items.
- 3.0: Mode of measurements & payment**
- 3.1. The rate includes cost of all labour, materials, tools and plant etc. required for satisfactory completion of this item as specified in workmanship.
- 3.2. The rate shall be for a unit of One number.

**Item No.33**

**Providing and fixing Overhead Water Tanks "Sintex" or equivalent of 2000 Litres capacity with all necessary plumbing fittings etc. comp. as directed by Engineer-in-charge.**

**(A) MATERIALS AND WORKMANSHIP :**

Overhead water tanks "Sintex" or equivalent of cylindrical vertical tanks with closed top with of self-supported type having approved grade of polyethylene, molded to seamless and suitable for potable water tank of capacity as mentioned in Schedule-B as per company's dimensions provided with G.I. fittings of size 25mm Dia for inlet, outlet, overflow and scour connections and float valves etc. complete placed with all fittings fixing as directed by engineer in charge.

The rate for this work will be paid per number basis.

**Item No.34 :**

**Providing, fabricating, erecting and placing in position stainless steel pipe(304 grade) including cutting welding and bolting wherever necessary including accessories fixing hardware. All welded joints to be griended and cleaned and finished as satin finish including buffing. All ss to 304 grade**

The steel railing work at site is to be carried out of required size and design by providing required material supply, fitting and fixing, cutting, welding, primer and paint work of approved quality (two coats) complete as per instructions of engineer in charge. The pattern of steel railing shall be as approved by the engineer in charge.

The galvanized pipe to be used in the work should be 40 mm dia of Class-B. The Channel should be 100 X 50 X 5 mm and the interval gaps should be 1.82 to 2.40 mt. The fitting of pipe should be done in three rows.

Fabricating, erecting and placing in position stainless steel pipe(304 grade) including cutting welding and bolting wherever necessary including accessories fixing hardware. All welded joints to be griended and cleaned and finished as satin finish including buffing. All ss to 304 grade

The rate shall be for a unit of one Running Meter

**Item No.35**

**Supply & Fixing of 60 mm M-30 Grade cement concrete rubber mold paving inter locking paving block (Grey colour) after bedding of black stone powder in line and CC on the edge in proportion of 1:2:4 with curing etc. complete**

**Scope work:**

The scope of work includes supplying and lying of precast paver blocks at site, as mentioned in the Item. Laying of **ISI Mark** paver blocks at site as per requirement in technical specification, within shortest possible time. The site is public place hence care should be taken to ensure that the routine activities shall not be disturbed. The job of laying may required to be carried out during night also. The work shall be executed in perfect line and level as per instructions of Engineer in charge. Colored concrete paver blocks shall be manufactured as per specifications using approved color pigment. The color shade shall be as selected by employer before commencement of the work. The contractor shall guarantee that all material and components designed, fabricated, supplied and laid by him shall be free from any type of defect due to faulty material and/Workmanship/erection For a period of One year from the date of completion of work.

## 1.0 MATERIALS

## 1.1 Cement and Cement Admixtures

## 1.2 Aggregates

## 1.2.1 Coarse Aggregates

**1.2.1.1** Coarse aggregates shall comply with the requirements. As far as possible crushed semi-crushed aggregates shall be used. For ensuring adequate durability, the aggregate used for production of blocks shall be sound and free of soft or honeycombed particles.

1.2.1.2 Other types of aggregates such as slag and crushed, over-burnt brick or tile which maybe found suitable with regard to strength, durability of concrete and freedom from harmful effects may be used in preparation of concrete for production of paver blocks. However such aggregates shall



not contain more than 0.5 percent of sulphates as SO<sub>2</sub> and shall not absorb more than 2 percent of their own mass of water.

1.2.1.3 Heavy weight aggregates or light weight aggregates such as bloated clay aggregates and sintered fly ash aggregates may also be used provided the purchaser is satisfied with the data on the properties of concrete made with them.

1.2.1.4 The nominal maximum size of coarse aggregates used in production of paver blocks shall be 12 mm.

1.2.2 ***Fine Aggregates***

Fine aggregates shall conform to the requirements. Both river/quarry sand and stone dust meeting the requirements can be used.

1.3 **Admixtures**

Admixtures: Previous experience with and data on such materials should be considered in relation to the specified standards of mechanization, supervision and workmanship in production of blocks. They may be added for specific requirements without affecting other quality parameters.

1.4 **Pigments**

1.4.1 Synthetic or natural pigments may be used in concrete mix to obtain paver blocks with desired shades of colours. The pigment used should result in durable colours of paver blocks. It shall not contain matters detrimental to concrete. Pigments, either singly or in combination, conforming to the following Indian Standards may preferably be used:

<b><i>Pigments</i></b>	<b><i>Relevant Indian Standard</i></b>
Black or Red or Brown pigment	IS 44
Green pigment	IS 54
Blue pigment or	IS 55 IS 56
White pigment	IS 411
Yellow pigment	IS 50

Pigment quantity to be restricted to a maximum of 9 percent by weight of cement content. The pigment should be finer than the cement (Fineness value between 2-15 m<sup>2</sup>/kg).

1.4.2 The pigments shall not contain zinc compounds or organic dyes.

1.4.3 Lead pigments shall not be used unless otherwise specified by the purchaser.

1.5 **Water**

The water used in production of paving blocks shall conform to the requirements specified.

## 2 PHYSICAL REQUIREMENTS

### 2.1 General

- 2.1.1 The physical requirements of paver blocks are categorized into two groups, namely:
- a) Obligatory requirements shall be for ensuring durability of pavements constructed with paver blocks as well as obtaining better levels of service in block paving work, and
  - b) Optional requirements shall be as per the specific demands of the purchaser. These are described in 6.2 and 6.3.
- 2.1.2 All paver blocks shall be sound and free of cracks or other visual defects which will interfere with the proper paving of the unit or impair the strength or performance of the pavement constructed with the paver blocks.
- 2.1.3 When two layer paver blocks are manufactured there shall be proper bonding between the layers. Delamination between the layers shall not be permitted. The compressive strength of the two layer blocks shall meet the specified requirements.
- 2.1.4 When paver blocks with false joints, surface reliefs or projections are supplied, the same shall be specified. Also, the surface features shall be well formed and be devoid of any defects.

### 2.2 Obligatory Requirements

#### 2.2.1 *Visual Inspection*

Visual inspection of quality of paver blocks shall be carried out in natural daylight, prior to the tests for other properties. The inspection shall be conducted by the purchaser and the manufacturer jointly at a location agreed to between them, normally at the site or factory. Visual inspection shall be conducted as per 7.1.

NOTE— When efflorescence occurs and it is not deleterious to the performance of the blocks in use and is not considered significant.

#### 2.2.2 *Dimensions and Tolerances*

2.2.2.1 The recommended dimensions and tolerances for paver blocks, measured as per the method in Annex B, are given in Table 2. Minimum block thickness shall be 50 mm and maximum 120 mm. The thicknesses 60 mm, 80 mm, 100 mm and 120 mm will be considered as standard thicknesses under this specification.

2.2.2.2 All blocks manufactured to meet this specification shall have arris/chamfer as per the dimensions and tolerances given in Table 2.

#### 2.2.3 *Thickness of Wearing Layer*

When paver blocks are manufactured in two layers, the wearing layer shall have minimum thickness as specified in Table 2. The thickness of the wearing layer shall be measured at several points along the periphery of the paver blocks. The arithmetic mean of the lowest two values shall be the minimum thickness of the wearing layer.

#### 2.2.4 *Water Absorption*

The water absorption, being the average of three units, when determined in the manner described in Annex C, shall not be more than 6 per cent by

mass and in individual samples, the water absorption should be restricted to 7-percent.

## 2.2.5

### **Compressive Strength**

#### 2.2.5.1

Compressive strength of paver blocks shall be determined as per the method given in Annex D. Paver block strength shall be specified in terms of 28 days compressive strength. In case the compressive strength of paver blocks is determined for ages other than 28 days, the actual age at testing shall be reported. The average 28 days compressive strength of paver blocks shall meet the specified requirement. Individual paver block strength shall not be less than 85 percent of the specified strength. In case blocks of age less than 28 days are permitted to be supplied, correlation between 28 days strength and the strength at specified age for identified batch/mix of blocks shall be established.

#### 2.2.5.2

The specified average 28 days compressive strengths of different grades of paver blocks are given in Table 3 and the minimum specified strengths of individual paver blocks are given in 6.2.5.1.

Table 2 Recommended Dimensions and Tolerance for paver Blocks  
(Clauses 6.2.2.1, 6.2.2.2, 6.2.3 and 9.1.2)

Sr No	Dimensions	Measurement method, Ref. to	Recommended Values	Tolerance limit for paver block	
				Thickness < 100 mm	Thickness ≥ 100 mm
1	2	3	4	5	6
i)	Width, W	Annex-B	To be specified by manufacturer	± 2 mm	± 3 mm
ii)	Length, L	Annex-B	To be specified by manufacturer	± 2 mm	± 3 mm
iii)	Thickness, T	Annex-B	50 to 120 mm	± 3 mm	± 4 mm
iv)	Aspect ratio (L/T)	Annex-B	Maximum : 4.0	+ 0.2	+ 0.2
v)	Arris/chamfer	Annex-B	Maximum : 5.0 Maximum : 7.0	± 1 mm	± 1 mm
vi)	Thickness of wearing layer	6.2.3	Maximum : 6.0	± 2 mm	± 2 mm
vii)	Plan area, $A_{SP}$	Annex-B	Maximum: 0.03 m <sup>2</sup>	+ 0.001 m <sup>2</sup>	+ 0.001 m <sup>2</sup>
viii)	Wearing face area, $A_{SW}$	Annex-B	Minimum 75 percent of Plan Area	-1 percent	-1 percent
ix)	Squareness	Annex-B	Nil	± 2 mm	± 3 mm

Table 3 Compressive Strength Requirements of Concrete Paver Blocks

(Clauses 6.2.5.2 and 9.1.4)

Sr.No.	Grade of paver blocks	Minimum average 28 days compressive strength N/mm <sup>2</sup>
1	2	3
i)	M-30	≥ $f_{ck} + 0.825 \times$ established standard deviation (rounded off to nearest 0.5 N/mm <sup>2</sup> )
ii)	M-35	
iii)	M-40	
iv)	M-50	

v)	M-55	
----	------	--

#### 2.2.6 **Abrasion Resistance**

The abrasion resistance of paver blocks should be determined as per the method given in Annex E. It may be specified the limits to the test results, which should be complied with by the manufacturer.

### 2.3 **Optional Requirements**

#### 2.3.1 **Tensile Splitting Strength**

The tensile splitting strength of paver blocks should be determined as per the method given in Annex F. When required by the purchaser, the test values for tensile splitting strength of paver blocks may be specified by the manufacturer.

#### 2.3.2 **Flexural Strength/Breaking Load**

The flexural strength/breaking load of paver blocks should be determined as per the method given in Annex G. When required by the purchaser, the test values for flexural strength breaking load of paver blocks may be specified by the manufacturer.

#### 2.3.4 **Colour and Texture**

When required, the colour and texture of paver blocks should be mutually agreed to between the purchaser and the manufacturer.

### 3 TEST METHODS

3.1 Visual inspection shall be conducted by first examining each paver block from a sample lot for any elimination. The blocks shall then be laid out on a level floor in any desired paving pattern, approximately covering a square area of 1m<sup>2</sup>. Any visual defects of paver blocks, including cracks and flaking, shall be recorded by observing the paved blocks from a distance of approximately 2 m from each edge of the paved area. The texture and colour of the paver blocks shall be compared with the manufacturer's tie samples supplies earlier to the purchaser.

3.2 Tests other than for visual aspects shall be carried out in a laboratory agreed to between the purchaser and the manufacturer. Wherever applicable, calibrated equipment shall be used for tests.

3.3 Compliance with the obligatory physical requirements laid down in 6.2 shall be ensured by conducting tests as described in Annexes B to E.

Compliance with optional physical requirements laid down in 6.3 shall be ensured by conducting tests as described in Annexes F to H.

3.4 Unless otherwise specified in the enquiry or order, the cost of the tests shall be borne as follows:

### 4 SAMPLING

4.1 The paver blocks selected for testing shall be representative of the consignment, the points of selection being evenly distributed through the consignment.

4.2 The number of blocks to be sampled from each batch for each test shall be as given in Table 4.

**Table 4 Sampling Requirements**  
(Clause 8.5)

Sr No	Property	Requirement Ref to C 1 No.	Test method Ref to	Number of paver blocks for test	
				Quality assurance by Third Party	Quality assurance by Manufacturer / Purchaser
1	2	3	4	5	6
i)	Visual Inspection	6.2.1	7.1	8 <sup>2)</sup>	4(16) <sup>2)</sup>

ii)	Dimensions	6.2.2	Annex B	8 <sup>2)</sup>	4(16) <sup>2)</sup>
ii)	Thickness of wearing layer <sup>3)</sup>	6.2.3	6.2.3.	8 <sup>2)</sup>	4(16) <sup>2)</sup>
iv)	Water absorption	6.2.4	Annex C	3	3
v)	Compressive strength	6.2.5	Annex D	8	4(16)
vi)	Tensile splitting strength	6.3.1	Annex E	8	4(16)
vii)	Flexural strength / breaking load	6.3.2	Annex F	8	4(16)
viii)	Abrasion resistance	6.2.6	Annex G	8	4(16)

1) The number within brackets is the number to be sampled to avoid secondary sampling from the batch if on -the basis of the conformity criteria, additional blocks are required to be tested to assess conformity.

2) These blocks may be used for subsequent test.%

4.6 The sample paver blocks shall be marked for future identification of the consignment it represents. The block shall be kept under cover and protected from extreme conditions of temperature, relative humidity and wind till they are required for test. The test shall be undertaken as soon as practicable after the sample has been taken.

## 5 ACCEPTANCE CRITERIA

### 5.1 **Obligatory Requirements**

5.1.1 The lot shall be considered as conforming to the requirements of this specification if the conditions mentioned in 9.1.2 to 9.1.4 are satisfied.

5.1.2 The sampled blocks tested for dimensions, aspect ratio, chamfer, plan area, wearing face area, deviation from squareness, and, in the case of two layer blocks, thickness of wearing layer shall meet the tolerance limit specified in Table 2. Blocks with visual defects with sample lot shall not be more than three.

5.1.3 For water absorption, the mean value of 3 samples determined shall be not more than the maximum limit specified in 6.2.4.

5.1.4 The 28 days compressive strengths and tolerance of 8 numbers of paver blocks manufactured as per the grades of paver blocks recommended in Table 1 shall be as given in Table 3.

### 5.2 **Optional Requirements**

Acceptance criteria for optional requirements shall be as per mutual agreement by the purchaser and manufacturer.

Care should be taken to see that single sized sands with excessive amount of fines or plastic fines should not be used. The shape of sand particles should preferably be sharp rather than rounded. Since the sharp possess higher strength and resist the migration of sand from under the block to less frequently trafficked areas. Even though sharp sands are relatively more difficult to compact than rounded sands, the use of sharp sands should be preferred for the more heavily trafficked pavements. The beddings and should be free of deleterious materials.

If necessary to restrict fines (silt and/or clay) to 10 percent, since excessive fines make joint filling very difficult. Similarly, it is not advisable to use cement in the joint filling sand which will not only make it difficult to completely fill the joints but would also adversely affect the desired flexibility characteristics of the paving block layer. The joint filling sand should be as dry as possible; otherwise complete filling of joints will be difficult. To overcome the problem of efflorescence on the surface of paving block layer, the joint filling sand should be washed to remove soluble salts.

Preparation of Subgrade: This is the foundation layer on which the block pavement is constructed. The prepared subgrade should be graded and trimmed to a tolerance of  $\pm 20$  mm of the design levels, and its surface evenness should have a tolerance of within 15 mm under a 3 m straight edge.

Placing and screeding of bedding sand:

The thickness of the sand bed after compaction should be in the range of 20-40 mm, whereas, in the loose form it can be 25 to 50 mm. It is preferable to restrict the compacted thickness to 20-25 mm to reduce the risk of any localized precompaction, which would affect the final block surface level. Bedding sand should not be used to fill up local depressions on the surface of a base or sub base. The depressions should be repaired in advance before placing sand.

Sand to be used should be uniformly in loose condition and should have a uniform moisture content. Best moisture content is that when sand is neither too wet nor too dry and have a value of 6 to 8 percent. Requirement of sand for a day's work should be prepared and stored in advance and covered with tarpaulin or polythene sheets.

The processed sand is spread with the help of screed boards to the required thickness. The screed boards are provided with nails at 2-3 m apart which when dragged gives the desired thickness. The length of nail should take into account the surcharge to be provided in the uncompacted thickness. Alternatively, the screed can be dragged on edge strips kept on both sides as guide. The sand is subsequently compacted with plate vibrators weighing 0.6 tonnes or more. Level checks shall be carried out on a grid pattern to establish that the desired level is achieved. Local correction can be done either by removing or adding extra sand followed by levelling and compacting the layer. There will be some settlement of sand after the blocks are placed and compacted, which must be allowed for, while fixing the level of sand bed.

The blocks will settle after trafficking in such a manner that the surface profile becomes parallel to base / sub base profile. Sand bed assumes uniform thickness under moving loads.

Laying of Blocks:

Blocks can be laid generally by manual labour but mechanical aids like hand-pushed trolleys can expedite the work.

Normally, laying should commence from the edge strip and proceed towards the inner side. When dentated blocks are used, the laying done at two fronts will create problem for matching joints in the middle. Hence, as far as possible, laying should proceed in one direction only, along the entire width of the area to be paved.

While locating the starting line, the following should be considered:

- On a sloping site, start from the lowest point and proceed uphill on a continuous basis to avoid downhill creep in complete areas.
- In case of irregular shaped edge restraints or strip, it is better to start from straight string line.
- Influence of alignment of edge restraints on achieving and maintaining laying bond

Compaction:

For compaction of the bedding sand and the blocks laid over it, vibratory plate compactors are used over the laid paving units; at least two passes of the vibratory plate compactor are needed. Such vibratory compaction should be continued till the top of each paving block is level with its adjacent blocks. It is

not good practice to leave compaction till end of the day, as some blocks may move under construction traffic, resulting in the widening of joints and corners contact of blocks, which may cause spalling or cracking of blocks. There should be minimal delay in compaction after laying of the paving blocks to achieve uniformity of compaction and retention of the pattern of layer; however, compaction should not proceed closer than 1 m from the laying face exception after completion of the pavement.

During the vibratory compaction of the laid blocks, some amount of bedding sand will work its way into the joints between them; the extent sand getting worked up in to the joints will depend on the degree of pre-compaction of sand and the force applied by the block compactor. Standard compactors may have a weight of about 90 kg, plate area of about 0.3 m<sup>2</sup> and apply a centrifugal force of about 15 kN, while heavy duty compactors may weigh 300-600 kg, have a plate area of about 0.5-0.6 m<sup>2</sup> and apply a centrifugal force of 30-65 kN. Where the bedding sand has been pre-compacted and for heavily trafficked block pavements, heavy duty compactors should be used. After compaction by vibratory plate compactors, some 2 to 6 passes of a vibratory roller (with rubber coated drums or those of static weight less than 4 tonnes and nominal amplitude of not more than 0.6 mm) will further help in compaction of bedding sand and joint filling.

#### Joint Filling:

The importance of complete joint filling cannot be over-emphasised. Unfilled or partially filled joints allow blocks to deflect, leading to loose blocks possibly spalling the edges and a locally disturbing bedding sand layer.

After the compaction of the bedding sand has been completed (and some bedding sand has been forced up in the joints between blocks) the joints should be completely filled with sand meeting the desired specifications. The joint filling sand should be stockpiled at suitable locations for convenience. There should be minimum delay in joint filling the process should in any case, be completed by the end of the day's work.

The operation of joint filling comprise of spreading a thin layer of the joint filling sand on the block surface and working the sand into each joint by brooming. Following this, a few passes of heavy plate compactor are applied to facilitate fine sand to fill the joints. The sand should be broomed or spread over the surface with a small surcharge.

Dry sand and dry blocks are best for the filling of joint, as damp sand tends to stick at the very top of the joints; also, if the blocks is wet and the sand dry, the sand will again stick at the joint top. Hence, if either the blocks or sand are wet, one may get a false impression of the joints being full, but the next rain will reveal that they are actually hollow. If the weather does not allow sand and blocks to be dry, the joint filling sand should be washed in by light sprinkling of water. In this case, several cycles of application of sand, water sprinkling and plate compaction will be necessary to completely fill the joints.

#### Opening of Traffic:

Until all the joints are completely filled, no traffic should be permitted over the block pavement. In case of lime or cement treated layers in the pavement, it must be ensured that these are given at least 14 to 7 days respectively to cure, before traffic is permitted. The block pavement should be inspected frequently, to ensure that any incompletely filled joints, exposed by traffic and / or weather are promptly filled. Such frequent inspection should be continued till dust and detritus from the roadway tightens the surface of the joints.

Laying and Surface Tolerance:

While the laying, the surface tolerance, given below may be observed:

Layer / Item	Tolerance
Subgrade	+0, -25 mm of nominated level
Select Subgrade / Sub-base	+0, -20 mm of nominated level
Base course	+0, -10 mm of nominated level 10 mm deviation from a 3 m straight edge
Plan deviation: from any 3 m line from any 10 m line	10 mm (Maximum) 20 mm (Maximum)
Vertical deviation from 3 m line at kerbs intrusions, channels, edge restraints elsewhere	+ 3 mm, -0 mm
Maximum difference in surface level between adjacent paving units.	+ 10 mm, -15 mm
Deviation of finished surface level from designated level	+ 10 mm, -15 mm
Joint width range	2 mm to 4 mm
Percentage of joints outside range	10% max. along 10 m line
Nominal joint width	3 mm

Laying of concrete paving blocks:

Laying of the blocks shall be done, precisely at the indicated level and profile and in a way that a good surface draining to the gulley chambers is assured.

Around gulley chambers and inspection pits the pavement shall have a level of 5 mm higher than the above mentioned elements.

The blocks shall be laid to the pattern directed by the Engineer or the pattern recommended by the designer. The blocks shall be laid as tight as possible to each other. The maximum joint width shall be limited to 4 mm

Laying of broken blocks is not allowed except along connections or edges. The maximum length of a purpose broken block is 100 mm. Breaking of the blocks shall be done with a "block splitter" or a mechanical saw.

Fine angular sand as per specification shall be brushed into the joints, and thereafter compaction shall be done with a vibrating plate compactor on a clean surface. After compaction, again fine angular sand shall be brushed in to the joints.

Field Laboratory Tests:

Necessary field / laboratory tests shall be carried out by the contractor while executing the work at his own cost.

The field / laboratory tests may be conducted in an Engineering College / approved technical institution as directed by the engineer in charge.

The agency shall have to carry out the testing for paving block at Government approved laboratory at his own cost and submit the test report to this office or other relevant provisions of IS:15658-2006 shall apply. The agency shall have to carry out the testing of paving blocks as per the instructions and in the presence of the engineer-in-charge.



**Item No.36****Supplying, Cutting, Bedding, Binding and Hooking and binding with wire for RCC work Tor steel TMT round bar including all cost****1:0. Materials**

- 1.11. TMT bars of Fe-415 should be used which shall confirm to M-19. Mild steel binding wires shall confirm to M-21 .

**2.0. Workmanship**

- 2.1. The work shall consist 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 confirm accurate to the dimensions given in the bar bending schedules shown an relevant drawings. Bars shall be bent cold to specified shape and dimensions or as directed, using a proper bar bender, operated by hand or power to attain proper radius of bends. Bars shall not be bent or straightened in a manner that will the material. Bars bent during transport or, handing 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 then twice 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 extend to the surface of concrete, except where shown on drawings. Placing bars on, layers of freshly laid concrete as the work progresses fro adjusting bar spacing shall not be allowed. Pieces of broken stone or brick and wooden blocks shall not be used. Layers of bars shall be separated by spacer bars, precast mortar bricks. or their 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 projecting from concrete and to which other bars are to be spliced and which are, likely to be exposed for a period 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 1.25 times the maximum size of the coarse aggregate whichever is greater by concrete between them. Where not feasible, overlapping bars shall be bound with

annealed wires 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 nor bending moment is maximum.

- 2.7. Whenever indicated on the drawings or desired by the Engineer-in-charge, bars shall be joined by couplings which shall have a cross-section sufficient to transmit the full stresses of bars. The ends of the bars that are joined by coupling shall be upset for sufficient length so that the effective cross section at the base of threads is not less than the normal cross-section of the bar. Threads shall be standard threads: Steel for coupling shall conform to I.S.226 (Latest edition)
- 2.8. When permitted or specified on the drawing's joints of reinforcement bars shall be butt-welded so as to transmit their full stresses. Welded joints shall preferably be located at points where steel will not be subject to more than 75 percent of the maximum permissible stresses and welds shall be staggered so that at any one section not more than 20 percent of the rods are welded. Only electric arc welding using a process which excludes air from the molten metal and conforms to any or all other special provisions for the work shall be accepted. Suitable means shall be provided for holding bars securely in position during welding. It shall be ensured that no voids are left in welding and when welding is done in two or three stages, previous surface shall be cleaned properly. Ends of the bars shall be cleaned of all loose scale, rust, grease, paint and other foreign matter before welding. Only competent welders shall be employed on the work. The M.S. electrodes used for welding shall conform to I.S. 814 (Latest edition). 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 & payment
  - 3.1. 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, 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 tonnes on the same basis as per M-18 even though steel is supplied, to the contractor by the department on actual weight. Length shall include hooks at the ends. Wastage and annealed steel wire for binding shall not be measured and the cost of these items shall be deemed to be included in the rate for reinforcement.
  - 3.2. The rate for reinforcement includes cost of steel binding wires, its carting from Department 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.
  - 3.3. The rate shall be for a unit of One Kg.  
The testing of material is to be carried out at the cost of contractor.

**Item No.37 :**

**Making cupboard with 18mm plywood which 6mm ply back side, 0.8mm white lamination inner side, fixing approved quality sunmica, hinges, stoper etc. 18mm thick ply with both side lamination for selves. plywood brands - kitply, century, dura, everest**

The cupboard with 18 mm plywood with 6 mm ply on back side is to be provided and fixed with approved quality material as instructed. 0.8 mm white lamination inner side is to be fixed of approved quality sunmica with hinges, stopper, etc. Both side lamination for selves for 18 mm thick ply is to be done. The Plywood brand shall be Kitply, Century, Dura, Everest. The work as may be instructed by the Site Engineer shall have to be completed.

The rate shall be for a unit of one square meter basis.

**Item No.38 :**

**Making Table of wooden with sunmica sheet on both side with including all fittings & labour**

The wooden table shall have to prepared by providing all the required material of approved quality as per the requirement and instructions of engineer in charge. The size of the table shall be 1.37 X 0.75 X 0.75. The plywood requirement and other details for making the table is as under:

Plywood of 18 mm of approved quality and water proof ISI Mark : 56.00 Sq.Mt.

Plywood of 12 mm of approved quality and water proof ISI Mark : 24.00 Sq.Mt.

Plywood of 6 mm of approved quality and water proof ISI Mark : 32.00 Sq.Mt.

Sunmica 1 mm of approved quality 8'X4' size sheet 2 Nos.:

Wooden Dhoka for foot rest and front portion of box for placing the Key-Board

**Wooden Bidding patti as per requirement of 1" x 0.25" of 2" x 0.25"**

Steel Sliding channel of approved quality and make for drawers : 3 Nos.

Necessary Locks of approved quality : 3 Nos.

S S Handle as per instructions : 3 Nos.

Hinges of approved quality and size : 2 Nos.

Fevicol : 2 Kg

Nails, Screw, Magnet, Agrotape etc. as per requirement

Rickshaw Trip for bringing of materials - 1 Trip

Applying Oil Paint, Polishing, Astar, etc. for 1 Table including material and labour.

The whole work for preparation of table is to be carried out by providing all above and other necessary materials as may be required to complete the item as per requirement and instructions of engineer in charge to his satisfaction.

The rate will be paid for a unit of one square meter basis.

**Item No.39:**

**Supply & fixing FRP corrugated sheet for ceiling work (plain or corrugated) without iron work**

The sheets of size as per the requirement of site engineer shall be plain or corrugated sheets of specified in item. The Sheets shall conform to relevant I.S. The sheets shall be undamaged in carriage and handling either by rubbing off of zinc coating or otherwise they shall have dean and bright surface and shall be free from dents, holes, rust or white powdery deposit.

The length and width Of sheet shall be as directed as per site condition.

The whole fixing of G I sheets is to be carried out with necessary fitting / fixing fixture and as per requirement and instructions of site engineer.

The rate shall be for a unit of one square meter basis.

**Item No.40**

**Filling of Plinth with using excavated useful material partly and remaining murrum to be brought from out side in layer of 0.23 m thick including murrum and sprinkling of water, compaction etc. complete**

**1.0. Materials :**

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

**2.0. Workmanship :**

**2.1.** The murrum or selected soil shall be filled in foundation and plinth in 20 cms. layers including consolidating , ramming, watering, dressing etc. complete.

**3.0. Mode of measurement and payment:**

**3.1.** The relevant specifications of the item 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 required for filling in trenches and plinth.

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

**Item No.41**

**Dismantling of Cement Concrete of RCC**

**Item No.42**

**Dismantelling of Super Structure and disposing it in 90 mtr ead area**

1. The work shall consist of removing, as herein after set forth; existing culverts, bridges, pavement, kerbs and other structures like guards-rails, fences, utility poles, manholes, catch basins, inlets, etc. Which are in place but interfere with the new construction or are not suitable to remain in place and of salvaging and disposing of the resulting materials and back-filling the resulting trenches and pits.
2. Existing culverts, bridges, pavements and other structures which are within the highway and which are designated to be removed, shall be removed up to the limits and extent specified in the drawings or as indicated by the Engineer-in-charge.
3. Dismantling and removal operations shall be carried out with such equipment and in such a manner as to leave undisturbed, adjacent pavement, structures and other work to be left intact.
4. All operations necessary for the removal of any existing structure which might endanger new construction shall be completed prior to the start of new work.
5. The structures shall be dismantled carefully and the resulting materials so removed as not to cause any damage to the serviceable materials to be salvaged, the part of structure to be retained and any other properties or structures nearby.

6. Unless otherwise specified, the superstructure portion of culverts / bridges shall be entirely removed and other parts removed to below the ground level or as necessary depending upon the interference they cause to the new construction. Removal of overlying of adjacent material if required in connection with the dismantling of the structures shall be incidental to this item.
7. Where existing culverts / bridges are to be extended or otherwise incorporated in the new work only such part or parts of the existing structure shall be removed as are necessary to provide a proper connection to the new work. The connecting edges, shall be cut, chipped and trimmed to the required lines and grades without weakening or damaging any part of the structure to be retained. Reinforcing bars which are to be left in place so as to project into new work as dowels or ties shall not be injured during removal of concrete.
8. Pipe culverts shall be carefully removed in such a manner as to avoid damage to the pipes.
9. Steel structures shall unless otherwise provided be carefully dismantled in such a manner as to avoid damage to members thereof. If specified in the drawing or directed by the Engineer-in-charge that structure is to be removed in a condition suitable for re-erection, all members shall be match marked by the contractor with white lead paint before dismantling. End pins, nuts, loose, plates, etc. shall be similarly marked to indicate their proper location. All pins, pin holes and machined surfaces shall be painted with a mixture of white lead and tallow and loose parts shall be securely wired to adjacent members or packed in boxes.
10. Timber structures shall be removed in such a manner as to avoid damages to such timber or lumber as is designated by the Engineer-in-charge to be salvaged.
11. In removing pavements, kerbs, gutters, and other structures, like guard rails, fences, manholes, catch, basins, inlets etc. where portions of the existing construction are to be left in the finished work, the same shall be removed to an exiting joint or cut and chipped to a true line with a face perpendicular to the surface of the existing structure. Sufficient removal shall be made to provide for proper grades and corrections with the new work as directed by the Engineer-in-charge.
12. All concrete pavements base course in carriageway and shoulders etc. designated for removal shall be broken to pieces whose volumes shall not be exceed 0.02 cubic meter and, stockpiled at designated locations if the material is to be used later or otherwise arranged for disposal as directed.
13. Where directed by the engineer-in-charge holes and depressions caused by dismantling operations shall be backfilled with excavated or other approved material and thoroughly compacted in line with surrounding area.
14. All materials obtained by dismantling shall be the property of Government. Unless otherwise specified, materials having any salvage value shall be placed in neat stack of like material within the right-of-way as directed by the

Engineer-in-charge, for which contractor will remain responsible for its safe custody and preservation for 60 days after recording measurements of the salvaged material.

15. Pipe culverts that are removed shall be cleared and neatly piled on the right-of-way at points designated by the Engineer-in-charge.
16. Structural steel removed from old structure shall, unless otherwise specified or directed be stored in a neat and presentable manner on blocking in locations suitable for loading. Structures or portions thereof which are specified in the contract for re-erections shall be stored in separate piles.
17. Timber of lumber from old structures which is designated by the Engineer-in-charge as materials to be salvaged shall have all nuts and bolts removed from and shall be stored in neat piles in locations suitable for loading.
18. All the products of dismantling operations which in the opinion of the Engineer-in-charge cannot be used or auctioned shall be disposed as directed, within 100 meters.
19. The work of dismantling structure shall be paid for in units indicated below by taking measurement before and after, as applicable;
 

i)	Dismantling of RCC	Cubic Meter
ii)	Dismantling of Super Structure	Cubic Meter
20. The contract unit rates for the various items of dismantling shall be for payment in full for carrying out the required operations including full compensation for all labor, materials, tools equipment, safeguard and incidentals necessary to complete the work. These will also include excavation and backfilling where necessary and for handling, salvaging, piling and disposing of the dismantled material within all lifts and up to a lead of 90 meters.

#### **Item No.43**

##### **Removal of Excavated Stuff and Laying within the sites specified in Notification as directed by Engineer-in-Charge**

This item will not be executed and will not be paid, however, contractor shall have to carry out the work of Removal of Excavated Stuff and Laying within the sites specified in Notification as directed by Engineer-in-Charge

#### **Item No.44**

##### **Pebble dash plaster upto 10 m height above ground level with a mixture of washed pebble or crushed stone 6 mm to 12.5 mm nominal size, dashed over and including fresh plaster in two layers under layer 12 mm cement plaster 1:4 (1 cement : 4 coarse sand) and top layer 10 mm cement plaster with cement mortar 1:3 (1 cement : 3 fine sand) mixed with 10% finely ground hydrated lime by volume of cement**

The work is to be carried out as per requirement by providing all allied items as per the instructions of engineer in charge.

The rate will be paid for a unit of one square meter.

**Item No.45****Foundation filling in proportion of 1:2 - Filling of foundation with Lime:Mortar in proportion of 1:2 using Black Trap metal of size 4-9 cm****1.0. Materials:**

**1.1.** Water shall conform to M-1. Sand shall conform to M-6. Lime shall conform to M-2. Graded aggregated 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 foundations 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 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 layers 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 damp, protected from sun and rain till used-up, covering it by tarpauline 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 of 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 material and the mass is uniform in colour and consistency but in no case mixing shall be done for less than 2 to 3 minutes.

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.

**Mode of measurement and payment:**

The lime work shall be measured in length, breadth and depth as specified in drawing or as directed, correct upto largest centimetre and cubical content shall be worked out upto two places of decimals.

3 2. The rate shall be for a unit of one cubic metre.

Addl.A.E.  
R.M.C.

Dy.Ex. Engineer  
R.M.C.

Addl. City Engineer  
R.M.C.

Signature of Contractor:

## ELECTRIFICATION

### GENERAL

01. The work shall be carried out as per C.P.W.D. specifications of electrical works 1972 for internal E.I. the Indian electricity rule 1956 as amended up to date for such work, unless otherwise specified in writing by the O.O.W.
02. All materials should be of ISI mark/standard and of approved quality.
03. The run of the cables position of junction boxes, fittings etc. should be approved by the O.O.W. The layout of the above should be marked on the site and approved by the O.O.W. before actual execution.
04. Persons executing electrical work should have electrical license as required according to IE Ac.
05. The earthing should be done in presence of the O.O.W. or his authorized representative.
06. Contractor shall quote rates of relevant item including cost of all materials and labour charges of following item in point included
  - (a) Point wiring with 1.0 mm<sup>2</sup> copper PVC insulated-wire with 1.0 mm<sup>2</sup> copper PVC insulated wire for earth continuity in PVC casing capping having double locking arrangement with grooves, trunking of as per ISI for light & fan. Complete with 5A tissiono type shockproof accessories erected on polished wooden block covered with 3mm thick laminated sheet.
  - (b) Point wiring with 1.0 mm<sup>2</sup> copper PVC insulated-wire with 1.0 mm<sup>2</sup> copper PVC insulated wire for earth continuity in PVC casing capping having double locking arrangement with grooves, trunking of as per ISI for plug with tissiono type shock proof 3 pin socket & switch 5 Amp. Erected & polish wooden block covered with 3mm thick laminated sheet.
  - (c) Mains with ISI marked copper conductor PVC insulated wire in PVC casing capping erected with copper conductor PVC insulated wire for earth continuing of following size 2wire 1.5mm<sup>2</sup>, 2 wire 2.5mm<sup>2</sup>.
  - (d) All internal wiring are open in PVC casing capping.
  - (e) 240V MCB Double pole switch. 6 to 32 Amp. With endosure –
  - (f) Steel meter box with shutter and locking arrangement
07. Completion certificate and test report must be submitted after the end of the works or during the execution as per requirement of the O.O.W.
08. The electrical fitting / fixtures of all required items should be carried out as per the instructions of engineer incharge.

**The electrification items for this tender includes fans, tube lights, door bells including all other related required appurtenances. The electrification work carried out should be provided with necessary Test Report, the cost of testing is to be borne by the agency.**

### MEDIUM VOLTAGE DISTRIBUTION SYSTEM (INTERNAL LIGHTING & POWER WIRING)

#### 01. GENERAL

Medium voltage distribution system shall be applicable for wiring 3 phase, 4 wire 440 Volts, 50 HZ. A.C. supply & single phase, 2 wire 240 Volts, 50 HZ. A. C. supply.



**02. REGULATIONS & STANDARDS**

The system shall be governed by the requirements of IS:732: I.E. rules, & IEE regulations. I.S. standard & codes applicable for medium voltage distribution is also listed in standard specification.

**03. PVC CASING CAPPING & ACCESSORIES**

The thickness of PVC conduits shall be as follows as per IS-14927 Part-I 2001

40 mm dia.	1.5 mm
32 mm dia.	1.5 mm
25 mm dia.	1.5 mm
20 mm dia.	1.5 mm
15 mm dia.	1.5 mm

**04. WIRING CONDUCTORS**

All wiring conductors shall be PVC insulated, standard copper conductors of 650 V/1100V grade. Wiring conductors shall be confirmed in all respects to IS: 694.

4.1 The current rating for wiring conductors shall be based on the following parameters

- (a) Ambient temperature 40° C.
- (b) Conductor temperature 70° C.

Wiring conductors shall be supplied in red, black, yellow, blue colors for easy identification of wires. The wiring conductors shall be supplied in sealed coils of 100 m. length. The wiring conductor shall bear manufacturer's trade mark name, ISI mark, voltage grade etc.

4.3 Wiring for power, lighting circuit's, television systems shall be carried out in separate and distinct wiring system.

4.4 The wiring system envisaged will be generally shown on the layout drawings and line diagrams, however, a brief account of the general wiring system is given below :-

- (a) **SUBMANS WIRING**  
Wiring from switch board to the individual distribution board.
- (b) **CIRCUIT WIRING**  
Wiring from DBs to the points control boxes for lighting, fans, SA socket etc. and from DBs to the power sockets in the case of power wiring.

4.5 The sub-main wiring shall be single phase 2 wire system. Each sub-main wiring circuit shall also have its own copper earth continuity wire. The number & size of copper earth continuity wire shall be as per the detailed drawings and Standard specification.

4.6 Circuit wiring shall generally be of single phase system. However a maximum of 3 to 4 single phase circuits belonging to the same phase/pole could be installed in the same conduit or race-way. Each circuit wiring shall be provided with suitable copper earth continuity conductor as per standard specification No. AD F-150-85. Not more than eight light points/fan points shall be grouped on one lighting circuits. The load per circuit shall not exceed 800 watts. The minimum size of conductor for wiring of lighting circuits shall not be less than 1.5 mm in case of copper conductor. Power wiring shall not have than one sockets connected to one circuit. All the wiring shall be carried out in looping in-loop system . .

The maximum number of various size conductors that could be drawn into various sizes of conduits shall be as per table II of IS: 732. The wiring shall be color coded for easy identification of phases and neutral. The following color code shall be adopted.

Phase	R	Red
	Y	Yellow / White
	B	Blue
Neutral		Black
Earth		Green

- 4.7 The circuit wiring may be separately measured or included in point wiring as per the nomenclature specified in BOQ.

## **05. SWITCHES, SOCKETS & ACCESSORIES**

### **5.1 GENERAL REQUIREMENTS**

Light control switches shall be 5A rating for controlling up to four light points and 15A rating for more than four light points. Light control switches shall be of piano key type design suitable for flush mounting for general lighting. Wherever specifically called for tumbles type switches shall be used for surface mounting. Light control shall have either integral mounting plates or white PVC/Perspex plates as specified / approved.

- 5.2 All sockets 6A & 16A ratings shall be flush mounting type with control switches of piano key type design of the same rating as that of the sockets. All sockets outlets shall be of 5 pin type. The base of the socket shall be of high quality porcelain with pins made of brass. Sockets shall be provided with PVC surface plates with round comers and beveled edges. All the sockets shall be provided with plug tops of approved quality and design.

### **5.3 LAMP HOLDERS, CEILING ROSES ETC.**

Accessories for, light outlets such as lamp holders, ceiling roses etc. shall be in conformity with requirements of specifications. Only approved make of accessories shall be supplied.

### **5.4 INSTALLATION OF SWITCHES, SOCKET & ACCESSORIES**

All the switches shall be wired on phase. Connections shall be made only after testing the wires for continuity, cross phase etc. with the help of meter. Switches, sockets, fan regulator etc. shall be housed in proper approved. Teakwood / PVC / metal box with PVC / Perspex sheet plates. Regulators shall be fixed on adjustable MS flat straps inside the enclosure. The arrangement of switches and sockets shall be neat and systematic. Covers for enclosures accommodating switches, sockets, etc. (Point control boxes) shall be of 3 mm thick, fine finished PVC / Perspex materials and fixed to the enclosure in plumb with counter-sunk head, chromium plated brass screws. Outlets shall be terminated into a ceiling rose for fan points and into auto way porcelain or bakelite connector for ceiling light points. For wall plug sockets, the conductors may be terminated directly into the switches and sockets. The outlets, points control boxes etc. shall be set out as shown on the drg. Before fixing these, the contractor shall obtain clearance from the O.O.W. with regard to their proper location. The enclosures of sockets and 3rd pin of the sockets shall be connected to the ground through a proper size earth continuity wires as laid out in standard specification.

## **06. LUMINAIRES**

### **6.1 GENERAL**

The MCBs shall be rated for 9 KA fault level. The MCBs shall be checked & coordinated with the down-stream MCBs for proper operation.

## **07. POINTWIRING**

Point wiring shall commence from the first point control box / local control box for the points connected to the same circuit. Point wiring for, lights, fans, 5A -15A sockets etc. shall be carried out with copper conductor PVC insulated wires of 1.0 & 1.5 Sq.m. cross section as per BOQ. The points wiring shall be inclusive of 40m / 32mm / 25mm / 20mm PVC casing capping of standard and approved make (As specified hereinbefore) along with approved quality accessories such as bends, reducers, junction boxes, etc. together with wiring accessories such as ceiling roses, lamp holder, connector, points control boxes (enclosure for electrical accessories) etc. Points wiring shall be provided with 1.0mm copper conduit PVC

insulated earth continuity wire for earthing 3rd pin of sockets, luminaries and fan fixtures. Light Control shall be either single, twin or multiple points controlled by a switch as specified.

#### **08. TESTING & ELECTRICAL INSTALLATION**

Testing and installation shall be as per IS : 7362-1963 or its latest edition.

- (a) The insulation resistance shall be measured by applying between earth and the whole system of conductors or any section thereof with all fuses in places and all switches closed and except in earthen concentric wiring all lamps in position or both poles of the installation otherwise electrically connected together, where a direct current pressure of not less than twice the working pressure, provided that it need not exceed 500 Volts for medium voltage circuits. Where the supply is derived from the three wires (A.C. or D.C.) or a poly phase system, the neutral pole of which is connected to earth direct or through added resistance, the working pressure shall be deemed to be that which is maintained between the outer or phase conductor and the neutral.
- (b) The insulation resistance measured as above shall not be less than 50 divided by the number of points on the circuits provided, that the whole installation shall be required to have an insulation resistance greater than one megohm.
- (c) Control rheostats, heating and power appliances and electric signs may, if required, be disconnected from the circuit during the test, but in event the insulation resistance between the case of frame work and all live parts of each rheostat appliance and sign shall not be less than that specified in the relevant Indian standard specification or where there is no such specification shall not be less than half a mega ohm.
- (d) The insulation resistance shall also be measured between all conductors connected to one pole or phase conductor of the supply and the entire conductor connected to the middle wire or the neutral or to the other pole or phase conductor of the supply and its value shall not be less than specified in sub clause (b).
- (e) On completion of an electric installation (or an extension to an installation) a certificate shall be furnished by the Contractor countersigned by the qualified supervisor under whose direct supervision the installation was carried out. The certificate shall be in the prescribed form as required by the local electric supply authorities. One such recommended form is given in Appendix.

#### **8.1 TESTING OF EARTH CONTINUITY PATH**

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

#### **8.2 TESTING OF POLARITY OF NON-LINKED SINGLE POLE SWITCHES.**

- (a) In two wires installation a test shall be made to verify that all non linked single pole switches have been fitted in the same conductor throughout and such conductor shall be labeled or marked for connection to an outer one phase conductor or to be the non earthed conductor of the supply.
- (b) In a three wire or four wire installation a test shall be made to verify that every non linked signal switch is fitted in a conductor which is labeled and marked for connection to one of the outer phase conductor of the supply.

#### **09. CERTIFICATE OF INSPECTION**

The contractor shall be responsible for getting the installation inspected and approved by the Electrical Inspector and other local electric supply authorities concerned, for getting the electric supply at the earliest.

The contractor shall obtain and deliver to the owners the certificate of final inspection and approved by the local electrical authorities concerned. The inspection fees etc. shall be paid

by the, Contractor. In case any defects are pointed out by the Electrical Inspector the contractor shall remove these defects at his own cost, and arrange for re inspection by the Electrical Inspector till such time the installation is finally approved and the required certificate is issued. The contractor shall bear all expenses and deposit the necessary fees for the second and subsequent inspections by the Electrical Inspector.

**10. ADDITIONAL SPECIFICATION AND CONDITIONS**

The contractor shall keep himself in touch with the building work and shall adjust his work accordingly so as to minimize breaking of masonry / concrete. No claim whatsoever on account of delay due to building work shall be entertained.

Any damage done to the building during the reaction of the work shall be made good by the contractor, free of charge to the satisfaction of the Engineer-In-charge. On his failure to do so the same will be made good at his risk and cost through another agency.

**11. EARTHING :**

Supplying & erecting funnel type earthing having earth plate of following size burrid in specifically prepared earth pit 3 mtr. Below ground with 40 kg. charcol and salt with alternate layers of charcol & salt, 20mm dia. G.I. pipe with Funnel with a wire mesh for watering & bricks masonry block, C.I. cover complete as per para 7.3 of IS 3043 with necessary length of double G.I. / copper earth wire No. 6 SWG bolted with lug to the plate and covered in 12mm dia. G.I. pipe 2.5 mtr. long complete connected to the nearest switch gear with end socket as per direction & duly tested by earth tester confirming to ISS (As per drawing) with following specification.

12. The whole plumbing work is to be carried with all required supply, fixing, fitting and complete as per the instructions of engineer in charge.

**13. The layout for plumbing and electrification shall have to be provided by the agency at their own cost and carry out the work with all allied items, fitting and fixing etc complete as per the requirement and instructions of engineer in charge..**

Addl.Asst.Engineer  
Rajkot Muni. Corporation

Dy.Ex.Engineer  
Rajkot Muni. Corporation

Addl. City Engineer  
Rajkot Muni. Corporation

Signature of contractor

### GENERAL TECHNICAL GUIDELINE

- 1.0 All the items occurring in the work and as found necessary during actual execution shall be carried out in the best workman like manner as per specifications and the written order of the Engineer in charge
- 1.1 Extra Claim in respect of extra work shall be allowed only if such work is ordered to be carried out in writing by the Engineer in charge
- 1.2 The contractor shall engage a qualified Engineer for the Execution of work who will remain present for all the time on site and will receive instructions and orders from the Engineer in charge or his authorized representative. The instruction and orders given to the contractor representative on site shall be considered as it given to the contractor himself.
- 1.3 The work order book as prescribed shall be maintained on the site of the work by the contractor and the contractor shall sign the orders given by the inspecting officers and shall carry out them properly.
- 1.4 Quantities specified in the tender may vary at the time of actual execution and the contractor shall have no claim for compensation on account of such variation
- 1.5 Unexcavated lengths shall be left wherever required and so directed by the Engineer in charge during the currency of the contract and shall be tackled. If required, before completion of work.
- 1.6 Diversion of road, if necessary, shall be provided and maintained during the currency of the contract by the contractor at his cost.
- 1.7 Figured Dimensions of drawing shall supersede measurements by scale, special dimensions or directions in the specifications shall supersede all other dimensions.
- 1.8 The contractor shall be responsible to take regular level on the approved alignment before actually starting the work The levels shall be commence to the G.T.S. levels and shall be got approved from the Engineer in charge
- 1.9 If the arrangement of temporary drainage or waterway is required to be made during any work of this Contract, this shall be made by the Contractor without claiming any extra cost.
- 2.0 The rates are inclusive of dewatering, if required .
- 3.0 Testing of the materials shall have to be tested periodically as suggested by the Engineer-incharge at Government approved material testing Laboratory and testing charges for the same has to be borne by the contractor.

Addl.Asst.Engineer  
Rajkot Muni. Corporation

Dy.Ex.Engineer  
Rajkot Muni. Corporation

Addl. City Engineer  
Rajkot Muni. Corporation

Signature of contractor

**Bidders are required to fill up all blank spaces in this Bid Form**

The Commissioner  
Rajkot Municipal Corporation  
Dr. Ambedkar Bhavan  
Dhebar Road  
Rajkot

Dear Sir,

**SUB : Construction of New Laboratory at Quality Control Cell in Gurukul Pumping Station in Ward No.14**

Having visited the site and examined the Bid Documents, Drawings, Conditions of Contract, Specifications, Schedules, Annexures, Preamble to Price Schedules, Price Schedules etc. including Addenda/Amendments to the above, for the execution of the above Contract, we the undersigned offer to carry out as given in Conditions of Contract and in conformity with the Drawings, Conditions of Contract, Specifications, Preamble to Price Schedules, Price Schedules, Annexures, Bidding Documents, including Addenda Nos. \_\_\_\_\_ (insert numbers) for \_\_\_\_\_ % age (in figure) \_\_\_\_\_ (in words) below / above than the rates given in Price Schedule.

2. I/ We agree that
  - (a) if we fail to provide required facilities to the Employer's representative or any other person/agency by the employer to perform on his behalf for carrying out the inspection and testing of materials and workmanship
  - or
  - (b) if we incorporate into the Works, materials before they are tested and approved by the Engineer's representative
  - or
  - (c) if we fail to deliver raw water of required quantity according to the conditions/stipulations of the Contract, the Engineer will be at liberty to take any action including termination of Contract and impose at his absolute discretion any penalties, and/or reject the work.
3. We undertake, if our Bid is accepted, to complete and deliver the Works in accordance with the Contract within the time limit described in the tender document, from the date of Work order issued to us by you.
4. We agree to abide by this Bid for a period of 180 days from the date fixed for receiving the same and it shall remain binding upon us and may be accepted at any time before the expiry of that period.
5. In the event of our Bid being accepted, we agree to enter into a formal Contract Agreement with you incorporating the conditions of Contract thereto annexed but until such agreement is prepared this Bid together with your written acceptance thereof shall constitute a binding Contract between us.

6. We agree, if our Bid is accepted, to furnish Performance Bond/Security in the forms and of value specified in the Conditions of Contract of a sum equivalent to 5% of the Contract price for due performance of the Contract.
7. We have independently considered the amounts of liquidated damages shown in Appendix to Bid and agree that they represent a fair estimate of the damages likely to be suffered by you in the event of the Work not being completed by us in time.
8. I/We agree to pay the Government Income-Tax, CGST, SGST, Sales Tax on contraction, Labour Cess, Professional Tax and Other Taxes prevailing from time to time on such items on which the same leviable and the rates quoted by me/us are inclusive of the same.
9. We understand that you are not bound to accept the lowest or any Bid you may receive.

Dated this \_\_\_\_\_ day of \_\_\_\_\_ 2021.

\_\_\_\_\_  
(Signature)

\_\_\_\_\_  
(Name of the person)

\_\_\_\_\_  
(In the capacity of)

Company Seal

\_\_\_\_\_  
(Name of firm)

Duly authorised to sign Bid for and on behalf of  
(Fill in block capitals)

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Witness

Signature

Name

Address

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

### **ADDITIONAL CONDITIONS**

1. The contractor shall have to provide his own level instrument for this work.
2. The safety of the traffic is the prime important factor. Along the trenches on both the side, a hump of excavated stuff of minimum height 3 to 5 ft shall have to be provided till the work is got completed. However, where there is no defined road, in such area, the fencing/ lighting etc., requires to be provided as per clause 1.1.15. Sign Board shall have to be provided at required locations, so that there will not be any fatal accident.
3. After entering into an agreement, the agency shall have to finalize the agency for supply of the material like Precast RCC slab and column and the name of manufacturer / supplier should immediately be informed to Rajkot Municipal Corporation so that Rajkot Municipal Corporation can also expedite the manufacturer / supplier for the material. If necessary, Rajkot Municipal Corporation will visit and inspect the factory. During the inspection, if Rajkot Municipal Corporation is not satisfied then the contractor shall have to procure the material from other manufacturer(s).
4. While the work in progress, there is possibility of change in location line according to the site conditions. Under these circumstances, the contractor shall have to carry out the work accordingly, for which, no extra payment shall be made in such situations. Over and above, the decision of Engineer-in-charge for change in line shall be final and binding to the contractor.
5. The quantity of various items mentioned in the schedule-B is liable to increase or decrease. Under the circumstances, the contractor shall have to carry out the work accordingly. Rajkot Municipal Corporation will not entertain any dispute in this regard.
6. In case of any ambiguity found in inspections / drawings, specifications, etc, the decision of engineer-in-charge shall be final and binding to the contractor.
7. Rates quoted in Bill of Quantities to cover everything necessary for complete Execution of work :

The rates quoted will be held to cover everything necessary of the due and complete execution of the work according to the drawings and the several conditions and the stipulations of the contract, including specification, or the evident intent and meaning of all or either of them or according to customary usage and for the periodical and final inspection and test and proof of the work in every respect and for measuring, numbering or weighing the same including setting out and laying or fixing in position and the provision of all materials,

Power, tool rammers, beaters, labour, tackle platforms with impervious lapped joints for scaffolding ranging rods, straight edges, centering and boxes, wedges, moulds, templates, post straight rails, boning-staves, measuring rods, page boards, shores, barriers, fencing, lighting, pumping apparatus, temporary arrangements of passage of traffic, access to premises and continuance of drainage, water supply and lighting (if interrupted by the work) lard temporary sheds and buildings nahanis roofed in or otherwise haulage, painting, varnishing, polishing, establishments for efficient supervision and watching arrangements for the efficient protection of life and property and all requisite plant, implements and appliances every kind, except only such matter and things as it may be distinctly stated here in are to be supplied by the contractors. A rate for anyone description of work is to be held to include such items of other classes of and for these on



separate specific charge will be admitted. The contractors shall keep every portion of the work clear of accumulation from time to time and shall leave every portion of the work clean, clear, perfect and at the conclusion of whole, providing at their own cost all such material implement appliances and labour as the Engineer may require to prove if it is to be so.

8. The contractors are particularly directed to observe from the Articles of Agreement and the specifications, what is to be included in their rates for the several portions of the work and also under what conditions payments are to be made.
9. This office Circular bearing No.RMC/C/329 dated 22-12-2012 and Order No.RMC/C/132 dated 10-06-2013 are uploaded separately as a part of tender document. The Contractors/Consultants quoting their rates shall have to read, implement, and submit the same duly signed along with the documents to be submitted during physical submission.
10. In reference to the above Circular and Order cited para above, the Contractors/Consultant who have quoted their rates for this work will be called in person for verification of original documents. The date and time for verification of original documents will be as prescribed in the tender document.
11. After issuance of work order for this tender, if the work falls under any kind of dispute then Rajkot Municipal Corporation reserves the right to terminate the contract for this work awarded to the contractor or execute part work. The decision of Rajkot Municipal Corporation in this regard will be final and binding to the contractor.
12. Till the Completion Certificate is issued by Rajkot Municipal Corporation, the agency will be the sole responsible for security of material and structure at site.
13. The quantities given in the Schedules are provisional. The Rajkot Municipal Corporation reserves the right to increase or decrease the quantity of work or totally omit any item work and the contractor shall not be entitled to claim any extras or damages on these grounds & he is bound to execute the work as per the instruction of the Engineer-in-charge.
14. It is further clarified that Performance Guarantee (SD) for extra work will also be recovered @ 10% from the bill of extra work i.e. works beyond tender amount.
15. The bidder must understand clearly that the prices quoted are for the totally works or the part of the total works quoted for and include all costs due to materials, labour, equipments, supervision, other services, royalties, taxes, duties, etc., and to include all extra to cover the cost. No claim for additional payment beyond the prices quoted will be entertained and the bidder will not be entitled subsequently to make any claim on any ground.
16. Qualified engineer must be deployed on site and at Plant. The details of qualified engineers are to be given to RMC at the time of bidding of this tender.
17. The whole work shall be executed by qualified Site Engineer. The required L-Section and Cross section is to be prepared by contractor at his own cost. The work should be done by leveling instrument. The Drawings shall be submitted accordingly in advance before starting the work. No extra payment will be made

for the above work. Contractor has to submit Bill form with hard copy and soft copy of cross section and L-section of work completed. No bill be accepted without above drawings.

18. The agency to whom the work will be awarded shall have to arrange its own vehicle for to and fro transportation of the staff of Rajkot Municipal Corporation till the work is completed at his own cost.
19. If any irregularities found during the work then penalty will be imposed by Engineer-in-charge or any higher officer. If any disputes arises regarding penalty imposed by Engineer-in-charge than decision of Municipal Commissioner will be final and binding to agency.
20. The time limit will remain same as mentioned in the tender document and the work is to be completed accordingly.
21. Tender of such Contractor not having registration in appropriate Class and Category, will be treated as non-responsive. In case of any conflicting provisions between registration of appropriate category and Pre-qualification criteria, the later shall govern the process of bid evaluation.
22. The agency shall have to quote their rates only after visiting the site and looking to the site conditions.
23. DEFECTS: Date of completion for start of defect liability period for a particular road will be considered as the last date mentioned in the completion of work recorded in Measurement Book. The contractor shall be required to make good all the damages / defects identified and conveyed to him, during the entire defect liability period. The method and time limit of rectification will be decided by the Engineer in charge. If the contractor fails to carry out rectification as per the instructions, the same will be carried out at his cost and and the cost will be recovered from the amount retained.
24. Joint venture shall not be allowed under this tender.
25. After the completion of work, at the interval of every month, joint inspection must be done by the agency and RMC staff and then agency has to submit the report stating the condition of road to Rajkot Municipal Corporation. The final checking report stating the condition of road is also to be submitted by the agency before one month of the expiry of defect liability period to the competent authority.
26. The Contractor shall carry out modifications in the procedure of work, if found necessary, as directed by the Engineer during inspection. Works falling short of quality shall be rectified/ redone by the Contractor at his own cost, and defective work shall also be removed from the site of works by the Contractor at his own cost.
27. **Defective Materials:** All materials which the Engineer/ his representative has determined as not confirming to the requirements of the Contract shall be rejected whether in place or not; they shall be removed immediately from the site as directed. Materials, which have been subsequently corrected, shall not be used in the work unless approval is accorded in writing by the Engineer. Upon failure of the Contractor to comply with any order of the Engineer/ his representative given under this clause, the Engineer-in-charge shall have authority to cause the removal of rejected material and to deduct the removal cost thereof from any payments due to the contractor.

28. The Royalty of each and every material, required to be paid is to be borne by the contractor.
29. Testing of each material as and when required by Rajkot Municipal Corporation, is to be carried out in Government approved laboratory by the contractor at his own cost. Schedule of testing of material will be as per R&B, State Government Manual and I S Code provision.
30. Necessary tests for material quality, soil tests etc. shall be carried out as per the instructions of engineer-in-charge by contractor at his own cost and reports to be submitted to the engineer-in-charge.
31. The testing of metal and the design as per IRC shall have to be carried out by the contractor at his own cost.
32. The word "Arbitration" or "Arbitration Clause" wherever mentioned in this tender document, is now to be treated as "Deleted". In this context, an Order bearing No.RMC/Legal/1858 dated 18-02-2017 of Legal Department of Rajkot Municipal Corporation is uploaded separately along with this tender, which Order, will hereafter be referred and taken into consideration for Arbitration related purpose for the tenders of Rajkot Municipal Corporation.

Addl.Asst.Engineer  
Rajkot Muni. Corporation

Dy.Ex.Engineer  
Rajkot Muni. Corporation

Addl. City Engineer  
Rajkot Muni. Corporation

Signature of Contractor

**Note on Schedule**

1. The bid is percentage rate bid.
2. The rates and prices shall be submitted in the formats given in the online Price Schedules. Rates and prices received in any other formats will be rejected and the Bids will be disqualified.
3. It will be entirely at the discretion of the Employer to accept or reject the bidder's proposal, without giving any reasons whatsoever.
4. In Price Schedule, bidder shall quote his percentage Equal/Above/Below for items listed in the schedule. Prices quoted in Schedule only will be considered for price evaluation & shall form a part of the Contract Agreement.
5. The Only Price Schedule will be considered for financial evaluation of the bid with the successful bidder.
6. The bidder shall be deemed to have allowed in his price for provision, maintenance and final removal of all temporary works of whatsoever nature required for construction including temporary bunds, diverting water, pumping, dewatering etc. for the proper execution of works. The rates shall also be deemed to include any works and setting out that may be required to be carried out for laying out of all the works involved.
7. Where there is a discrepancy between the unit rates and the amount entered, the latter shall govern.
8. The Price Schedules are to be read in conjunction with the Conditions of Contract, the Specifications and other sections of these bid documents and these documents are to be taken as mutually explanatory of one another.
9. Prices quoted by the bidder shall be firm for the entire period of Contract without any escalation.
10. The bidder shall interpret the data furnished and carry out any additional survey work, or investigative work required at his own cost.
11. The prices quoted shall also include the cost of materials utilized for testing.
12. The bidder should acquaint himself with the site conditions including the access to Worksite. The successful bidder shall have to make suitable access to worksites at his own cost. These accesses will be used by the other contractors working for RMC.
13. The contractor shall have to quote their rates including GST and other taxes and the Invoice with break-up of GST is to be submitted accordingly, failing which, such amount will be deducted from the bill of the agency and deposited accordingly.

14. As per the decision for corrections made in the 6<sup>th</sup> Review Meeting held at G.U.D.C., Gandhinagar, on 28-09-2011 for the works under SJMMSVY / 14th Finance Commission, the appointment of Third Party Inspection Agency is compulsory for the works costing Rs.50.00 lacs or more. Rajkot Municipal Corporation vide its Standing Committee Resolution No.370 dated 21-10-2011 has accepted the offers of M/s.RITES Limited, Mumbai, and M/s.Water & Power Consultancy Services (India) Ltd., Gandhinagar, (WAPCOS), as Third Party Inspection Agency for the inspection of materials and workmanship. The cost of TPI Agency as per the prescribed Schedule of Payment is to be borne by the Contractor.
15. Agency shall have to engage Structural Engineer approved by Rajkot Municipal Corporation and shall have to submit the structural design for RCC design and steel work for this work, for which, no extra payment will be made by Rajkot Municipal Corporation. The work is to be carried by taking necessary approval for structural design from competent authority of Rajkot Municipal Corporation.
16. The material shall be inspected departmentally, the cost of which, if any, is to be borne by contractor.
17. In case of extra item work if quoted and approved tender price is above Percentage Rate then no above percentage rate will be given, only the rates as per S.O.R. will be paid for such extra item. But, if the quoted and approved tender price is below percentage rate then that below percentage rate will be considered for paying of any extra item
18. The agency shall have to get the plans done from the approved Architect / Engineer and also to get approved from the Town Planning Branch of RMC, the cost of which is to be borne by the agency. The agency shall have to get the approval for plan(s) within a period of 30 (Thirty) days.  
  
The Plans got prepared by the agency shall have to be get the design done from the Structural Engineer, the cost of which also is to be borne by the agency.  
  
The work order will be given only after getting the preliminary approval from Town Planning Department.
19. The work is to be carried out mandatorily by Ready Mix Concrete only as per requirement and instructions of engineer in charge with prior approval and with all relevant works as may be required to complete the work. The Batching & Mixing of Concrete will not be permitted.

Addl.Asst.Engineer  
Rajkot Muni. Corporation

Dy.Ex.Engineer  
Rajkot Muni. Corporation

Addl. City Engineer  
Rajkot Muni. Corporation

Signature of Contractor.

**Rajkot Municipal Corporation**

Name of work: -

**Construction of New Laboratory at Quality Control Cell in Gurukul Pumping Station in Ward No.14**

**:: SCHEDULE - B ::**

S.No	Quantity	Discription	Rate	Unit	Amount
1	135.00	Excavation of Foundation in Soft Murrum , Soil or Sand from 0.0mtr. to 1.50 mtr depth including lifting and laying in designated area as instructed	96.60	cum	13041.00
2	80.00	mtr. to 1.50 mtr depth including lifting and laying in designated area as instructed	103.50	cum	8280.00
3	38.00	Foundation filling with CC work in proportion of 1:2:4 using 1.5 cm to 2.0 cm aggregate including Raming, Curing etc	3913.20	cum	148701.60
4	25.00	CC work M-25 for RCC footing using aggregate of size 10-20 mm, centring, curing, finishing etc. complete (without reinforcement)	5569.00	cum	139225.00
5	41.00	CC work M-25 for Column using aggregate of size 10-20 mm, centring, curing, finishing etc. complete (without reinforcement)	6096.00	cum	249936.00
6	64.00	CC work M-25 for Beam using aggregate of size 10-20 mm, centring, curing, finishing etc. complete (without reinforcement)	6156.00	cum	393984.00
7	84.00	CC work M25 for RCC slab using aggregate of size 10-20 mm, centring, curing, finishing etc. complete (without reinforcement)	5875.00	cum	493500.00
8	8.00	CC work M-25 for Lintel using aggregate of size 10-20 mm, centring, curing, finishing etc. complete (without reinforcement)	5675.00	cum	45400.00
9	5.00	CC work M-25 for Chhajja using aggregate of size 10-20 mm, centring, curing, finishing etc. complete (without reinforcement)	5861.00	cum	29305.00
10	150.00	Brick Masonry work in Cement:Mortar 1:6	4196.00	cum	629400.00
11	130.00	Brick Masonry Partition Wall in Cement:Mortar 1:4 (3.5 to 4.5 inch thick)	411.00	sq.mt	53430.00
12	250.00	Supply & Fixing of Broken Glazed (China Mosaic) tiles size 5-6 mm thick of different size and shade (approved crazy patern) in Cement:Mortar 1:2 and joint filling with White Cement / Coloured Cement including Ramping, Watering, Curing etc. complete	259.00	sq.mt	64750.00
13	250.00	Water Proofing Treatment on Terrace and Wall sides with smooth finishing including material-Habour etc. complete	105.00	sq.mt	26250.00
14	11.00	Flush Door 25mm thick with Teak wood frame for Door & window with polishing / oil painting using company viz. Kitply / Century / Dura / Everest	3090.00	sq.mt	33990.00
15	11.00	Providing & fixing FRP door	4189.00	sq.mt	46079.00
16	1400.00	Cement Plaster 12 mm thick using Cement:Mortar in proportion 1:3 with Niru Finishing curing, etc. complete	182.00	sq.mt	254800.00
17	265.00	Decorative Malhar Plaster Work of 8mm thick in proportion of 1:1.5 as specification and design with Groove and Base Coat 15mm thick in proportion of 1:3	316.00	sq.mt	83740.00

S.No	Quantity	Discription	Rate	Unit	Amount
18	790.00	20mm thick Sand Face Cement Plaster Work in which 1 paster in proportion of 1:3 and 2nd plaster in teh proportion of 1:2 using Cement Mortar with spong finishing etc. complete (Note: Before carringout Plaster work on RCC, required tipping work should be carried out as instructed)	217.00	sq.mt	171430.00
19	1400.00	Plastic Imulsion Paint (Two coats) (Asian Paint, ICI, Dulux, Nerolac, Berger etc. of approved type) (with Prime Coat)	126.00	sq.mt	176400.00
20	790.00	Apex Color work on Outer side of Wall (Two coats) (with Base Coat)	99.00	sq.mt	78210.00
21	115.00	Supply & Fixing of Glazed tiles (1st Quality) of required size in Cement Roga and joints to be filled with white cement after 12mm rough plaster in proportion of 1:3	426.00	sq.mt	48990.00
22	11.00	CC work M-25 for Stair Case using aggregate of size 10-20 mm, centring, curing, finishing etc. complete (without reinforcement)	5886.00	cum	64746.00
23	170.00	Supply & Fixing of Polished Kota Stone steps and risers work of length 0.90 to 1.45 mtr and thickness 20-25 mm to be fixed in Lime:Mortar 1:2 and Cement slury and as instructed	383.00	sq.mt	65110.00
24	55.00	Supply & Fixing of Polished of Kota Stone of required size & thickness as instructed to fixed in Platform/ CupBoard etc	744.00	sq.mt	40920.00
25	2.70	Supply & Fixing of Polished on both sides of Kota Stone in thickness of 20-25 mm to fix as Urinal Curtain and as per instruction machine cut should be done on this Kota in all three sides	786.00	sq.mt	2122.20
26	45.00	S&F of alluminium section	4088.00	sq.mt	183960.00
27	14.00	18 guage collepsible gate with primer & double coat oil paint.	3151.00	sq.mt	44114.00
28	1852.40	Iron work as per drawing and instruction including all	86.00	kg	159306.40
29	25.00	PV/C pipe 110mm dia	182.90	Rmt	4572.50
30	9.00	Uropean type w/c with sit, cover fixing with comp. standard quality.	1420.00	no	12780.00
31	4.00	White porselin Kitchen Sink size 60/450/200 mm with supply and fitting.	3048.00	no	12192.00
32	550.00	Supply, Fixing & Polishing of Kota Stone work thickness 20-25 mm to be fixed in Lime:Mortar 1:2 and liquid Cement and as instructed	791.00	sqm	435050.00
33	2.00	S&F of sintex 2000 lit	15400.00	no	30800.00
34	25.00	S&F of ss railing	34500.00	Rmt	862500.00
35	250.00	Supply & Fixing of 60mm M-30 Grade cement concrete rubber mold paving inter locking paving block (Grey colour) after beding of Bhogavo sand in line and CC on the edge in proportion of 1:2:4 with curing etc. complete	514.00	sq.mt	128500.00
36	28600.00	Supplying, Cutting, Beding, Binding and Hooking and binding with wire for RCC work Tor steel TMT round bar including all cost	57.00	K.G	1630200.00
37	40.00	Making cupboard with 18mm ply wood w hich 6mm ply back side, 0.8mm white lamination inner side, fixing approved quality sunmica, hinges, stoper etc. 18mm thick ply with both side lamination for selves. plywood brands - kitply, century, dura, everest	7505.00	SQ.MT	300200.00

S.No	Quantity	Discription	Rate	Unit	Amount
38	7.50	Table work in plywood with necessary fitting fixing etc copm.	15542.00	SQ.MT	116565.00
39	29.00	Supply & fixing FRP corugated sheet for ceiling work	650.00	sqm	18850.00
40	520.00	Filling of Plinth in layers of 0.23 m thick including murrum and sprinkling of water, compaction etc. complete	279.00	cum	145080.00
41	9.00	Dismantalling of RCC	518.00	cum	4662.00
42	24.00	Dismantelling of Super Structure and disposing it in 90 mtr lead area	242.00	cum	5808.00
43	320.00	Removal of Excavated Stuff and disposing it of in designated place as directed by Engineer-in-Charge (in exterior Part Of City)	171.00	cum	54720.00
44	260.00	Pebble dash plaster upto 10 m height above ground level with a mixture of washed pebble or crushed stone 6 mm to 12.5 mm nominal size, dashed over and including fresh plaster in two layers under layer 12 mm cement plaster 1:4 (1 cement : 4 coarse sand) and top layer 10 mm cement plaster with cement mortar 1:3 (1 cement : 3 fine sand) mixed with 10% finely ground hydrated lime by volume of cement	300.15	sqm	78039.00
45	35.00	Foundation filling in proportion of 1:2 - Filling of foundation with Lime:Mortar in proportion of 1:2 using Black Trap metal of size 4-9 cm	1001.10	cum	35038.50
				Total	7624677.20
		Electric+plumbing work 6%			457480.63
					8082157.83
				Say	8083000.00

Addl.Asstt.Er  
Rajkot Muni. Corporation

Dy.Ex.Engineer  
Rajkot Muni. Corporation

Addl. City Engineer  
Rajkot Muni. Corporation

I/We agree to carry out the above said work at \_\_\_\_\_  
\_\_\_\_\_ % Equal / above / below  
on the tendered rates shown in Schedule.

Signature of Contractor: