

SURAT MUNICIPAL CORPORATION**TRAFFIC - BRTS PROJECT CELL**

NAME OF WORK	ANNUAL RATE CONTRACT FOR CIVIL MAINTENANCE AND REPAIRING IN BRTS BUS SHELTERS, CITY BUS STOPS AND BUS DEPOTS IN NEW EAST (SARTHANA) ZONE IN SURAT CITY.
E-Tender	
Tender Notice (On Line) No. ACE & I/C C.E./ TRAFFIC - BRTS PROJECT CELL / 03 / 2026-2027, (Work No.02)	
Volume-I : Technical Bid	

DOWNLOAD OF TENDER DOCUMENTS FROM website smc.nprocure.com	:	From 19/06/2026 to 09/07/2026 up to 17:00 hrs
DATE OF ONLINE SUBMISSION OF TENDER	:	on or before 09/07/2026 up to 18:00 hrs.
LAST DATE OF PHYSICAL SUBMISSION OF TENDER FEES, EMD AND OTHER SUPPORTING DOCUMENTS MENTIONED IN THE TENDER (SUBMISSION IN HARD COPY)	:	From 10/07/2026 to 17/07/2026 up to 17:00 Hrs. at the office of "Chief Accountant, Surat Municipal Corporation, Shri Tapipura by Speed Post/RPAD only." In sealed cover duly superscribed with name of work and tender notice no.
PROBABLE DATE OF ONLINE OPENING TECHNICAL BID	:	10/07/2026 at 11:00 hrs onwards.
ESTIMATED AMOUNT	:	Rs. 24,30,508.57 Ps.
E.M.D.	:	Rs.25,000/-
TENDER DOCUMENT FEES	:	Rs.900.00 + Rs.162.00 (18%GST) = Rs.1,062/-
CLASS	:	"E-1"

TENDER TO BE SUBMITTED TO:
 THE CHIEF ACCOUNTANT,
 SURAT MUNICIPAL CORPORATION,
 SHRI TAPI BHAVAN,
 GORDHANDAS CHOKHAWALA MARG, SHRI TAPIPURA
 SURAT – 395 003.

**SURAT MUNICIPAL CORPORATION
TENDER DOCUMENT
I N D E X**

SR. NO.	PARTICULARS	PAGE NO.
1.	NOTICE INVITING TENDER	03
2.	CONTRACTOR TO PLEASE READ THIS CAREFULLY	09
3.	DECLARATION FORM	11
4.	CHECK LIST	12
5.	INSTRUCTIONS TO TENDERERS	13
6.	GENERAL RULES AND DIRECTIONS FOR THE GUIDANCE FOR CONTRACTOR	26
7.	GENERAL CONDITIONS OF CONTRACT	30
8.	SCHEDULE-A	58
9.	MEMORANDUM	60
10.	CONDITION FOR THE WATER SUPPLY AND ELECTRIC SUPPLY	61
11.	IMPORTANT INSTRUCTIONS-A TO THE CONTRACTOR	62
12.	IMPORTANT INSTRUCTIONS-B TO THE CONTRACTOR	63
13.	SPECIFICATIONS OF MATERIALS	64
14.	GENERAL TECHNICAL SPECIFICATION FOR THE WORKS	92
15.	ITEMWISE DETAILED TECHNICAL SPECIFICATIONS	94
16.	AFFIDAVIT	161
17.	UNDERTAKING	162
18.	ANTI-BLACKLISTING CERTIFICATE	163
19.	LIST OF BANKS	164

SURAT MUNICIPAL CORPORATION

1.0 NOTICE INVITING TENDER

(A) RECEIPT AND OPENING OF TENDER :

Online Tenders will be received from the established and reliable contractors **From 19/06/2026 to 09/07/2026 up to 18.00 hrs.** on website smc.nprocure.com. The tender received after due time and date specified will not be accepted.

(B) NAME OF WORK : **ANNUAL RATE CONTRACT FOR CIVIL MAINTENANCE AND REPAIRING IN BRTS BUS SHELTERS, CITY BUS STOPS AND BUS DEPOTS IN NEW EAST (SARTHANA) ZONE IN SURAT CITY. (Work no.02)**

- | | |
|--------------------------|--|
| 1. ESTIMATED COST | : Rs. 24,30,508.57 Ps. |
| 2. EARNEST MONEY DEPOSIT | : Rs. 25,000/- |
| 3. TIME LIMIT | : 12 (Twelve) months [Including monsoon] |
| 4. Tender Document Fee | : Rs. 900.00 + Rs.162.00 (18% GST) = Rs. 1062/- |
| 5. Registration required | : "E-1" |

(C) OPENING OF TENDERS:

The tenders will be opened online in presence of bidders who wants to remain present and opening authority subject to receipt of Tender Fees, EMD **in hard copy in Account Department (Head Office). But Tenderer has to upload relevant documents as required/mentioned in the technical bid in Soft Copy (By Scanning).** The tenders will be opened in two stages i.e. Technical Bid and Commercial Bid.

(D) PURCHASE OF TENDER DOCUMENTS :

Tender Documents can be downloaded from smc.nprocure.com **From 19/06/2026 to 09/07/2026.** Tender documents fees as mentioned which is required for submission of tender towards the cost of tender documents in pay order or by demand draft of any nationalized bank, in favor of "The Commissioner, Surat Municipal Corporation" payable at Surat and shall be submitted along with EMD and other documents. The cost of the Tender Documents will not be refunded in any circumstances. The Surat Municipal Corporation shall not be liable for any postal delay in any case.

- **EMD & Tender Fee shall be submitted in electronic format only through online (by scanning) while uploading the bid. This submission shall mean that EMD and tender fee are received for purpose of opening the bid. Accordingly, offer/tenders of those Tenderer whose EMD & tender fee is received electronically, shall be opened. However, for the purpose of realization of EMD and Tender fee, bidder shall send the EMD as well as Tender fee in required format in original through RPAD/Speed post so as to reach to Account Department (Head office) within stipulated date as mentioned in tender notice for the submission of tender FEE & EMD.**

As per City Engineer, Note No.61, dated.05/02/2025, The EMD for the tender (EMD) and the demand draft of tender fee shall be scanned online and the tender shall be uploaded in electronic format. The details submitted in this manner shall be deemed to have received the EMD and tender fee. And accordingly the tender will be opened only for those who have received the EMD and tender Fee in electronic format. For actual payment, the tenderer has to submit the demand draft in original form through the Register Post Add./Speed Post to the Accounts Department (Main Office) within 07 (seven) days from the last date of uploading. In the first instance of non-arrival of demand draft in original at the Chief Accounts Office of Surat Municipal Corporation within the stipulated time, penaltative action shall be taken as per the table mentioned below.

Sr.No.	Tender Amount Rs. Ps.	The Penalty Amount Rs. Ps.
1	up to 1.00 cr	10,000/-
2	above Rs.1.00 cr and Rs. Up to 10.00 cr	20,000/-
3	above 10.00 cr and up to Rs.50.00 cr	30,000/-
4	above 50.00 cr more and Rs. 100.00 cr	70,000/-
5	More than 100.00 cr	1,00,000/-

If the tenderer does not deposit the penalty amount to the Municipal Corporation within 10 days and/or if the tenderer commits this type of lapse/mistake for the second time, in case of non-Submission of the demand draft in the second time, punitive action against the tenderer (in case the Penalty based actions for not submitting D.D. in original to Account Department (Main Office) by bidder shall be initiated and action shall be taken for abeyance of registration and cancellation of E-Tendering code for 6 month) Will be taken. Any documents in support of the tender bid required shall be scanned and sent online in electronic format and separate hard copies will not be accepted.

- **All documents must be coloured scanned to be seen as original. Scanning in black and white or gray shall not be acceptable.**
- **If the documents uploaded electronically are photocopies, they must be notarized with clearly displaying stamp, number and name of the notary.**

(E) **CONTRACT PERIOD :**

The total contract period is hereby fixed as **12(Twelve) months including monsoon from the 11th Day of the work order.**

(F) **Tenderer must comply with and agree to all instructions & requirements in the Notice and in the Instructions to Tenderer, including requirements in the Contract Documents.**

- All tenders must be submitted in the prescribed Tender form.
- Each Tender must be accompanied by the completion Schedule.
- Each tender must be accompanied by the Tender Document fee and the Tender Security (Earnest Money Deposit).
- The successful Tenderer shall execute the Contract Agreement within fifteen days after the date of Notice of award.
- The successful Tenderer will be required to furnish a performance bond (Security Deposit) of amount equal to **(2%)** two percent of the tendered amount.
- The successful Tenderer shall furnish insurance in accordance with the contract documents.
- The Surat Municipal Corporation may withhold issuance of the Notice of proceeds for a period not exceeding **fifteen** days after the date of execution of the contract agreement.
- The tender and tender guarantee bond (Earnest Money Deposit) shall be submitted by the Agency in whose name tender has been issued. Transfer of tender documents to any other party is prohibited.

- (i) All intending tenderers will have to purchase digital signatures in order to participate in the online bidding process.
- (j) **All the applicant contractors are required to have their own employer's code number under EPF Act, 1952 and are required to comply the applicable provisions of said statute regularly and totally.**
- (k) **Further the contractors for services are required to produce the certified copies of paid challans in respect of employees/workers employed by said contractor in respect of work allotted by Surat Municipal Corporation, along with copies of Pay Roll and Muster Roll. If the same are not produced, the bills will not be released.**

(G) RECEIPT OF TENDER DOCUMENTS :

The following details are to be submitted online on smc.nprocure.com :

- a. Document fees and EMD Details
- b. Commercial Bid
- c. Statement A to B along with all necessary supporting documents
- d. Bank solvency
- e. Pan Card
- f. GST Registration
- g. Power of attorney
- h. Partnership deed in case of Partnership firm.
- i. Affidavit of Annexure A on Non Judicial Stamp Paper of Rs.300/-
- j. Undertaking on Non-Judicial Stamp paper of Rs 300/-.
- k. Anti- blacklist Certificate on Non-Judicial Stamp paper of Rs 300/-.
- l. All documents in supporting of bid.

The following details shall be submitted in hard copy at prescribed address :

- a. Tender fees in prescribed format
- b. Earnest Money Deposit in prescribed format
- c. Affidavit of Annexure A on Non Judicial Stamp Paper of Rs.300/-
- d. Other necessary documents mentioned in Technical Bid (if any)
- e. Declaration Form.
- f. Undertaking on Non-Judicial Stamp paper of Rs 300/-.
- g. Anti- blacklist Certificate on Non-Judicial Stamp paper of Rs 300/-.
- h. Addenda Corrigendum if any.

Please note that commercial bid shall not be submitted in hard copy under any circumstances. This will hold the tender liable for rejection.

(H) Tender Validity Period:

The validity period of the tender submitted for this work shall be of one hundred twenty (120) calendar days from date of opening of the price bid for this work and the Tenderer shall not be allowed to withdraw or modify the tender offer on his own during the validity period.

(I) Rights Reserved:

Without assigning any reason, The Surat Municipal Corporation reserves the right to reject the lowest or any other or all tenders or part of its. To waive any informality or irregularity in any tender, which in the opinion of the Surat Municipal Corporation does not appear to be in its best interest and cause of action or claim against the Surat Municipal Corporation or its officers, employee, successors or assignees for rejection of this tender.

The Surat Municipal Corporation further reserves the right to withhold issuance of the notice to proceed, after execution of the contract agreement by the successful Tenderer. The Surat Municipal Corporation is not obliged to give reasons for any such action.

During Tender validity period, if any Tenderer withdraws or makes any modifications or additions in the terms and conditions on his own in this tender, then The Surat Municipal Corporation shall without prejudice to any right or remedy be at liberty to reject the tender and forfeit the Earnest Money Deposit in full. Such Tenderer may be disqualified from tendering for further works under the jurisdiction of The Surat Municipal Corporation.

The Surat Municipal Corporation reserves the right to increase or decrease the scope of work and split the tender in two or more parts without assigning any reason even after the award of contract.

Signature of the contractor with seal:

Date :

**Executive Engineer
Traffic-BRTS Project Cell
Surat Municipal Corporation**

**ANNEXURE-I TO II FOR PRE-QUALIFICATION
TO BE FILLED IN BY TENDERER
ANNEXURE-I**

Proforma for list of works of similar nature already completed by the Tenderer during last 7 years.

Sr. No.	Name of work and Place	Cost on Completion	Time taken in months to complete the work	Client name	Date of completion
1	2	3	4	5	6

Note: Bidder shall give completion certificate from client. In absence of such completion certificate, experience shall not be considered for evaluation. If completion certificate covers "Similar work with other work" then bidders shall have to submit copies of final bill indicating similar work or certificate of amount including "Similar work" from relevant authority (Govt. or Semi Govt. Dept., State Govt., Municipal Corporation, Municipality, CPWD etc.). Also an attested copy of registration with MES, Various department of State Govt., Surat Municipal Corporation, CPWD etc.)

Please Fill above details attached separate sheet.

Signature of the Contractor
With seal.

Place:
Date

ANNEXURE-II

Proforma for declaration regarding work on hand with the tender:

Sr. No.	Name of work with place	Estimated Cost	Date of Issue of work order	Stipulated period of completion	Amount of work done	Brief details of delay if any	Name of client
1	2	3	4	5	6	7	8

Present liability = Total of column 3 - Total of column-6

Signature of the Contractor
with seal :
Place
Date:

Note: Amount of work done in Column 6, should be given up to the month previous to the month in which tender are invited.

Please Fill above details attached separate sheet.

SURAT MUNICIPAL CORPORATION

TRAFFIC- BRTS PROJECT CELL

2.0 CONTRACTOR TO PLEASE READ THIS CAREFULLY

- (1) If the tender is taken in favour of the company, a power of attorney in favour of the person who may have signed the tender for the company, must accompany the tender.
- (2) Current Solvency certificate of Bank or a Revenue Officer of an amount upto 20% of the tender cost plus works on the hand still to be executed will have to be produced by the contractor.
- (3) Tenderer may pay earnest money in form of a crossed demand draft of a local Bank drawn in favour of the Municipal Commissioner. Earnest Money by cheque shall not be accepted.
- (4) In view of the latest circular of IT Department IT clearance certificate is not required. However the contractor shall give photo copy of the PAN card. Also provide GST Number and necessary documents as per Govt-resolution.
- (5) Copies of certificate as regards previous experience of **similar type of completed works of Govt. or Semi Govt. Dept., if any must accompany the tender. Also an attested copy of registration with MES, Various department of State Govt., Surat Municipal Corporation, CPWD etc.**
- (6) Declaration showing all works on hand with the contractor and the value of works that remains to be executed in each case must accompany the tender.
- (7) All pages of Schedule: 'A & B' & specification should be initialled by the contractor.
- (8) All corrections, erasures & over writing should be initialled by the contractor.
- (9) Discrepancies and adjustment of errors:- Any error in quantity or amount in Schedule-'B' showing item of words to be carried out shall be adjusted in accordance with the following rules:-
 - (a) In the event of a discrepancy between description in works and figures quoted by a tenderer in the 'rates' column, the descriptions in words shall prevail.
 - (b) In the event of an error occurring in the amount column of the Schedule- 'B' showing items of works as a result of wrong multiplication of the unit rate and quantity, the units rate shall be regarded as firm and multiplication shall be amended on the basis of the rate.
 - (c) All the errors in totalling in amount column and in carrying forwarded total shall be corrected.
 - (d) Any rounding of amounts against item 'or in totals' shall be ignored.

The tendered sum so altered shall, for the purpose of the tenders, be substituted for the sum originally tendered and considered for acceptance.
- (10) (i) It may please be noted that the tender shall be considered as invalid specially, if the requirements as per instruction No.1 to 9 above are not completed before submitting the tender. Also please read carefully the face sheet and "General Rules and Direction for the guidance of contractor" of his form.
 (ii) Right is reserved to reject any or all tender (s) without assigning any person (s) thereof.
- (11) In addition to the above the tender will also be liable to rejected outright if :-
 - (i) The tenderer proposes any alteration in the works specified or in the time allowed for carrying out the work or any conditions or correction made in any code or made of Schedule-'B' or specifications.
 - (ii) Any of the page or pages of the tender is removed or replaced.
 - (iii) All corrections, additions or pasted slips are not initialled by the tenderer.
 - (iv) Any erasures is made by him in the tender AND
 - (v) The tenderer or in the case of a firm, each partner or person holding the power of attorney thereof does not signed or the signature/s is/are not attested by a witness on page-9 of the tender in the space for the purpose.

(12) (1) The several documents forming the contract are the essential part of the contract and requirement Occurring in one is as binding as through occurring in all, they are intended to be mutually explanatory and complementary and to described and provide for a complete work.

(2) In the event of any discrepancy, the several documents forming the contract or in any the document, the following order or precedence shall apply:-

(a) Dimension & quantities :-

(i) Drawings.

(ii) Schedule-B of the tender form.

(iii) Specification.

On drawings, figures, dimensions, unless obviously incorrect will be followed in preference to sealed dimensions.

(b) Description :

(i) Schedule-B of the tender form.

(ii) Drawings.

(iii) Specifications.

In case of defective description or ambiguity, the Engineer- in-charge should issue further instructions direction in what meaner the work is to be carried out it being understood that the best modern practice is to followed. The contractor should forthwith comply with such instructions.

(3) The contractor should take no advantage of any apparent error or omission in drawings or specification and the Engineer in charge shall make such corrections and interpretation as necessary to fulfil the intent of the Plans and specifications.

(4) No withstanding that all proper precautions may have been taken by contractor at all the times during the progress of the work, the contract shall be held responsible for all damages whether to the work under execution or to any other property or to lives of persons during the progress of the work and the period of maintenance.

(5) Plans are for rough guidance only when detailed plans are received from the Architect/Consultant of corporation during the course of execution the same will supersede previous plans

(13) The contractor should appoint a qualified engineer and he must remain present on site during working hours.

(14) The Quantity mentioned in the scheduled "B" is Tentative (indicative) for each item. Tender shall have to execute the concerned work/item as per the site condition and payment shall be made accordingly as per the actual measurement of the particular item.

Signature of the contractor with seal:

Date :

**Executive Engineer
Traffic-BRTS Project Cell
Surat Municipal Corporation**

3.0 DECLARATION FORM

- (1) I/We hereby declare that I/We have visited the site and fully acquainted myself/ourselves with the local situation regarding materials, labour and other factors pertaining to the work before submitting this tender.
- (2) I/We hereby declare that I/We have carefully studied the conditions of contract, specifications and other tender documents of this work and agree to execute the same accordingly.

Signature of the contractor with seal:

Address:

Date :

**Executive Engineer
Traffic-BRTS Project Cell
Surat Municipal Corporation**

SURAT MUNICIPAL CORPORATION

TRAFFIC BRTS PROJECT CELL

E- Tender Notice (online) No. ACE & I/C C.E./ TRAFFIC- BRTS PROJECT CELL /03/2026-2027
(Work No.02)

4.0 CHECK LIST

Sr. No.	Particulars	To be Submitted		Please O Mark as for Submission
		file to be attached Online	Hardcopy Submission	
(1)	Forwarding Letter	No	Yes	
(2)	Tender Fee	Yes	DD / PO	
(3)	EMD	Yes	DD / PO	
(4)	GST Registration certificates	Yes	No	
(5)	PAN card No.	Yes	No	
(6)	Professional Tax Registration (EC/RC) certificates	Yes	No	
(7)	1. Partnership Agreement / Partnership Deed / power of attorney / Board Resolution in case of semi government / government Organization for being the tender documents etc. (if applicable)	Yes	No	
	2. Power of attorney for signing tender document etc. (if applicable)	Yes	No	
	3. Photograph of each partner or as the case may be	Yes	No	
(8)	Solvency certificate	Yes	No	
(9)	Financial turnover certificate of last three years	Yes	No	
(10)	Certificates of successful completion of work for the works mentioned in "IT-04".	Yes	No	
(11)	A list of work on hand	Yes	No	
(12)	All the documents required as per the check list/attached annexure with the tender.	Yes	No	
(13)	Affidavit on non-judicial stamp paper of Rs. 300.00 (Annexure - C)	Yes	Yes	
(14)	Undertaking Certificate on Non Judicial Stamp Paper of Rs.300/-	Yes	Yes	
(15)	Anti-Blacklist Certificate on Non Judicial Stamp Paper of Rs.300/-	Yes	Yes	
(16)	Addenda corrigendum(s) duly sealed/ signed if applicable)	Yes	Yes	
(17)	CHECK LIST	Yes	No	

Note: -

The tenderer should be required to furnish details/certificates etc. as mentioned above otherwise their offer/tender shall be liable for rejection.

SEAL & SIGNATURE OF TENDERER :-

5.0 INSTRUCTIONS TO TENDERERS

IT-01 GENERAL :

The Contract documents may be secured in accordance with the notice Inviting Tender for the work called. The work shall include supply of materials necessary for construction of the work.

IT-02 INVITATION TO TENDER:

The Surat Municipal Corporation hereinafter referred to as the Corporation will receive tenders for the work of **ANNUAL RATE CONTRACT FOR CIVIL MAINTENANCE AND REPAIRING IN BRTS BUS SHELTERS, CITY BUS STOPS AND BUS DEPOTS IN NEW EAST (SARTHANA) ZONE IN SURAT CITY** as per the specifications in the tender documents. The tenders shall be opened in presence of opening authority Surat in the presence of tenderers or their representatives who are present. The Corporation reserves the right to reject the lowest or any other or all 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 tender.

IT-03 LANGUAGE OF TENDER :

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

IT-04 QUALIFICATIONS OF TENDERERS:-

(A) Mainly tenderer shall fulfil following the pre-qualification.

(a) Experience of having successfully completed similar works during last 7 years ~~either of the following:~~

~~(1a) Three similar completed works, each costing not less than amount equal to 40% of the estimated cost.~~

OR

~~(2a) Two similar completed works, each costing not less the amount equal to 50% of the estimated cost.~~

OR

~~(3a) One similar completed works, each costing not less the amount equal to 80% of the estimated cost.~~

"Similar work" means Civil Maintenance / Construction work of building works likes residential building, commercial buildings, educational building, hospital buildings and Fabricated Structure work of relevant authority (Govt. or Semi Govt. Dept., State Govt., Municipal Corporation, Municipality, CPWD etc.)

(b) Average Annual Turnover during last 3 years, ending 31st March of previous financial year should be atleast 30% of Estimated Tender Amount. An attested copy of annual turnover for last 3 years should be enclosed. The turnover certificate shall be prepared by Chartered Accountant

(c) Current Solvency certificate from bankers of schedule bank/Nationalized bank for the amount upto 20% of the tender cost plus works on the hand still to be executed.

(d) An attested copy of registration with MES, Various department of State Govt., Surat Municipal Corporation, CPWD etc.

(e) List of the works already completed in last seven years in prescribed proforma as per Annexure-I and attested copies of certificates from head of the office concerned for completion of the works.

~~Following enhancement factors will be used for the cost of works executed on financial figures to amount base for the value of the works completed in India.~~

Financial Year	Multiplying factor
One (2021-22)	1.10
Two (2020-21)	1.21
Three (2019-20)	1.33
Four (2018-19)	1.46
Five (2017-18)	1.61
Six (2016-17)	1.77
Seven (2015-16)	1.95

Bidder should indicate actual figures of cost and the amount for the work executed in Annexure-I without accounting for the above mentioned factors.

(f) Declaration regarding the work on hand with the tender should also be given in prescribed proforma as per Annexure-II. Attested copies of work orders, interim certificates if any shall also be attach as supporting documents.

(g) Attested copy of partnership deed, power of attorney etc.

IT-05 TENDER DOCUMENTS :

Printed and online documents and set of drawings shall comprehensively be referred to as Tender documents. The several sections forming the documents are the essential parts of the contract and a requirement occurring in one shall be binding as though occurring in all. They are to be taken as mutually explanatory and describe and provide for complete works.

IT-06 EXAMINATION BY TENDERERS :

- A. At his own expenses and prior to submitting his 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 Tender Documents.
- B. The tender quantity is approximate and may increase or decrease. Any increase or decrease in quantity will not entitle tenderer to claim any extra over the quoted rate.

IT-07 EARNEST MONEY DEPOSIT:

- A. The Tender shall be accompanied by the Earnest Money Deposit. The tenderer shall pay Earnest Money Deposit to be deposited by pay order/demand draft issued in favour of Commissioner, Surat Municipal Corporation, Surat through Nationalized / Schedule Bank only. The Earnest Money Deposit in the form of FDR or cheque shall not be accepted. The tenderer shall have to mention details of Earnest Money Deposit on the seal cover of Earnest Money Deposit. The instruments for Earnest Money Deposit shall be issued by or payable / encashable at Surat Branch of the said nationalized bank.
- B. 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 Security Deposit / Performance Guarantee Bond to the owner as stipulated in this tender documents within **fifteen** days after receipt of notice of award of contract. In such case owner may disqualify the tenderer from tendering for further works, under the jurisdictions of the Corporation (S.M.C.).
- C. The Earnest Money Deposit of the successful tender shall be returned after the Security Deposit/ performance guarantee bond, as required, if furnished by the contractor.
- D. No interest shall be paid by the owner on any tender guarantee.

- E. As per City Engineer, Note No.61, dated.05/02/2025, The EMD for the tender (EMD) and the demand draft of tender fee shall be scanned online and the tender shall be uploaded in electronic format. The details submitted in this manner shall be deemed to have received the EMD and tender fee. And accordingly the tender will be opened only for those who have received the EMD and tender Fee in electronic format. For actual payment, the tenderer has to submit the demand draft in original form through the Register Post Add./Speed Post to the Accounts Department (Main Office) within 07 (seven) days from the last date of uploading. In the first instance of non-arrival of demand draft in original at the Chief Accounts Office of Surat Municipal Corporation within the stipulated time, penaltative action shall be taken as per the table mentioned below.

Sr.No.	Tender Amount Rs. Ps.	The Penalty Amount Rs. Ps.
1	up to 1.00 cr	10,000/-
2	above Rs.1.00 cr and Rs. Up to 10.00 cr	20,000/-
3	above 10.00 cr and up to Rs.50.00 cr	30,000/-
4	above 50.00 cr more and Rs. 100.00 cr	70,000/-
5	More than 100.00 cr	1,00,000/-

If the tenderer does not deposit the penalty amount to the Municipal Corporation within 10 days and/or if the tenderer commits this type of lapse/mistake for the second time, in case of non-Submission of the demand draft in the second time, punitive action against the tenderer (in case the Penalty based actions for not submitting D.D. in original to Account Department (Main Office) by bidder shall be initiated and action shall be taken for abeyance of registration and cancellation of E-Tendering code for 6 month) Will be taken. Any documents in support of the tender bid required shall be scanned and sent online in electronic format and separate hard copies will not be accepted.

IT-08 INCOME TAX CLEARANCE CERTIFICATE :

In view of the latest circular of IT Department IT clearance certificate is not required. However the contractor shall give attested photo copy of the PAN card and last three years income tax return.

IT-09 PREPARATION OF TENDER DOCUMENTS :

Tenderers are requested to note the following while preparing the Tender Documents:

- A. **Technical bid, EMD and Tender** fees shall be submitted on the Tender Form bound herein in English. All tender items and statements shall be properly filled in. Numbers shall be stated both in words and in figures wherever so indicated, and signatures of all persons signing shall be in longhand.
- B. **Technical Bid** shall be accompanied by the prescribed 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 address shall be stated below their signatures. All signatures in the Tender Documents shall be dated.
- C. Variations to the Contract Documents requested by the tenderer may be affixed to the Tender Document in the space available and duly signed and stamped. Such variations may be approved or refused by the Engineer at the time of adjudications of Tenders, and in either case the Engineer is not obliged to give reasons for his decisions.
- D. Delivery of Tenders shall comply with Notice inviting tenders as to place, date and time.
- E. Price Bid shall be submitted online only. Tenderers are requested to quote for all parts of the tender.

IT 10 SUBMISSION OF TENDER DOCUMENT :-

- **EMD & Tender Fee shall be submitted in electronic format through online (by scanning) while uploading the bid. This submission shall mean that EMD and tender fee are received for purpose of opening the bid. Accordingly, offer/tenders of those tenderers whose EMD & tender fee is received electronically, shall be opened. However, for the purpose of realization of EMD and Tender fee, bidder shall send the EMD as well as Tender fee in required format in original through RPAD/Speed post so as to reach to Account Department (Head office) within stipulated date as mentioned in tender notice for the submission of TENDER FEE & EMD. (Also refer IT- 07)**
- **All documents in supporting of bid shall be in electronic format only through online (by Scanning) during the bidding period & hard copy will not be accepted separately.**
- All documents must be coloured scanned to be seen as original. Scanning in block and white or gray shall not be acceptable.
- If the documents uploaded electronically are photocopies, they must be notarized with clearly displaying stamp, number and name of the notary.
- **"Only Following Documents shall be submitted in HARD COPY to Surat Municipal Corporation by all bidders."**
 - a. Tender fees in prescribed format
 - b. Earnest Money Deposit in prescribed format
 - c. Affidavit of Annexure A on Non Judicial Stamp Paper of Rs.300/-
 - d. Other necessary documents mentioned in Technical Bid (if any)
 - e. Declaration Form.
 - f. Undertaking on Non-Judicial Stamp paper of Rs 300/-.
 - g. Anti- blacklist Certificate on Non-Judicial Stamp paper of Rs 300/-.
 - h. Addenda Corrigendum if any.

All necessary documents mentioned in Technical bid (if any) shall be submitted online.

Technical bid and price bid are not to be submitted in physical form. Please note that non submission of Technical Bid as well as price bid does not absolve the bidders from any liability created from the bid condition and bidding process. Technical-Bid and Price Bid in hard copy shall be submitted by Successful bidder upon intimation from Surat Municipal Corporation.

(i) COVER : Technical Bid

EMD and Tender Fees for the work of **ANNUAL RATE CONTRACT FOR CIVIL MAINTENANCE AND REPAIRING IN BRTS BUS SHELTERS, CITY BUS STOPS AND BUS DEPOTS IN NEW EAST (SARTHANA) ZONE IN SURAT CITY** along with other Documents in Hard Copy within stipulated period mentioned in the tender. Also mention the name of Tenderer, address, tender notice number, work number etc. on the cover.

The name of work to be written on cover shall be work of **ANNUAL RATE CONTRACT FOR CIVIL MAINTENANCE AND REPAIRING IN BRTS BUS SHELTERS, CITY BUS STOPS AND BUS DEPOTS IN NEW EAST (SARTHANA) ZONE IN SURAT CITY** Also mention the name and the address of tenderer, tender notice number on the cover, work number and to be submitted to the Chief Accountant, Surat Municipal Corporation, Tapipura, Surat – 395 003.

(ii) PRICE BID

Price bid for the work of **ANNUAL RATE CONTRACT FOR CIVIL MAINTENANCE AND REPAIRING IN BRTS BUS SHELTERS, CITY BUS STOPS AND BUS DEPOTS IN NEW EAST (SARTHANA) ZONE IN SURAT CITY** shall be submitted online only.

2. Submission of a tender by a tenderer shall mean that he has read this notice and contract documents and has made himself aware of the scope and specifications of the work to be done and of conditions and nature of required quantities of materials stores, tools and plants etc. that may be required by him in carrying out the work and of local conditions and laws and bylaws of the Government, Surat Municipal Corporation and other factors bearing influence on the execution and cost of the works.
3. **Tender shall stand rejected if:**
 1. Any eraser is made in the tender unauthenticated or any page or pages is/are removed or replaced.
 2. The Tenderer shall submit the tender which satisfied each and every conditions laid down in the notice tender documents, failing which the tender will be liable for rejection.
 3. Tenderer's tender/quotation containing conditions shall be liable for rejection out rightly without assigning any reason for the same.
 4. Stipulates the validity period less than what is stated in the form or tender.
 5. Stipulates his own conditions.
 6. Does not quote his rates inclusive of Octroi duty and other terminal or sales tax or CENTRAL taxes in his rates.
 7. Does not disclose the full names and address of all his partners in the case of partnership firm.
 8. Does not pay the Earnest Money Deposit by Demand Draft/Pay order and Tender Fees with Technical Bid (Cover-1).
 9. Does not submit the tender before the stipulated time and specified date in the Account Office as directed.
 10. Does not attached the document mentioned.
 11. The Tenderer proposes any alteration in the work specified in the tender or in the time limit allowed for carrying out the work or any other condition.
 12. Does not submit all the addenda, corrigendum duly signed in hard copy.
4. All corrections, additions or posted slips to be initialled by the Tenderer.
5. All pages of tender documents including specifications should be initialled by the contractor.
6. The tenderer shall submit the tender that satisfies each and every condition laid down in this notice and tender documents failing which the tender is liable for rejection.
7. Notice of inviting tenders shall be a part of the contract documents.
8. Acceptance of tender/quotation will rest with the competent authority of Surat Municipal Corporation who does not bind himself to accept the lowest and reserves the right to accept or to reject any or all quotations/tenders and no reasons will be given for acceptance or rejection thereof.
9. The contractor shall also attach list of machineries, tools, plants, equipments which he propose to deploy for this work.
10. All octroi duty and other taxes chargeable by the Municipal Corporation shall be payable by the Contractor.
11. Tender once accepted shall be binding on the contractor even if the formal agreement is not signed.
12. Tender once offered cannot be withdrawn except with the permission of head of the concerned department, Surat Municipal Corporation, Surat.
13. The successful tenderer shall be required to enter in to agreement with Municipal Corporation after placing the work order for the said work from SMC.

14. The successful tenderer may be required to furnish surety in accordance with IT-28 on stamp paper.
15. The tenderers are requested to give complete specification of work quoted.
16. Unless specifically mentioned by the tenderer for the extra payment of taxes on price quoted by them it will be presumed the prices quoted are inclusive of the all taxes but excluding GST and no claim will be entertained for payment of extra taxes on the bills submitted by them.
17. The Price-bid will be opened only after technical clarifications are clarified.
18. Surat Municipal Corporation reserves the right to open or not to open any or all Price-bid without assigning any reason thereof.

IT-11 TENDER VALIDITY PERIOD :

The validity period of the tender submitted for this work shall be of one hundred twenty (120) Calendar day from the date of opening of price bid and that the tenderer shall not be allowed to withdraw or modify the tender offer on his own during the validity period. The tenderer will not be allowed to withdraw the tender or make any modifications or additions in the terms and conditions of his own in his tender. If this is done then the owner shall without prejudice to any right or remedy, be at liberty to reject the tender and forfeit the Earnest Money Deposit in full.

IT-12 SIGNING OF 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 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 addresses, or by a partner holding the power of attorney for the firm signing the Tender in which case a certified copy of the power of attorney shall accompany the Tender. A certified copy of the partnership deed, current addresses of all the partners of the firm shall also accompany the tender.

If the tender is made by a limited company or a limited Corporation, it shall be by a duly authorised person holding the power of attorney for signing the Tender in which case a certified copy of the power of attorney shall accompany the Tender. Such limited company or Corporation may be required to furnish satisfactory evidence of its existence before the contract is award.

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 signatures in the Tender document shall be dated.

IT-13 WITHDRAWAL OF TENDERS :

If, during the Tender validity period, the Tenderer withdraws his Tender, the Tender Security (Earnest Money Deposit) shall be forfeited and the Tenderer may be disqualified from tendering for further works under the jurisdiction of SURAT MUNICIPAL CORPORATION.

IT-14 INTERPRETATIONS OF TENDER DOCUMENT :

Tenderers shall carefully examine the tender documents and fully inform themselves as to all the conditions and matters which may in any way affect the work or the cost thereof. Should a tenderer find 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 Divisional Head provided for concerned authority as referred in the Tender Document in Clause GC-01 (Definitions and interpretations) of the (General Condition of Contract). Any resulting interpretation of the Tender documents will be issued to all Tenderers as an addenda corrigendum. Verbal clarification and / or information given by the SMC / Consulting Engineer shall not be binding on the Municipal Corporation.

IT-15 ERRORS AND DISCREPANCIES IN TENDERS :

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

IT-16 MODIFICATION OF DOCUMENTS :

Modification of specifications and extension of the closing date of the tender, if required, will be made by an addendum. Copies of each addendum will be uploaded on line. These shall be signed and shall form a part of 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 addenda.

IT-17 ADDENDA

Addenda form part of the contract documents & full consideration shall be given to all addenda in the preparation of tenders. Tenderers shall verify the number of addenda issued, if any and acknowledge the receipt of all Addenda in the Tender. Failure to acknowledge may cause the Tender to be rejected.

- A. The Engineer of the owner may issue Addenda to advise Tenderers of changed requirements. Such addenda may modify previously issued Addenda.
- B. No Addenda/Corrigendum may be issued after the time stated in Notice Inviting Tenders.

IT-18 TAXES AND DUTIES ON MATERIAL :

All charges taxes on account of Octroi, terminal tax or Sales tax or GST etc. and other duties on material obtain for the works from any source shall be borne by the Contractor. 'P' and 'C' form shall not be supplied by the Municipal Corporation.

IT-19 EVALUATION OF TENDERS : DELETED**IT-20 EVALUATION OF TIME REQUIRED FOR COMPLETION :**

The time required for completion of work shall be considered as indicated by the tenderer in the completion schedule attached with the tender. The completion period mentioned in this schedule is to be reckoned from 11th day from the date of work order to proceed. Total completion period is calendar months from 11th day from date of issue of work order and tenderers should adhere to this delivery time.

IT-21 POLICY FOR TENDER UNDER CONSIDERATION :

Tenders shall be termed to be under consideration from the opening of the tender until such time an official announcement of award is made.

While tenders are under consideration, tenderers and their representative or other interested parties are advised to refrain from connecting by any means Municipal Corporation or representatives on matters related to the tenders under study. The Engineer's representative if necessary will obtain clarification on tenders by requesting information from any or all the tenderers either in writing or through personal contact, as may be necessary. The tenderers will not be permitted to change the substance of his tender after price submission. Non-compliance with this provision shall make the tender liable for rejection.

IT-22 PRICES AND PAYMENTS :

The tenderer must understand clearly that the price quoted are for the total works or the part of the total works quoted for and include all costs due to materials labour, equipment, supervisions, other services, royalties and Octroi etc. and to include all extras 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 excepting for the condition laid down in GC-35 (Price Adjustment).

IT-23 PAYMENT TERMS :

The terms of payment are defined in the General Conditions of Contract. The Municipal Corporation shall not under any circumstances relax, their 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 tenders.

IT-24 AWARD :

Award of the Contract or the rejection of tenders will be made during the Tender validity period stated in the Notice Inviting Tenders.

- 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 in the Notice Inviting Tenders and shall furnish the Bond as required herein. The Contract Agreement shall be executed in the form stipulated by the owner. A copy of the required form is included in the contract documents.
- 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 SMC may annul his award and declare the tender security forfeited.
- 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 & Bonds for the Corporation, partnership firm or other consortium acting as the Tenderer is duly authorised to do so.

IT-25 SIGNING OF CONTRACT :

The successful tender shall be required to pay the security deposit and to execute the contract within 15 days of receipt of intimation to execute the contract, failing which the Municipal Corporation will be entitled to annul the award and forfeit the Earnest Money Deposit. The person to sign the contract document shall be person detailed in Article IT-12.

IT-26 DISQUALIFICATION :

- A. Tender shall be disqualified and will not be taken for consideration if :-
 - (a) The outer envelope does not show on the outside the reference of bid and thus get opened before the due date of opening (as per Article IT-10 i.e. Submission of Tender Document).
 - (b) The Tender Security Deposit is not deposited in full and in the manner i.e. Earnest Money Deposit.
 - (c) The tender is in a language other than English or does not contain its English Translation in case of other language adopted for tender preparation.
 - (d) The tender documents are not signed by an authorised person.
 - (e) The general performance data for qualification not submitted fully.
 - (f) The tenderer does not agree to deposit security amount as specified (as per Article IT-25 i.e. Signing of Contract).
 - (g) The tenderer does not agree to payment terms defined as per Article IT-23 i.e. Payment Terms.)
 - (h) Conditional tender.
- B. Tenderer may further be disqualified if :
 - (a) Price variation is proposed by the Tenderer on any principles other than provided in the Tender Documents.
 - (b) Completion schedule offered is not consistent with the completion schedule defined and specified in tender documents.
 - (c) The validity of tender is more than that mentioned in Article IT-11 i. e. Tender Validity Period.
 - (d) Any of the page or pages of tender is/are removed or replaced.
 - (e) All corrections or pasted slips are not initialled by tenderer.
 - (f) Any erasure is made in the tender.

IT-27 PERFORMANCE GUARANTEE (SECURITY DEPOSIT) :

The total Security Deposit is 4% (Four) percent of contract value and shall be as under:

The successful tenderer shall have to pay initial security deposit at 2% (two) percent of tendered amount.

- Initial Security Deposit (2%) shall be paid in form of Cash or Demand Draft/ Pay Order if the Tender Amount of work is **less than Rs. 2.00 crore.**

The person/persons whose tender may be accepted [here-in after called the Contractor, which expression shall unless excluded by or repugnant to the context include his heirs, executors, administrators and assignees shall (within 15 days of the receipt by him of the notification of the acceptance of his tender) deposit with Municipal Commissioner cash or Government securities endorsed to the Commissioner sum sufficient which will make up the full security deposit specified in the tender.

If the amount of the security deposit to be paid in lump sum within the period specified above is not paid the tender contract already accepted shall be considered as cancelled. The security deposit lodged by Contractor shall be refunded after the expiry of the Defects Liability period as shown in the attached Memorandum after deducting dues, if any, which become liable to be recovered from the Contractor under the terms and conditions of this Agreement.

Regarding remittance and release of Security Deposit (SD), Retention money deposit (RMD) following clause will supersede over and above all the clauses depicted in the tender document.

Tender costing Less than Rs.2.00 Crore.

(a) Remittance of SD/RMD

- The total security deposit shall be recovered at the rate of 4% from contractor. Out of which, 50% of amount as Initial Security Deposit shall be payable at the rate of 2% of approved Tendered Amount in form of Cash or Demand Draft/ Pay Order of any Nationalised Bank (encashable at Surat city).
- The remaining amount of the Security Deposit i.e. 2% to be deducted from each running account bill of Total Amount of Work Done (Including GST).
- 5% Retention money deposit (RMD) to be retained from each running account bill of Total Amount of Work Done (Including GST).

(b) Release of SD/RMD

- The 2% Initial security deposit **in form of Cash or Demand Draft/ Pay Order** shall be released after clearance of Final bill by Audit Dept and completion of defect liability period is 01(One) Year From Date Of Completion.
- Remaining 2% of work done in terms of performance security deposit deducted from the running and final bill shall be refunded at the end of the defect liability period, after payment of final bill and after rectifying the defects found.
- 5% Retention money deposit (RMD) to be released along with final bill.

Tender costing Rs. 2.00 Crore. & more than Rs. 2.00 Crore.

(a) Remittance of SD/RMD

- ~~The total security deposit shall be recovered at the rate of 4% from contractor. Out of which, 50% of amount as Initial Security Deposit shall be payable at the rate of 2% of approved tender cost in form of in Cash or Demand Draft/ Pay Order / FDR / Bank Guarantee of any Nationalised Bank (encashable at Surat city).~~
- ~~The remaining amount of the Security Deposit i.e. 2% to be deducted from each running account bill.~~
- ~~5% Retention money deposit (RMD) to be retained from each running account bill.~~

(b 1) Release of SD/RMD

- (i) ~~The 2% Initial security deposit in form Demand Draft /Pay order / FDR shall be released after clearance of Final bill by Audit Dept & completion of defect liability period.~~
- (ii) ~~Whereas, the 2% security deposit recovered from the each running account bills Shall b released along with Final Bills according to Work Quality.~~
- (iii) ~~5% Retention money deposit (RMD) to be released along with final bill.~~

(b 2) Release of SD/RMD

- (i) ~~The 2% Initial security deposit in form Bank Guarantee shall be released along with Final Bills according to Work Quality.~~
- (ii) ~~Whereas, the 2% security deposit recovered from the each running account bills Shall be released after clearance of Final bill by Audit Dept & completion of defect liability period.~~
- (iii) ~~5% Retention money deposit (RMD) to be released along with final bill.~~

~~The amount recovered from the running bills as security deposit shall not be allowed to the transferred in the form of Bank Guarantee. However, the remaining 50% (2% of Security Deposit) of the amount so, deducted from running bills will be allowed for conversion in the form of interest bearing fixed deposit receipt, (FDR) issued in favour of the Municipal Commissioner, Surat Municipal Corporation, Surat by a Nationalized Bank located at Surat only. Additional stamp duty payable as per government prevailing rule shall be paid by contractor for remittance of this FDR.~~

~~It is clarified that the amount of security deposit shall be collected on the basis of contract price and not on the basis of Estimated Amount put to tender. As initial Security Deposit as mentioned above, accepted by the competent Authority shall have to be paid toward Security Deposit at the time of execution of agreement.~~

~~Interest will be payable on FDR (that is deducted from Running Bill and converted in to FDR for initial SD) for One year, after completion of work. After that no further interest shall be paid for any extended period what so ever.~~

- (i) If the Security Deposit is not paid within 15 days from the date of L.O.I. / Work Order than penalty at the rate of 0.065% per day of the amount of Security Deposit will charged. If the Security Deposit is not paid within one month with interest, necessary actions as per condition of contract will be taken.
- (ii) The Tenderer shall place Tender Deposit/Earnest Money Deposit by Demand Draft or pay order drawn on any Nationalized /Scheduled Bank situated in Surat favouring "Commissioner" Surat Municipal Corporation and payable at Surat only. The Tender Deposit/Earnest money deposit in any other form shall not be accepted and in that case the tender shall be liable for rejection without assigning any reason what so ever for such rejection.
- (iii) If there is increase in amount of work more than 5% of the contract value (tendered amount + GST), the additional S.D. should be recovered from the running bill. When the total amount of work done by the Contractor upto running bills under consideration is more than 5% of the contract value (tendered amount + GST). However, such S.D. shall be recovered in the round figure of Rs. 1000/- i. e. the amount of work done when it exceeds 5% of the contract value it shall be rounded of the nearest multiple of Rs. 25000/- such additional S.D. shall be recovered for the works amount to Rs. 5 Lacs or more at the rate of 4% of the additional amount.
- (iv) In many cases, the contractors are stopping the work half- way due to number of reasons and when the department has to take actions in accordance to clause 3(a) or (b) or (c) of the contract the remaining work has to be carried out by advertising the tender for the remaining work and the whole administrative process right from inviting tenders to finalizing the tender etc. shall be repeated. In such cases a fixed amount of Rs.1000/- should be recovered from the original contractor towards the cost of advertisement and other administrative charges incurred by the department in finalizing the contract for the remaining work. In case a separate advertisement is issued for a single work actual cost of advertisement shall be recovered such recovery shall be in addition to the recovery to be made under clause-3 or such other relevant clauses.

~~Initial Security Deposit (i.e. 2% Of Tender Amount) in form of Bank Guarantee may be accepted as per relevant tender provision, However BG shall be valid till final date of completion of work+1year (Whether final bill is audited and paid or not). It shall be contractor's responsibility to extent the BG On Or Before expiry of time limit of BG. In case of late renewal of BG, penalty of security deposit shall be levied at the rate of 0.065% of per day of BG amount.~~

~~The successful tenderer shall have to enter into an agreement on a non-judicial stamp paper of Rs. 300/- if initial Security Deposite paid in form Bank Guarantee or Demand draft as per the form of the agreement approved by the Municipal Corporation, Surat.~~

~~If initial Security deposit is paid in form of Fixed Deposit, additional stamp paper amounting As per government's prevailing rule of Security Deposit shall be used to execute the agreement.~~

IT-28 STAMP DUTY :

The successful tenderer shall have to enter into an agreement on a non-judicial stamp paper of Rs.4.90 % of S.D. Amount, if S.D. Amount in FDR otherwise as per the form of the agreement approved by the Municipal Corporation, Surat. (i.e. on stamp paper worth Rs.300/-)

The Undertaking and Surety shall be executed on stamp paper worth **Rs.300/- + Rs.300/-**.

Specific references in the specifications to any materials by tender's name, or catalogue number shall be construed as establishing a standard or quality and performance and not as limiting competition and the tenderer in such cases, may at their option freely use any other product, provided that it ensures and equal or higher quality than the standard mentioned and meets Municipal Corporation approval.

IT-29 BRAND NAMES :

Specific references in the specifications to any materials by tender's name, or catalogue number shall be construed as establishing a standard or quality and performance and not as limiting competition and the tenderer in such cases, may at their option freely use any other product, provided that it ensures and equal or higher quality than the standard mentioned and meets Municipal Corporation approval.

IT-30 NON-TRANSFERABLE :

Tender documents are not transferable.

IT-31 COST OF TENDERING :

The owner will not defray expenses incurred by Tenderers in tendering.

IT-32 DEFECT OF TENDER :

The Tender for the work shall remain open for a period of 120 calendar days from the date of opening of price bid of the tenders for this work and that the tenderer shall not be allowed to withdraw or modify the offer on his own during the period. If any tenderer withdraws or makes any modifications or additions in the terms and conditions on his own, then the Municipal Corporation, shall without prejudice to any right or remedy, be at liberty to reject the tender and forfeit the earnest money in full.

IT-33 CHANGE IN A QUANTITY :

The Surat Municipal Corporation reserves the right to waive any informality in any tender and to reject one or all tenders without assigning any reasons for such rejections and also to vary quantities of items or group as specified in the Schedule of price as may be necessary. Claim what so ever by the contractor on the basis of variation of quantities shall not be entertained.

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 work.

IT-35 RIGHTS RESERVED :

The SMC reserves the right to reject any or all tenders, to waive any informality or irregularity in any tender without assigning any reasons. The SMC further reserves the right to withhold issuance of the notice to proceed, after execution of the contract agreement, for the period of time stated in the notice inviting tenders and no additional payment will be made to the successful tenderer on account of such withholding. The SMC is not obliged to give reasons for any such action.

IT-36 Municipal Commissioner reserves the right to reduce the scope of work and split the tender in two or more parts without assigning any reason even after the award of contract.

IT-37 No mobilisation advance or advance on machinery will be given.

IT-38 The scope of work is clearly mentioned in the tender documents. The contractor shall have to carry out the work in accordance with the details specifications. No conditions will be accepted. The conditional tender will be liable to be rejected.

IT-39 The surplus excavated earth, after backfilling the trenches shall have to be removed from the site as directed.

After compaction and consolidation, if any short fall of earth is found then contractor has to bring the same to the required quantity in order to meet shortfall at his own cost. Moreover, if any settlement of road after reinstatement is observed during the defect liability period of the work, contractor shall be fully responsible for the defective work and patches/ depression / settlement shall be repaired with quarry spoil or metal at contractor's own cost. If contractor fails to repair the patches / depression / settlement in time, corporation will repair it at all risk and cost of contractor.

Surplus earth shall not be disposed off in a way that leads to nuisance to the public or SMC.

IT-40 Taxes

GST CLAUSE FOR CONSTRUCTION / ERECTION / COMMISSIONING / INSTALLATION / REPAIRS / MAINTENANCE / RENOVATION / FABRICATION OF STRUCTURE INCLUDING BUILDING (MEANS ALL WORKS CONTRACT / TURN KEY PROJECTS / SUPPLY OF MATERIAL / GOODS)

GST (Goods & Service Tax) has come in existence from 1st July, 2017. Contractor / Successful Bidder is bound to pay any amount of GST prescribed by the Govt. of India as per the Terms of Contract agreed upon during the course of execution of this Contract.

During the course of execution of Contract, if there is any change in Rate of GST (Goods & Service Tax) by the Government, the same shall be reimbursed / recovered separately by SMC, subject to the submission of Original Receipt / Proof for the amounts actually remitted by the Successful Tenderer / Contractor to the Competent Authority along with a Certificate from Chartered Accountant of Contractor / Successful Bidder certifying that the amount of GST paid to the Government and the same shall be intimated / submitted / claimed within 30 (Thirty) Days from the date of payment. Remittance of GST within stipulated Period shall be the sole responsibility of the Successful Bidder / Contractor, failing which, SMC may recover the amount due, from any other payable dues with SMC and decision of Municipal Commissioner shall be final and binding on the Contractor / Successful Bidder in this regard. Further, the non-payment of GST to the Government may lead to the termination of contract and forfeiture of Security Deposit / Performance Guarantee Amount.

If imposition of any other new Taxes / Duties / Levies / Cess or any other incidentals etc. or any increase in the existing Taxes / Duties / Levies / Cess or any other incidentals etc. (Excluding GST) are imposed during the course of the contract, the same shall be borne by the Contractor / Successful Bidder only, in no case SMC shall be liable for the same.

The Contractor will submit the invoice to the SMC having GSTIN of SMC mentioned therein and the taxes shall be shown separately on the face of the Invoice so as to claim as ITC by SMC.

1% Construction Cess will be deducted from respective R.A. Bill and Final bill in accordance with the prevailing norms of Govt. of Gujarat.

Signature of the contractor with seal:

Address:

Date :

**Executive Engineer
Traffic-BRTS Project Cell
Surat Municipal Corporation**

SURAT MUNICIPAL CORPORATION

PERCENTAGE RATE TENDER & CONTRACT FOR WORKS

6.0 GENERAL RULES AND DIRECTIONS FOR THE GUIDANCE OF CONTRACTORS :-

- (1) All work proposed to be executed by contract shall be notified in a form of invitation to tender Posted on a board hung up in the Municipal Office and signed by the authorised officer of SMC or shall be notified in news paper.
This form will state the work to be carried out, as well as the date for submitting and opening tenders, and the time allowed for carrying out the work; also the amount of earnest money to be deposited with the tender, and the amount of the security deposit to be deposited by the successful tenderer and the percentage, if any to be deducted from bills. Copies of the specifications, designs drawings and estimated rates; schedule rates and any other documents required in connection with the work which will be signed by the Engineer-in-charge for the purpose of identification shall also be opened for inspection by contractors at the office of the Engineer-in-charge during office hours.
Where the works are proposed to be executed according to the specifications recommended by a contractor and approved by a competent authority on behalf of the Surat Municipal Corporation such specification with designs and drawings shall form part of the accepted tender.
- (2) In the event of the tender being submitted by a firm, it must be signed by each partner thereof, and in the event of the absence of any partner, it shall be signed on his behalf by a person holding a power of attorney authorising him to do so.
- (3) Receipt for payments made on account of any work when executed by a firm, should also be signed by all the partners, except where the contractors are described in their tender as a firm, in which case the receipts shall be signed in the name of the firm by one of the partners, or by some other person having authority to give effectual receipt for the firm.
- (4) The Municipal Corporation shall have the right of rejecting all or of the tenders without assigning any reason.
- (5) No receipt for any payment alleged to have been made by a contractor regard to any matter relating to this tender or the contract shall be valid and binding on Municipal Corporation unless it signed by the Engineer-in-charge.
- (6) The memorandum of work to be tendered for and the schedule of materials to be supplied by the Municipal Corporation and their rates shall be filled in and completed by the office of the Engineer-in-charge before the tender form is issued. If a form issued to an intending tenderer has not been so filled in and completed, he shall request the said office to have this done before he completes and delivers his tender.
- (7) All work shall be measured net by standard measure and according to the rules and custom of the Municipal Department of Surat Municipal Corporation without reference to any local custom.
- (8) Under no circumstances shall any contractor be entitled to claim enhanced rates for any items in this contract.
- (9) Every contractor shall, if so desired by the Commissioner, produce alongwith his tender a banker's certificate of his financial stability. If he fails to produce such a certificate his tender will not be considered.
- (10) All corrections and additions or pasted slips shall be initialled by bidders.

- (11) The measurements of work will be taken according to the usual method in use in the Public Works Department of Govt. of Gujarat and no proposals to adopt alternative methods will be accepted. The Commissioner's decision as to what the usual method in use in the Public Works Department will be final.
- (12) The Insurance Company's bond will not be accepted against the Security Deposit.
- (13) The Contractor will have to construct a shed for storing control and valuable materials issued to him under Schedule-'A' of the agreement at work site having double locking arrangement. The materials will then be taken for use in the presence of the department person. No materials will be allowed to be removed from the site of work except with the written permission from Engineer-in-charge.
- (14) No foreign exchange will be released by the Corporation for the purpose of plant and machineries required for the execution of the work contracted for.
- (15) Controlled materials (Essentiality certificate)
 - (i) As regard controlled materials the Corporation will help to arrange for the permit as far as possible and help the contractor in securing for the permit as far as possible and help the contractor in securing the same. All incidental charges met with in procuring these materials shall be borne by the contractor himself. Though the Corporation will help to arrange for the permit as far as possible and help the contractor in obtaining the materials it shall not accept any responsibility for any delay or loss on account of delay caused to the contractor while obtaining the same.
 - (ii) The contractor shall submit to Engineer-in-charge on Close of every calendar months, the monthly returns in the prescribed forms as to the receipt and actual use of the controlled materials during the month.
 - (iii) The contractor shall permit the Engineer-in-charge or his representatives to inspect the stock of the controlled materials stored by him at any time, whenever the Engineer-in-charge or his representatives so desired (s).
- (16) The tender for work shall remain open for a period of 120 days from the date of opening of the price bid for this works and that the tenderer shall not be allowed to withdraw or modify the offer on his own during this period. If any tenderer withdraws or makes any modifications or addition/s in the terms and conditions of his tender, not acceptable to the corporation then the corporation shall without prejudice to any right or remedy be at liberty in full the said earnest money absolutely (in figures as well as in words). This Blank Space should be filled in while preparing the draft tender papers.
- (17) The contractor shall employ only such labourer who shall produce a valid certificate of having been vaccinated against small pox within a period of last 3 years.
- (18) Tenderer should submit True Copy of the Certificate of Registration along with the tender without which the tender will not be considered.
- (19) Every partner of the firm shall have to sign the tender documents, otherwise the same will not be accepted.

(20) Performance Guidelines :

For the due performance of the work and safety of the people around and to ensure quality work the following performance guidelines is given to the contractors which shall be strictly followed :

- (I) Boards indicating “Caution-Work in Progress” shall be invariably displayed at site, the boards shall be of enough size so as to be visible and readable from a distance for night time, reflective type boards are from a distance for night time, reflective type boards are advisable : or proper lighting of the site shall be done to avoid accidents.
- (21) The contractor shall have to give in writing the date completion of the work within a fortnight from the date of work completed by him. Otherwise the date noted on the record by the department shall be reawakened as final and no excuse or representation in that behalf shall be entertained at later date.
- (22) "Whatever sales tax is levied by the Government on works contract and if paid by the contractor in the first instance, shall be refunded to the concerned contractor by Corporation.

Signature of the contractor with seal:

Address:

Date :

**Executive Engineer
Traffic-BRTS Project Cell
Surat Municipal Corporation**

TENDER FOR WORKS

<p>I/We hereby tender for the execution for the Surat Municipal Corporation (herein before and after referred to as "Municipal Corporation") of the work specified in the memorandum within the time specified in such memorandum at the tendered rates specified in schedule-B (memorandum showing items of work to be carried out) and in accordance in all respects with the specification, designs, drawings, and instructions in writing referred to the annexed general conditions of contract and agree that when materials for the work are provided by Municipal Corporation such material and the rates to be paid for them shall be as provided in schedule-A hereto.</p> <p>Should this tender be accepted I/We hereby agree to abide by and fulfill all the terms & provisions of the conditions of contract annexed hereto so far as applicable, & in default thereof to forfeit & pay to Municipal Corporation in office the sums of money mentioned in the said conditions.</p>	
<p>* Receipt No. _____ dated _____ from Municipal Corporation in respect of the sum of Rs. _____/A crossed order cheque of Rs. _____ No. _____ Dated _____ on the in favour of the Commissioner, Surat Municipal Corporation is herewith forwarded representing the earnest money the full value of which is to be absolutely forfeited to Municipal Corporation should I/We not deposit the full amount of security deposit specified in the Memorandum, in accordance with GC-10 of the said conditions.</p>	<p>Amount to be specified in word & figures</p> <p>Strike out (a) if no cash security deposit is to be taken</p>
<p>Contractor :</p> <p>Address :</p> <p>Dated the _____ day of _____ 2026</p>	<p>Signature of the Contractor before submission of tender</p>
<p>(Witness)</p> <p>(Address)</p> <p>(Occupation)</p>	<p>Signature of witness to contractor's signature</p>
<p>The above tender is hereby accepted by me on behalf of the Surat Municipal Corporation.</p>	
<p>I/C CITY ENGINEER SURAT MUNICIPAL CORPORATION</p>	<p>Signature of the officer by whom Accepted.</p>
<p>Dated: _____ day of _____ 2026</p>	

7.0 GENERAL CONDITIONS OF CONTRACT

SECTION-I

GC-01 DEFINITIONS AND INTERPRETATIONS:

- 1.0 In the contract documents, as herein defined the following words and expression used shall, unless, repugnant to the subject or context thereof, have the following meanings assigned to them.
- 1.1 The "Owner/Municipal Corporation, Surat represented by Municipal Commissioner / City Engineer / Deputy Municipal Commissioner / Additional City Engineer or any officer authorised by the Municipal Corporation.
- 1.2 The "Contractor" shall mean the person or the persons, firm of company whose tender has been accepted by the owner and includes his legal representative successors and permitted assignees.
- 1.3 The "Engineer-in-charge" shall mean the person designated as such by the owner from time to time and shall include those who are expressly authorised by the Municipal Corporation to act for and on its behalf for the operation of this contract.
- 1.4 "Engineer - in - charge's Representative" shall mean any Engineer or Assistant to the Engineer-in-charge designated from time to time by the Engineer-in-charge to perform duties set forth in the Tender documents whose authority shall be notified in writing to the Contractor by the Engineer-in-charge.
- 1.5 "Tender" The offer or proposal of the Tenderer submitted in the prescribed form setting forth the prices for the work to be performed, and the details thereof.
- 1.6 "Contract Price" shall mean total money payable to the Contractor under the contract documents.
- 1.7 "Addenda" OR "Corrigendum" shall mean the written or graphic notices prior to submission of tender which modify or interpret the contract documents.
- 1.8 "Contract Time" - The number of consecutive calendar months for the completion of work as stated in the executed contract agreement.
- 1.9 "Contract" shall mean agreements between the parties for the execution of works including therein all contract documents.
- 1.10 "Tender document" shall mean Designs, Drawings, specifications, agreed variations, if any, and such other documents constituting the tender and acceptance thereof.
- 1.11 "The Sub-Contractor" means any person, firm or company (other than the contractor) to whom any part of the work has been entrusted by the Contractor with the written consent of the Engineer-in-charge and the legal personnel representative, successors and permitted assignees of such person, firm or company.
- 1.12 "The Specifications" shall mean all directions' the various technical specifications provisions and requirements attached to the contract which pertain to the method and manner or performing the work to the quality of the work and the materials to be furnished under the contract for the work and any order(s) or instruction (a) there under. It shall also mean the latest Indian Standards Institution Specifications for or relative to the particular work or part thereof, so far as they are not contrary to the Tender specifications or I.S.I. specifications, and in absence of any tender specifications, the specifications of any other country applied in India as a matter of Standard Engineering practice and approved in writing by the Engineer-in-charge with or without modifications.
- 1.13 The "Drawing" shall include maps, plans, tracings or prints thereof with any modifications approved in writing by the Engineer-in-charge and such other drawings, as may, from time to time, be furnished or approved in writing by the Engineer-in-charge in connection with the work.
- 1.14 The "Work" shall mean the works to be executed in accordance with the context 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 totally of the work by expression or implication envisaged in the contract and shall include all material, equipment and labour required for or relative or incidental to or in connection with the commencement, performance and completion of any work and/or for incorporation in the work.
- 1.15 The "Permanent work" means works which will be incorporation in and form part of the work to be handed over to the owner by the contractor on completion of the contract.

- 1.16 The "Temporary Work" shall mean all temporary works of every kind required in or about the execution, completion and maintenance of the work.
- 1.17 "Site" shall mean the land and other place on, under, on or through which the work is to be carried out and any other lands or places provided by the Municipal Corporation for the purpose of the Contract together with any other places designated in the Contract as forming part of the site.
- 1.18 "The Construction Equipment" means all appliance/equipments of whatever nature required in or for execution, completion or maintenance of work or temporary works (as hereinafter defined) but does not include materials or other things intended to form or forming part of the permanent work.
- 1.19 "Notice in Writing or Written Notice" means a notice written, types or printed form delivered personally or sent by Registered post to the latest known private or business address at Registered Office of the Contractor.
- 1.20 The "Alteration/Variation order" means an orders given in writing by the Engineer-in-charge to effect additions to or deletion from and alterations in the work.
- 1.21 "Final Test Certificate" shall mean the final test Certificate issued by the owner within the provisions of the Contract.
- 1.22 The "Completion Certificate" shall mean a certificate to be issued by the Engineer-in-charge when the work has been completed to his satisfaction.
- 1.23 The "Final Certificate" shall mean the final certificate issued by the Engineer-in-charge after the work is finally accepted by the owner.
- 1.24 "Defect Liability Period" shall mean the specified period from actual date of completion of work or as decided by Engineer-In-Charge.
- 1.25 "Approved" shall mean approved in writing including subsequent modification in writing of previous verbal approval and "Approval" means approved in writing including as aforesaid.
- 1.26 "Letter of Acceptance" shall mean an intimated by a letter to tenderer that the tender has been accepted in accordance with provisions contained therein.
- 1.27 "Order" and "Instruction" shall respectively mean any written order or instruction given by the Engineer-in-charge within the scope of his powers in terms of the Contract.
- 1.28 "Running Account Bill" shall mean a Bill for the payment of "On Account" money to the contractor during the progress of work on the basis of work done and the non-perishable materials to be incorporated in the work supplied by the Contractor.
- 1.29 "Security Deposit" shall mean the deposit to be held by the owner as security for the due performance of contractual obligations.
- 1.30 "The appointing authority" for the purpose of Arbitration shall be the Municipal Commissioner, Surat Municipal Corporation, Surat.
- 1.31 "Retention Money" shall mean the money retained from R.A. Bill for due completion of "NET WORK".
- 1.32 Unless otherwise specifically stated, the masculine gender shall include the feminine and natural genders and vice-versa and the singular shall include the plural and vice-versa.

GC-02 LOCATION OF SITE AND ACCESSIBILITY :

The site of works is within the limits of Surat Municipal Corporation and SUDA area. It is served by all weather roads and Western Railway Broad Gauge line, Government Irrigation Canal Crossing. The intending Tenderer should inspect the site and make himself familiar with site conditions and available communication facilities. Non availability of access/roads shall in no case be the cause to condone any delay in the execution of the work or be the cause for any claims or extra compensation.

GC-03 SCOPE OF WORK :

The scope of work is defined broadly in the special conditions of Contract and specifications. The Contractor shall provide all necessary materials equipment and labour etc. for the execution and of the work till completion. All materials that go with the work shall be approved by the Engineer-in-charge prior to procurement and use.

Owner at his discretion may endeavour to provide water to the Contractor at the owner's source of supply at one point at the rate charged for such works.

The contractor shall make his own arrangement for the distribution pipe networks from the source of supply after getting prior permission for the same from the Engineer-in-charge. Supply of water shall not be free and the necessary charges as fixed by the Local Body shall have to be paid by the contractor. However, owner does not guarantee the supply of water and this does not relieve the contractor of his responsibility in making his own arrangements and for the timely completion of the work as stipulated.

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

Owner will not be a position to provide land required for Contractors shall have to make his own arrangement for the same. No land will be provided by S.M.C. to the contractor for constructing his labour and supervisory comp and other service facilities.

GC-04 RULLING LANGUAGE :

The language according to which the contractor shall be constructed and interpreted shall be English. All entries in the contract documents and all correspondence between the contractor and the Municipal Corporation or the Engineer shall be in English. All dimensions for the materials shall be given in metric units only.

GC-05 INTERPRETATION OF CONTRACT DOCUMENT :

1. The provisions of the General Conditions of Contract and special conditions of contract shall prevail over those of any other documents of the contract unless specifically provided otherwise. Should there be any discrepancy, inconsistency error or commission in the several documents forming the contract, the matter may be referred to the Engineer-in-charge for his instructions and decision. The Engineer-in-charge's decision in such case shall be the final and binding to the contractor.
2. Works shown upon the drawings but not described in the specifications of described in the specific specifications without showing on the drawings shall be taken as described in the specifications and shown on the drawings.
3. The heading and the marginal notes to the clauses of those general conditions of contract or to the specifications or to any other part of tender documents are solely for the purpose of giving a concise indication and not a summary of contents thereof or be used in the interpretation or construction thereof of the contract.
4. Unless otherwise stated specifically, in this contract documents the singular shall include the plural and vice versa wherever the context so requires. Works implementing persons shall include relevant corporate companies/ registered associations / body of individual / firm of partnership.
5. Notwithstanding the sub-divisions of the documents into separate sections 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 are variance with any provisions of the special conditions of contract, then, unless a different intension appears, the provisions of the special conditions of contract shall be deemed to override the provisions of General conditions of Contract and shall to the extent of such repugnancy or variance prevail.
7. The materials, Design and Workmanship shall satisfy the relevant I.S.S. and Codes referred to. If Additional requirements are shown in the specifications, the same shall be satisfied over and above I.S.S. and Codes.
8. If the specifications mention that the contract shall perform certain work or provide certain facilities, it will mean that the contractor shall do so at his own cost.
9. The correctness of the details given in the tender documents is not guaranteed. The contractor shall independently obtain all necessary information for making the tender. The contractor shall be deemed to have examined the Contract Documents, to have generally obtained his own information in all matters that might affect the carrying out of the work or the Tenderer rates. Any error in description of quantity or commission there from shall not vitiate the contract or release the contractor from executing the work comprised in the contract according to the Drawings and specifications at the tendered rates. He is deemed to have known the scope, nature and magnitude of the work and the requirements of materials and labour involved and as to what all works he has to complete in accordance with the contract whatsoever be the defects, omissions, or errors that may be found in the contract documents. The contractor shall be deemed to have visited the site and the surroundings, to have satisfied himself to the nature of all existing structures, if any, and also as to the nature and

the conditions of railways, roads, bridges and culverts, means of transport and communications, whether by land, air or water and as to possible interceptions thereto and the access and agrees from the site, to have made inquiries, examined and satisfied himself as to the sites for obtaining sand, stones, bricks and other materials, the sites for disposal of surplus materials, the available accommodation as to whatever required, the depicts and such other buildings as may be necessary for executing and completing the work, to have local independent inquiries as to the subsoil, subsoil water and variation thereof, storms, prevailing winds, climatic conditions and all other similar matters effecting the work. He is deemed to have acquainted himself as to his liability for payment of Government taxes, custom duty and other charges.

Any neglect or failure on the part of the contractor in obtaining necessary and reliable information upon the forgoing or any other matters affecting the contract shall not relieve him from any risks or liabilities or the entire responsibility from completion of the work at the tendered rates and time in strict accordance with the contract documents.

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

GC-06 CONTRACTOR TO UNDERSTAND HIMSELF FULLY :

The contractor by tendering shall be deemed to have satisfied himself, as to consideration and circumstances affecting the tender price, as to the possibility of executing the 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 be made beyond the contract price. The contractor shall be responsible for any misunderstanding or incorrect information given in writing by the Engineer.

GC-07 ERROR IN SUBMISSION :

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

GC-08 SUFFICIENCY OF TENDER :

The Contractor shall be deemed to have satisfied himself before tendering as to the correctness of the tender rates which rates shall, except as or otherwise provided for, cover all the Contractor's liabilities and obligation set further or implied in the contract for the proper execution of 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 figures dimension in preference to scale and special conditions in preference to general conditions. Special direction or dimensions given in the specifications shall supersede 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 works 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 Additional City Engineer, in case reference be made to him, be binding upon the contractor shall execute the work according to such explanation (subject to aforesaid) and without addition to or deduction from the contract 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 said specifications. In cases where not particular specifications are given for any article to be used under the contract, relevant specifications of the Indian Standard Institution shall apply.

GC-10 PERFORMANCE GUARANTEE (Security Deposit) : as per IT-27.

GC-11 INSPECTION OF WORK :

1. The Engineer in charge will have full power and authority to inspect the work at any time wherever in progress either on the site or at the contractor's any other manufacturers workshops or factories wherever situated and the contractor shall afford for Engineer-in-charge every facility and assistance to carry out such inspection. Contractor or his authorised representative shall, at all time during the usual working hours and all other times when so notified, remain present to receive orders and instructions, orders given to Contractor's representative shall considered to have the same force as if they had been given to the contractor himself. Contractor shall give not less than 7 days notice in writing to the Engineer-in-charge before covering up or otherwise placing beyond reach of inspection and measuring any work in order that the same may be inspected and measured. In the event of breach of the above, the same shall be recovered at Contractor's expenses for carrying out such inspection or measurement.

2. No material shall be dispatched from contract store on site of work before obtaining approval in writing of the Engineer-in-charge, Contractor shall provide at all time during the progress of work and maintenance period proper means of access with ladders, gangways, etc. and the necessary attendance to move and adopt as directed for inspection or measurement of work by Engineer-in-charge.

GC-12 DEFECT LIABILITY :

1. Contractor shall guarantee the work for a period of **12 (twelve) months** from actual date of completion of work or as decided by Engineer-In-Charge. Any damage or defect that may arise or that may remain undiscovered at the time of issue of completion certificate connected in any way with the equipment or materials supplied by him or in the workmanship be rectified or replaced by contractor at his own expenses as desired by Engineer-in-charge or in default may cause the same to be made good by other agency and deduct expenses of which the certificate of Engineer-in-charge shall be final from any sums that may then or any time thereafter become due to contractor of sale thereof or of a sufficient portion thereof.

2. From the commencement to completion of work contractor shall take full responsibility for the case of the work including all temporary works and in case any damage, loss or injury shall happen to work or any part thereof or to any temporary works from any cause whatsoever and shall at his own cost repair and make good the same so that at completion work shall be in good order and in conformity in every respect with the requirements of contract and as per the instructions of the Engineer-in-charge.

3. If at any time before the work is taken over, the Engineer- in-charge shall -

(a) Decide that any work done or materials used by the contractor are defective or not in accordance with contract or that work of any portion thereof is defective or do not fulfill the requirements of contract (all such materials being hereinafter called defects in this clause and (b) as soon as reasonably practicable given to contractor notice in writing of the said defect specifying particulars of the defects alleged to exist or to have occurred, then contractor shall at his own expenses and with all speed make good the defects so specified.

(b) In case contractor fails to do so, owner may take at the cost of the contractor, such steps as may in all circumstances, be reasonable to make good such defects. The expenditure so incurred by S.M.C. 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 TO GIVE FURTHER INSTRUCTIONS :

The Engineer 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 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 effectually as though the same had accompanied or had been mentioned or referred to in the specifications. No work which radically changes the original nature of the contract shall be ordered by the Engineer and in the event of any deviation being ordered, which in the opinion of the contractor changes the original nature of the contract, the shall nevertheless carry it out and any disagreement as to the nature of the work & the rate to be paid thereof shall be resolved. The time of completion of works, in the event of any deviations, resulting in additional cost over the contract sum being ordered, then be extended or reduced reasonable by the Engineer. The Engineer's decision in the case shall be final and binding.

GC-14 PROGRAMME :

The time allowed for execution of works shall be essence of the contract. The contract period shall commence from date of Notice of intimation to proceed. The tenderer at the time of submitting his tender shall indicate the construction or pipeline schedule, the month-wise program required for the execution of the works and shall confirm the same within fourteen (14) days of the acceptance of his Tender. The contractor shall provide to the Engineer-in-charge a detailed program of time schedule for execution of the works in accordance with the specifications & the completion date. The entire program to be finalised by the Contractor, has to confirm to the execution period mentioned along with the Bill of Quantities in the Tender Documents. The Engineer upon scrutiny of such submitted program by contractor shall examine suitability of it to the requirement of contract and suggest modifications, if found necessary.

GC-15 SUBLETTING OF WORKS :

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

GC-16 SUB-CONTRACTORS FOR TEMPORARY WORKS ETC. :

The owner may give written consent to sub-contractors for execution of any part of the work at the site being entered upon by the contractors provided each individual's contractor is submitted to the Engineer-in-charge before being entered into and is approved by him. List of Sub-Contractors is to be supplied. Notwithstanding any subletting with such approval as aforesaid and notwithstanding the Engineer-in-charge shall have received copies of any sub-contractors, the contractors shall be and shall remain solely responsible for the quality and proper expeditions and execution of the works and the performance of all the conditions of contract in all respects as if such submitting or sub-contracting had not taken place and as if such work 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 of contract 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 No. GC-18 (Extension of time) the contractor will be penalized for the delay.

2. The general time schedule for work is given in the tender document. Contractor shall prepare a detailed weekly or monthly program of work in consultation with Engineer-in-charge soon after the agreement and the work shall be strictly executed accordingly. The time for construction of road given includes, the time required for testing, rectification if any, retesting and completion 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 Municipal Corporation in supplying the materials of equipment it has undertaken to supply under the contract or from delays in handing over sites or from increase in the quantity of work to be done under the contract, or force Majeure an appropriate extension of time will be given. The Contractor shall request 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 when called upon to do so, enter into and execute the Contract Agreement within (15) fifteen days of the Notice of Award, in the form shown in tender documents with such modifications as may be necessary in the opinion of the Municipal Commissioner. It should be incumbent on the contract to pay the stamp duty and the legal charges for the completion of the contract agreement.

GC-20**A. PENALTY FOR DELAY :**

If the contractor fails to complete the work within the stipulated completion date for the work or he shall pay liquidated damages at one tenth of Two percent of contract value per day of delay in completion and handing over the work or part thereof as the case may be to the Municipal Commissioner. The amount of liquidated damages shall, however, be subjected to a maximum of ten (10) percent of the contract value. Delays in excess of one hundred days will be a cause for termination of the contract and forfeiture of all security for performance.

B. BAR CHART:

The successful tenderer shall have to submit the progress bar-chart within fifteen days after the contract, and the contractor should work as per the approved bar-chart, failing the contractor shall have to pay the compensation for delay as per the decision of Municipal Commissioner.

GC-21 FORFEITURE OF SECURITY DEPOSIT :

Whenever any claim arises against the contractor for the payment of a sum of money out of or under the contract, the owner shall be entitled to recover such sum by appropriating in part 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 shall pay to the owner on demand may 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 have forfeited the whole of his Security deposit or have 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 rescission 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% 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 hereof as shall be unexecuted out of his hand to give it to another contractor to complete. In this case the excess expenditure incurred than what whole have been paid to the original contractor, if the work had been executed by him, shall be earnest 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 course being adopted by the owner, the contractor shall have no claim to compensation for any loss sustained by him by reason of his having purchased or procured any materials or entered into any agreement so or made by advance on account of or with a view to the execution of the work or the performance of the contract. In such case the contractor shall not be entitled to recover or be paid by 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 the contractor 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 preceding clause, he may, if he so desire, take possession of all or any tools and plant, materials and stores in or upon the work 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 whose certificate thereof shall be final otherwise 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 if the contractor fails 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 to place of the sale and the certificate of Engineer-in-charge as to the expenses 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 NO COMPENSATION FOR ALTERATION IN OR RESTRICTION OF WORK :

If at any time from the commencement of work, the owner shall for any reasons whatsoever not require the whole or part thereof as specified in the tender to be carried out, the Engineer-in-charge shall give notice in writing of 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 execution of work in full, but which he did not derive in consequence of the full amount of the work not having been carried neither shall he have any claim for compensation by reason of any alternations 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 S.M.C. 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 business concern, such approval as aforesaid shall, likewise be obtained before sub-contractor enters into any 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 in contravention of sub-letting clause hereof and the same action may be taken and the same consequence shall ensue as provided in the sub-letting clause.

GC-24 IN EVENT OF DEATH OF CONTRACTOR :

Without prejudice to any of the right 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 MEMBER 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 obligations of the owner under the contract or answerable for any default or omission in the observance or performance of the 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, explanation or statement or alleged 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 be opened at all reasonable hours to receive instructions, notice 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, to 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 to superintend the execution of the work, competent sub-agents, foremen and leading hands including those specially qualified by previous expeditions to supervise the type of works comprised in the contract in such manner as will ensure work of the best quality and expeditions working, it, in the opinion of the Engineer-in-charge, additional properly qualified supervision staff is considered necessary, if 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 agents, sub-agents, assistance, foremen or other employees shall, in the opinion of Engineer-in-charge, be guilty of any misconduct or be

incompetent or insufficiently qualified or intelligent in the performance of their duties or that in 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 person or persons from employment thereon. Any person or persons so removed shall not again be reemployed 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 expenses of the contractor by qualified and competent substitute. Should the contractor be required to repatriate any person removed from the works he shall do so and shall bear all costs in connection therewith.

3. The contractor shall be responsible for the proper behaviour of all the staff, foremen, workmen and others shall exercise proper control over them and in particular and without prejudice to the same. Generally, 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 neighbourhood 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 grounds whatsoever. The decision of the Engineer-in-charge upon any matter arising under this clause shall be final.
4. If and 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 S.M.C. which must be worn at all times on owner's premises.

GC-29 TERMINATION OF SUB-CONTRACTOR BY OWNER :

If any sub-contractor engaged upon the works at the site executes any work which in the opinion of Engineer-in-charge is not in accordance with the contract documents, the S.M.C. may give written notice to the contractor request his to terminate such sub-contract and the contractor upon the receipt of such notice shall terminate such sub-contract and the letter 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.

- (i) Fail to carry out works in conformity with the documents or
- (ii) Fail to carry out the works in accordance with the time schedule.
- (iii) Substantially suspend work or the works for a period of fourteen days without authority from Engineer-in-charge or
- (iv) Fail to carry out and execute the work to the satisfaction of the Engineer-in-charge or
- (v) Fail to supply sufficient or suitable construction plant temporary works, labour materials or things or
- (vi) Commit breach of any other provisions of the contract on his part to be performed or observed or persist in any of the above mentioned breached of the contract for fourteen days after notice in writing shall have been given to the contractor by the Engineer-in-charge requiring such breach to be remedied or
- (vii) Abandon the work or
- (viii) 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 stock therein, and to revoke the contractor's license to use the same and to complete the works by his agents, other contractor or workman or to relate the same upon any terms and 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 authorise the use of any materials, temporary works, constructional plant, and stock as aforesaid, without making payment or allowance to the Contractor for the said materials other than such as may be certified in written 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 any 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 incur excess certified by the Engineer-in-charge shall 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. constructed by or belonging to and 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 & AGENCIES:

Without repugnance to any other condition, it shall be the responsibility of the contractor executing the work of civil construction to work in close co-operation and co-ordinate the work with other contractors or their authorized representative and the contractor will put a joint scheme with the concurrence of other contractors 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 by laws of any local or locally constituted authorities or public bodies which may be applicable from time to time to works or any temporary works. The contractor 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 levelling, 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 authorised representative at the job site or may be served by registered post direct to the official address of the contractor proof of issue of any such notice could be conclusive of the contractor having been duly informed of all contents therein.

GC-34 RIGHT OF VARIOUS INTERESTS :

The owner reserves the right to distribute the work between more than one contractor. Contractor shall co-operate and afford reasonable opportunity to other contractors for access to the works for the carriage and storage of materials and execution of their works.

Wherever the work being done by any department of the owner or by other contractor employed by the owner is contingent upon work covered by this contract, the respective rights of the various interests shall be determined by Engineer-in-charge to secure the completion of various portions of the work in general harmony.

GC-35 PRICE ADJUSTMENT :

No adjustment in price shall be allowed as the time limit for completion of the project is less than or equal to One year.

GC-36 TERMS OF PAYMENT :

The payment of Bills shall be made progressively according to the rules and practice followed by the Municipal 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 in an amount according to the value of the work performed less the aggregate of previous progressive payments and as required by clause GC-37 (Retention money) herein. All such progressive payment shall be regarded as payment 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 conditions at Clause GC-78 (Procedure for Measurement of Work in Progress)

GC-37 RETENTION MONEY :

Pursuant to Clause GC-36 (Terms of Payment) on all money due to the contractor for work done, Municipal Corporation will hold as retention money as per IT-27. 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 Municipal Corporation and completion certificate issued by the Municipal Corporation in pursuant to Clause No.GC-84 (Completion Certificate).

However, after the assurance of completion certificate, and Municipal Commissioner may at its own discretion and having considered the Contractor's performance and diligence during the contract time allow the retention money to converted into a Bond as stipulated in IT-27.

GC-38 PAYMENT DUE FROM THE CONTRACTOR :

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

GC-39 CONTINGENT FEE :

1. The Contractor warrants that he has not employed any person to solicit or secure the contract upon any agreement for a commission, percentage, brokerage or contingent fee. Breach of this warranty shall give the Municipal Commissioner the right to cancel the contract or to take any other measure as the Municipal Commissioner 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.

2. No officer, employer of the Municipal Corporation 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 the contractor fails to perform the work under the contract with due diligence or shall refuse or neglect to comply with instruction given to him in by the Engineer-in-charge accordance with the contract, or shall contravene the provisions of the contract, the S.M.C. may give notice in writing to the contractor to make good such failure, neglect or contravention. Should the Contractor fail to comply with such written notice within twenty eight (28) days or receipt, if the Municipal Commissioner shall think fit, it shall be lawful for the Municipal Corporation, without prejudice to any other rights, the contractor may have under the contract, to terminate the contract for all or part of the works, and to make any other arrangements it shall deem necessary to complete the work outstanding under the contract at the time of termination. In this event Article GC-15 (Subletting of work) and GC-16 (Sub-Contracts for Temporary Works etc.) hereof shall be invoked and the performance Bond shall immediately become due and payable to the Municipal Commissioner the value of the work done on the date of termination and not paid for shall stand forfeited to the Municipal Corporation and the Municipal Corporation shall have free use of any works which the contractor may have at the site at the time of termination of the contract.

GC-41 DEFAULT OF CONTRACTOR :

1. The Municipal Corporation may upon written notice of default to the contractor terminate the contract in circumstance detailed hereunder :

(a) If in the judgment of the Municipal 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 Municipal Corporation /Engineer to the Contractor.

(b) If in the judgment of the Municipal Corporation the contractor fails to comply with any of the provisions of this contract.

2. In the event the Municipal Commissioner terminates the contract in whole or in part as provided in Article GC-48 (Termination of Contract), the Municipal Corporation reserves the right to purchase upon such terms and in such manner as it may deem appropriate, plant similar to that

terminated and the contractor will be liable to the Municipal Corporation for any additional costs for such similar and / or for liquidated damages for delay until such reasonable time as may be required for the final completion of works.

3. If this contract is terminated as provided in this paragraph GC-30 (Power of entry) (1) the Municipal Corporation in addition to any other rights provided in this clause, may require the Contractor to transfer title and deliver to the Municipal Corporation under any of the following cases in the manual and as directed by the Municipal Corporation. (a) Any partially completed information and contract rights as the contractor has specifically produced or acquired for the performance of the contract so terminated.

4. In the event the Municipal Corporation does not terminate the contract as provided in the paragraph GC-49 (Termination of Contract) the Contractor shall continue performance of the contract, in which case the shall be liable to the Municipal Corporation for liquidated damages for delay until the works are accepted.

GC-42 BANKRUPTCY :

If the Contractor shall become bankrupt or insolvent or have a receiving order made against him, or compound with the creditors, or being the Municipal Corporation commence to be wound up, not being a member's 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 owner 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 of (b) to give such receiver liquidator or other person in work 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 subject to his providing a satisfactory guarantee for the due and faithful performance of the contract upto an amount to be agreed. In the event that the Municipal Corporation terminates the Contract in accordance with this article, the performance Bond shall immediately become due and payable on demand to Municipal Corporation.

GC-43 OWNERSHIP :

Works supplied pursuant to the Contract shall become the property of the Municipal 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 condonation by the Municipal Corporation of any breach of breaches by the stipulations and conditions contained in the contract shall in no way prejudice or effect to the constructed as a waiver of the Municipal Corporation rights, powers and remedies under the contract in respect of any breach or breaches.

GC-45 LAWS GOVERNING THE CONTRACT :

The contract shall be constituted according to and Subject to the laws of India and the State of Gujarat and under the jurisdiction of the courts of Gujarat at Surat.

GC-46 OVERPAYMENT AND UNDERPAYMENT :

Whenever any claim for payment of a sum to the Municipal Corporation arises out of or under this Contract against the contractor the same may be deducted by the Municipal 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 Municipal Corporation or from any sum due to the contractor with the Municipal Corporation (which may be available with Municipal Corporation), or from his retention money, or he shall pay the claim on demand. The Municipal Corporation reserves the right to carry out post payment audit and technical examination of the final bill including all supporting vouchers, abstracts, etc.

The Municipal Corporation further reserves the right to enforce recovery of any over payment when detected notwithstanding the fact that the amount of the final bill may be included by the Contractor.

It as a result of such audit and technical examination 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 Municipal Corporation from the contractor by way of all the means prescribed above or if any under payment is discovered by the Municipal Corporation, any amount due to the contractor under this contract or under payment may be adjusted against any amount then due or which may at any time thereafter become due before payment is made to the contractor from him to the Municipal Corporation on any other contract account whatsoever.

GC-47 SETTLEMENT OF DISPUTES :

Except or otherwise specifically provided in the contract, all disputes concerning questions of fact arising under the contract shall be decided by the Commissioner, subject to a written appeal by the Contractor to the Commissioner, and these decisions shall be final and binding to the contractor.

Disputes if any, shall be discussed and mutually settled and in case of disagreement the same shall be referred to commissioner / standing committee if the said dispute is not solved, the same shall be referred to the court subject to Surat Jurisdiction only.

GC-48 DISPUTES OF DIFFERENCE TO BE REFERRED TO :

Disputes if any shall be discussed and mutually settled and in case of disagreement the same shall be referred to Commissioner/Standing Committee. After referring to Commissioner / Standing Committee if the said dispute is not solved, the same shall be referred to the court subject to Surat Jurisdiction only.

GC-49 TERMINATION OF THE CONTRACT:

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

GC-50 CHANGES IN CONSTITUTION :

Where the contractor is a partnership firm, the prior approval in writing of the Municipal Commissioner shall be obtained any change is made in the constitution of the firm. Where the contractor is an individual or an 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 Article thereof.

GC-51 SUB-CONTRACTUAL RELATIONS :

All work performed for the contract by sub-contractor shall be pursuant to an appropriate agreement between the contractor and sub-contractor which shall contain provisions to :

- a) Protect and preserve the rights of the Municipal Corporation and the Engineer with respect to the work to be performed under the sub-contract so that the sub-contractor thereof will not prejudice such rights.
- b) Require that such work be performed in accordance with requirements of the Contract documents.
- c) Require under such contract of 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 and comply in accordance with the contract Documents for like claim by the Contractor upon the Municipal 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 so such insurance held by the Municipal Corporation as trustee and,
- e) Obligate each sub-contractor specifically to consent to the provisions of this Article.

GC-52 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 be 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 cost and reasonable expenses.

GC-53 EXECUTION OF WORK :

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

GC-54 WORK IN MONSOON :

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

GC-55 WORK CLOSED ON SUNDAYS & HOLIDAYS & BETWEEN SUNSET AND SUNRISE:

No work shall be carried out on Sundays and Corporation Holidays and no work shall be carried out between sunset and sunrise. Except with the special permission of Engineer-in-charge in writing previously obtained and with holding such permissions shall be no ground of complaint on the part of contractor or cause for compensation to them. Working period shall be maximum eight (8) hours per days.

GC-56 EXTRA SUPERVISION CHARGES TO BE BORNE BY CONTRACTOR :

Further to clause No. GC-55 when Engineer-in-charge feels necessary to give permission to contractor for carrying out work for period of more than Eight hours working period in a day and/or to continue work on Sunday and Corporation holidays. Extra Supervision charges arising due to overtime working of Corporation's staff shall be borne by the contractor at prevailing rates from time to time. Such extra supervision charges shall be deducted by Corporation from the running bill/s of the contractor at Surat Municipal Corporation's description.

GC-57 DRAWING TO BE SUPPLIED BY THE OWNER :

The drawings attached with the 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. Detailed working drawings according to which the work is to be done shall be furnished from time to time as the work progresses. The contractor shall study the drawings thoroughly in connection with other connected details and discrepancy if any bring to the notice of the Engineer-in-charge before actually carrying out the work.

GC-58 DRAWINGS TO BE SUPPLIED BY THE CONTRACTOR :

Where drawings, date are to be furnished by the contractor they shall be as enumerated in special condition of contract and shall be furnished within the specified time. Where approval of drawings has been specified it shall be the Contractor's responsibility to have these drawings got approved before any work is taken up with regard to the same. Any changes becoming necessary in these 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-59 SETTING OUT WORK :

The contractor shall set out the work on the site handed 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 in 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, flag, ranging, rods, strings and other materials and labour required for proper setting out of the work. The Contractor shall provide, fix and be responsible for the maintenance of all stakes, temples level marks profiles and similar other things and shall take and necessary precautions to prevent their removal or disturbance and shall be responsible for the consequence for such removal or disturbance. The contractor shall also be responsible for the maintenance of all existing Survey Marks, Boundary Marks, Distance Marks and Centre line marks either existing or fixed by the Contractor. The Centre, longitudinal or face lines and cross lines shall be marked by small masonry pillars. Each pillar shall have distance mark at the centre for setting up the theodolite. The work shall not be started unless the setting out is checked by Engineer-in-charge in writing but such approval shall not relive the contractor of his responsibilities. 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-60 RESPONSIBILITIES OF CONTRACTOR FOR CORRECTNESS OF WORK:

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

1. **Materials to be supplied by Contractor :**

Contractor shall procure and provide all the materials required for the execution and maintenance of work including M.S. rods, all tools, tackle, construction plant and equipment except the materials to be supplied by the owner detailed in the contract documents and for the transport thereof, owner, shall made recommendations to the respective authorities if designed by the contractor but assumes no responsibility or any nature. Owner shall insist for procurement of materials with ISI Marks supplied by reputed firms on the DGS & D List. 2. If however the Engineer-in-charge feels that work is likely to be delayed due to contractor's inability to procure the 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-61 MATERIALS TO BE SUPPLIED BY THE OWNER :

1. If the contract provides certain materials or stores to be supplied by the S.M.C. such materials and stores shall be transported by the contractor at his cost from S.M.C.'s stores or Railway Station. The sum due 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 contract has to account for the full quantity of materials supplied to him.
2. The value of store materials supplied by the S.M.C. to the contract 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 S.M.C., 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 un-used at the time of completion of work or termination of contract shall be returned to S.M.C.'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 balances thereof are not returned to the Municipal Corporation, recovery in respect of such balance will be effected at double the applicable issue rate of the materials or the market rate whichever is higher.

GC-62 CONDITIONS OF ISSUE OF MATERIALS BY THE S.M.C.:

- a) The materials specified to be issued by the S.M.C. to the contractor shall be issued by the S.M.C.'s store or at Railway Station and all expenses for its shifting to site shall be borne by the contractor. The materials will be issued during working hours and as per rules of S.M.C. from time to time.
- b) Contractor shall bear all expenses for storage and safe custody at site of materials issued to him before use in work.
- c) Material shall be issued by the S.M.C. in Standard/non-standard sizes as obtained from manufacturer.
- d) Contractor shall construct suitable godowns at site for storing the materials to protect the same from damage due to rain, dampness, fires, theft etc.
- e) The contractor should take the delivery of the materials issued by the S.M.C. after satisfying himself that they are in good conditions. 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 according to the instructions of the Engineer-in-charge.
- f) For delay in supply or for non supply of materials to be supplied by the S.M.C., on account of natural calamities, act of enemies, other difficulties beyond the control of the S.M.C., the S.M.C. carries non-responsibilities. In no case the contractor shall be entitled to claim any compensation for loss suffered by him on this account.
- g) None of the materials issued to the contractor, shall be used by the Contractor for manufacturing items which can be obtained from manufacturer. The materials issued by the owner shall be used for the work only and no other purpose.
- h) Contractor shall be required to execute indemnity bond in the prescribed form for the same custody and account of materials issued by the owner.
- i) Contractor shall furnish sufficiently in advance a Statement of his requirements of quantities of materials to be supplied by the S.M.C. 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.
- j) A daily account of materials issued by the owner shall be maintained by the Contractor showing receipt, consumption and balance in 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.
- k) Contractor shall see that only the required quantities of materials to be issued and no more. The contractor shall be responsible to return the surplus materials in good condition at S.M.C.'s store at his own cost.

GC-63 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 S.M.C. either by issue from S.M.C. stock or purchase made under orders or permits or licenses issued by the Government, the contractor shall hold the same materials as trustees for owner and use such materials economically

and solely for the purpose of contract and not dispose them off without the permission of S.M.C. and return, if required by Engineer-in-charge, all surplus or unserviceable materials that may be left with him after the completion of the contract or at its termination for any reason whatsoever on his being paid or credited such prices 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 charges if any. The decision of Engineer-in-charge shall be final and conclusive in such matters. In the event of breach of the aforesaid condition, the contractor shall in terms of license of permits and/or for criminal breach of trust be liable to compensate S.M.C. at double rate or any higher rates. In the event of these materials at that time having higher rate or not being available in the market than any other rate to be determined by the Engineer-in-charge and his decision shall be final and conclusive.

GC-64 MATERIALS OBTAINED FROM DISMANTLING :

If the contractor, in the course of execution of work is called upon to dismantle any part for reasons other than on account of bad or imperfect work, the materials obtained from dismantling will be the property of the S.M.C. and will be disposed of as per instruction of Engineer-in-charge in the best interest of the S.M.C.

GC-65 ARTICLE OF VALUE OR TREASURE FOUND DURING CONSTRUCTION:

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

GC-66 DISCREPANCIES BETWEEN INSTRUCTIONS :

If there is any discrepancy between the various stipulations of the contract documents of instructions to the contractor or his authorised representative or if any doubt arises as in 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.

In case there is any discrepancy in measurements shown in drawing and specifications, the same shown in drawing shall be considered as final and will be binding upon the contractor.

GC-67 SCHEDULE OF QUANTITIES AND EXTRA ITEMS :

A. Schedule of Quantities :

Variations in the quantities of work in schedule of quantities shall not vitiate the contract. The rates quoted for the individual items shall apply for the quantities of work increased or decreased by not more than thirty percent for each of the items, should the quantities of work actually involved under any item vary by more than thirty percent (30%), the rate for such item of work shall be revised in accordance with the procedures indicated under clause "Extra Items". The payment for the items will, however, continue to be at the original rate till the revised rate decided.

B. Extra Items :

Extra Items of work shall not vitiate the contract. The contractor shall be bound to execute extra items of work as directed by the Engineer-in-charge. The rates for extra items shall be derived from the S.O.R. (R&B Surat Division & SMC) Year 2024-2025 (1% Construction Cess shall be added in S.O.R. Rate) and quoted premium of tender. If the rate of extra item is not available in S.O.R., it will be derived on prevailing market rate.

GC-68 ACTION WHEN NO SPECIFICATION IS ISSUED :

In case of any class of work for which no specification is supplied by the S.M.C. in the tender documents, such work shall be carried out in accordance with I.S.S. do not cover the same, the work should be carried out as per standard Engineering practice subject to the approval of Engineer-in-charge.

GC-69 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. This will avoid loss of profit or gain in case of curtailment or change or specification for any item. In case it is notice that the rates quoted by a tenderer for any item is usually high or unusually low, it will be sufficient cause for rejection of tender unless the S.M.C. is convinced about the reasonableness of the rates on scrutiny of the analysis for such rate to the furnishing by the tenderer or demand.

GC-70 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 for taking measurement of work.

GC-71 TEST OF QUALITY OF WORK :

1. All workmanship shall be of the best kind described in the contract document and in accordance with the instructions of Engineer-in-charge and shall be subjected from time to time to such test at contractor's cost as the Engineer-in-charge may directed at the place of manufacture of fabrication or on site or at any such place. Contractor shall provide assistance, instruments, labour and materials as are normally required for examining measuring and testing any work workmanship as may be selected and required by Engineer-in-charge.
2. All tests will be 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. The contractor shall furnish to 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 and sufficiently in advance to permit test and examination thereof. All materials furnished and finished goods applied in work shall be exactly as per the approved samples.
4. All the testing charges shall be borne by the Contractor. The contractor shall have to borne all charges for testing and inspection purpose. The Contractor shall have to bear the to and fro travelling allowance of SMC officials.

GC-72 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 contractor shall, no demand in writing from Engineer-in-charge or his authorised 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, specified and in the event of failure to do so within a period to be specified by Engineer-in-charge in his aforesaid demand, contractor shall be liable to pay compensation at the rate of one (1) percent of the tendered cost of work for every Ten (10) days limited to a maximum of Ten (10%) Percent of the value of work while his failure to do so continue 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 other 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-73 SUSPENSION OF 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 two months) as ordered and shall not after receiving such written order 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 the applied for the same provided the suspension was not consequent upon any default or failure on the part of the contractor.

GC-74 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 S.M.C. has the right to carry out such parts of work as the S.M.C. may designate whether by purchasing materials and engaging labour or by the agency of another contractor. In such case the S.M.C. shall deduct from the amount which otherwise might become due to contractor the cost of such work and materials with Ten (10%) percent added to cover all departmental charges and should the total amount thereof exceed the amount due to contractor, contractor shall pay the difference to S.M.C.

GC-75 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 progress of work, equitable adjustment in the time of completion will be made and the contract shall be deemed to be modified accordingly.

GC-76 COMPLETION CERTIFICATE :

As soon as the work has been completed in accordance with contract (except in minor respect that do not affect their use for the purpose for which they are intended and except for maintenance thereof) as per general conditions of contract and has passed the tests on completion, the Engineer-in-charge shall issue a certificate (hereinafter called completion certificate) in which he shall certify the date on which work has been completed and has passed the said tests and S.M.C. shall be deemed to have taken over work on the date so certified. If work has been divided in various groups in contract, S.M.C. 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 only. In order that contractor could obtain a completion certificate, he shall make good, with all speed any defect arising from the defective materials supplied by contractor or workmanship or any act or omission of contract that may have been discovered or developed after the work or group 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 a reasonable time, S.M.C. may proceed to do work at contractor's risk and expenses and deduct from the final bill such amount as may be decided by S.M.C. 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 contractor for completion of work, S.M.C. 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 this work for the issue of completion certificate.

GC-77 SCHEDULE OF RATES :

1. The price/rates quoted by the contractor shall remain firm till the issue of final certificate and shall be subject to price ADJUSTMENT CLAUSE GC-35. Schedule of rates shall be deemed to include and cover all costs expenses and liabilities of every description and all risks of every kind to be taken in executing, completing and handling overwork to owner by contractor. Contractor shall be deemed to have known the nature, scope, magnitude and the extent of work and materials required through 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 completion work. The opinion of Engineer-in-charge as to the item of work shall be final and binding on Contractor although the same may be not shown on 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, pumps, materials, labour and all other materials in connection with each item in schedule of rates and the execution of work or any portion thereof furnished 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 free for the articles and processes, protected by letters patent or otherwise incorporated in or used in connection with work, also all royalties, and other payments in connection with materials of whatsoever kind for

work and shall include an indemnity to-owner which contractor hereby gives against all action, proceeding, claims, damages, costs and expenses arising from the incorporation in use of work of any such articles, processes or materials. Octroi of other Municipal or Local Board charges if levied on materials equipment of 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 any local body whatsoever will be granted to obtained. All of such expenses shall be deemed to have been included in and covered by schedule of rates. Contractor will also obtained and pay for all permits or other privileges necessary to complete work.
5. The schedule of rates shall be deemed to include and cover risk on account of delay or interference with contractor's conduct of work which may occur from any cause including orders of S.M.C. in the exercise of his power and no 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 reason of work or any part of them being field, altered extended, diminished or omitted.

GC-78 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 authorised agent. Such measurements will be got recorded in the measurement book by the Engineer or his authorised representative and signed by contractor or his authorised agent in token of acceptance. If the contract or his authorised agent fails to be present when even required by the Engineer-in-charge for taking measurements for any reasons whatsoever, the measurement will be taken by the Engineer - in - charge or his authorised representative notwithstanding the absence of contract and these measurement will be deemed to be correct and binding on contractor.
2. Contractor will submit a bill in approved proforma in duplicate to the Engineer - in - charge of the work giving abstract and detailed measurements of various items executed during a month as mutually agreed. The Engineer-in-charge shall verify the bill and the claim, far as admissible, adjusted if possible, within 10 days of presentation of the bills.
3. In case of Tenders for completed items of work, contractor may be allowed 'Secured Advance' on the Security of materials brought to site for execution of the constructed items of work the extent of 75% of the value of materials of imperishable nature and an agreement be drawn up with contractor under which the owner secured a lien on these materials and is safe guarded against losses due to any reasons whatsoever. Recoveries of advance paid would not be postponed till the whole work is completed but shall be adjusted from his work done or the materials used, the necessary deductions being made when the items of work in which they are used and are billed for. When the mode of measurement is not covered by contract for any item of work it shall be as per latest I.S.I.

GC-79 RUNNING ACCOUNT PAYMENT TO BE RECOVERED AS ADVANCES :

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 to be considered as an admission of the due performance of contract or any part thereof.

GC-80 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 particular 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 commission by S.M.C. to reject any such claim and no delay in dealing therewith shall be waiver by S.M.C. of any rights in respect thereof.

GC-81 PAYMENT OF CONTRACTOR'S BILL :

1. The price to be paid by the S.M.C. to contractor for the work to be done and for the performance of all the obligations under taken 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. No payment shall be made for work costing less than Rs.5,000/-till the work is completed and a certificate of completion given. But in case of work estimated to cost more than Rs.5,000/- 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 will be made after making necessary deductions as stipulated elsewhere in the contract documents for materials, security deposit, etc. The payment shall be released to the contractor within Thirty (30) days of submission of the bill in case of running bill and within two (02) months in case of final bill, contractor shall present the bill duly pre-receipted on proper revenue stamp.

Payment due to Contractor shall be made by the by crossed Accounts payee cheque in Indian currency forwarding the same to the registered office of the contractor. Owner shall not be responsible if the cheque is mislaid or misappropriated by unauthorised person.

GC-82 FINAL BILL :

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

GC-83 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 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 other person having authority to give effectual receipt for the Company.

GC-84 COMPLETION CERTIFICATE :

1. When the contractor fulfil 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 alongwith such application for completion certificate.

The Engineer-in-charge shall normally issue to contractor the completion certificate within 2 (Two) month after receiving an application thereof from contractor after verifying from the complete 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 document. 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 2 (Two) month of completion of work in all respect 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 (1) scaffolding, surplus materials and rubbish is clearing off site completely (2) until work shall have been measured by the Engineer-in-charge whose measurement shall be binding and conclusive and (3) 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 contractors 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 expenses of contractor remove such scaffolding, surplus materials and rubbish and dispose of the same he thinks fit.

3. The following documents will form the completion documents :

- (a) Technical documents according to which work was carried out.
- (b) Construction drawings showing therein the modifications and corrections made during the course of execution signed by Engineer-in-charge.
- (c) Completion certificate for "Embedded" or "Covered" up work.
- (d) Certificate of final levels as set out for various works.

(e) Material appropriation statement for the materials issued by owner for work and list of surplus materials returned to S.M.C.'s store duly supported by necessary documents.

4. Upon expiry of the period of defects liability and subject to Engineer-in-charge being satisfied that work has been duly maintained by contractor during the defects liability period as fixed originally, or as external subsequently and the contractor has in all respects made up by subsidence and performed all his obligations under contract, the Engineer-in-charge shall (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 notwithstanding previous entry upon and taking possession, working or using of the same or any part thereof by owner.

5. Final Certificate only Evidence of Completion :

Except the final certificate no other certificate or payments against a certificate or an general account shall be taken to be an admission by owner of the due performance of contract or any part thereof or of occupancy validity of any claim by the contractor.

GC-85 TAXES, DUTIES, OCTROI, ETC. :

GST(goods and service tax) has come in existence from 1st July. 2017 contractor / successful bidder is bound to pay any amount of GST prescribed by the Govt. of india as per the term of contract agreed upon during the course of execution of this contract.

During the course of execution of contract, if there is any change in rate of GST (Goods & Service Tax) by the Government, The same shall be reimbursed / recovered separately by SMC. Subject to the submission of original Receipt / Proof for the amounts actually remitted by the successful Tenderer / contractor to the competent Authority along with a Certificate from Chartered Accountant of Contractor / Successful Bidder certifying that the amount of GST paid to the Government and the same shall be intimated / submitted / claimed within 30 (Thirty) Days from the date of payment Remittance of GST within stipulated period shall be the sole responsibility of the successful Bidder / Contractor, Failing which, SMC may recover the amount due, From any other payable dues with SMC and decision of Municipal Commissioner shall be final and binding on the Contractor / Successful Bidder in this regard further, the non-payment of GST to the Government may lead to the termination of contract and forfeiture of Security deposit / Performance Guarantee Amount.

If imposition of any other new Taxes / Duties / Levies / Cess or any other incidentals etc. or any increase in the existing Taxes / Duties / Levies / cess or any other incidentals etc. (Excluding GST) are imposed during the course of the contract. The same shall be borne by the Contractor / Successful Bidder only. In no case SMC shall be liable for the same.

1% Construction Cess will be deducted from respective R.A. Bill and Final bill in accordance with the prevailing norms of Govt. of Gujarat.

GC-85(A) Bills and Rates Payable :

The contractor shall submit all the bills on the printed forms at the office of the Engineer-in-charge. The charges to be made in the bills shall always be entered at the rates specified in the agreement or at the partly reduced rates subject to the approval be the Engineer-in -charge in the case of items not completed/executed or in the case of any extra work ordered in pursuance of these conditions and not mentioned or provided for the tender, at the rate here in after provided for such work. **Contractor has to submit invoice of R.A bill as per approved rate plus GST, every running bill & Final bill. Rate is without GST (Including Cess) and GST charges will be paid as extra by SMC.** During the course of execution of contract, if there is any change in rate of GST (Goods & Service Tax) by the Government, The same shall be reimbursed / recovered separately by SMC.

If in future any changes in GST shall be given separately only after taking opinion from GST departments/GST consultant of SMC also burden in GST. If any shall only be payable only after that additional amount of GST have been deposited on GST portal.

GC-86 INSURANCE :

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

1. Employees State Insurance Act :

Contractor agrees to and does hereby accept full and exclusive liability for compliance with all obligations imposed by the Employees' State Insurance Act 1948, and Contractor further agree to defend, indemnify and hold owner harmless from any liability or penalty which may be imposed by the Central or State Government of Local authority by reasons of any asserted violation by contractor or Sub-Contractor of the Employees' State Insurance Act, 1948 and also from all claims, suits or proceedings that may be brought against owner arising tender, 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 from and all forms which may be required in respect Contractor's or Sub-contractor's employees these aggregate remuneration is Rs. 400/-p.m.or less and who are employed in work provided for or those covered by E.S.I. 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 India Employees' State Insurance Corporation Accounts, the employees contribution as required by the Act Contractor agrees to maintain all cares and record as required under the Act in respect of employees and payments and contractor shall secure the agreements of the sub-contractors to maintain such records, any expenses incurred for the contributions or maintaining records shall be to contractor's or sub-contractor' 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 workmen's compensation and employer's liability insurance which may be required by owner.

3. Other Insurance required under law or regulation 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-87 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 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 or will full act or omission of contractor, his employees, agent representatives or Sub-contractors.

2. Contractors shall indemnify and keep owner harmless of all claims for damage to properties other than S.M.C's property arising under or by reasons of this agreement if such claims result from the fault and / or negligence or wilful act of omission of contractor, his employees, agents, representatives or sub-contractors.

GC-88 LABOUR LAWS AND REGULATIONS :

1. The contractor shall be responsible for the strict compliance of and shall ensure strict compliance by his sub contractor employees and agents of all labours and others laws, rules or regulations having the force of law affecting the relationship of employer and employee between the contractor/ sub-contractor and their respective employees.
2. No labour below the age of eighteen (18) year be employed on work.
3. Contractor shall pay to the labours engaged on work according the law.
4. The Contractor and sub-contractors of the contractor shall obtain proper authority designated in this behalf under any application law, rules or regulations (including but not restricted to the factories Act and Contract Labour Abolition and Regulation Act 1970,) in so far as applicable) any and all such licenses, consents, Registration and / or other authorization as shall from time to time be

or become necessary for relating to the execution of work or any part of portion thereof or the storage or supply of any materials or otherwise in connection with the performance of the contract and shall at all times observance by the sub- contractors, employees and agents of all terms and conditions of the said licences, consents, regulation and other authorization and laws, rules and regulations applicable thereto.

GC-89 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 action, claims, demands and liabilities whatsoever and 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 and or from any liability and way to any workman / employee of the contractor or any sub-contractor under any law, rule or regulations having the force of law, including but not limited to claims against the owner under the workman compensation Act 1923. The employees' Provident Funds Act 1952 and/or the Contract Labour (Abolition and Regulations) Act, 1970.
2. Payment of claims and damages :
If owner has to pay any money in respect of such claims or demands as aforesaid, the amount so paid and the cost incurred by the owner shall be charged to and paid by contractor without any dispute notwithstanding 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, be obliged to pay compensation to workman employed by Contractor the amount of compensation so paid, and without prejudice to the rights of S.M.C. under sec.(12) Sub-section (2) of the said Act, S.M.C. shall be at liberty to recover such amount from any surplus due to the contractor or the security deposit. S.M.C. will not be bound to contest any claim made under section (12) Sub-section (2) of the said Act except or written request of Contractor and upon the contesting of such claim.
4. 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 made good at his cost, any such damage, so caused.

GC-90 IMPLEMENTATION OF APPRENTICE ACT 1964 :

Contractor shall comply with the provisions of the Apprentice Act 1964 and the orders issued there under from time to time. If the fails to do so, it will be a breach of contract. Contractor shall also be liable for any particular liability arising on account of any violation of the provisions of the Act by him.

GC-91 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 sanitary arrangements of all labour directly or indirectly employed on the work of this contract.

GC-92 SAFETY CODE :

GENERAL :

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

1. First Aid and Industrial Injuries :
 - 1.1 Contractor shall maintain first aid facilities for its employees and chose of his sub-contractor.
 - 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. General Rules :
 - 2.1 Carrying, striking, matches, lighters inside the project area & smoking within the job site is strictly prohibited Violators of smoking rules shall be discharged immediately. Within the operation

area, not hot work shall be permitted without valid gas safety, fire permits. The Contractor shall also be held liable and responsible for all lapses of his sub-contractors/ employees in this regards.

3. Scaffolding :
 - 3.1 Suitable scaffolding shall be provided for workmen for all works that can not safely be done from the ground or from solid construction except such short period work as can be done safely from ladders. When a ladder is used, an extra mazdoor shall be engaged for holding the ladder and if the latter is used for carrying materials as well, suitable foothold and handholds shall be provided on the ladder and the same shall be given inclination not steeper than 1 to 4 (1 horizontal and 4 vertical).
 - 3.2 Scaffolding or staging more than 3.6 M (12') above the ground or floor, swing or suspended from an overhead support or erected with stationary support shall have a guard rail properly attached, bolted, braced and otherwise fixed at least 1.0 M (3') high above the floor or platform of scaffolding or staging and extending along the entire length of the outside ends thereof with only such openings as may be necessary for the delivery of materials. Such scaffolding or staging shall be so fastened as to prevent it from swaying from the building or structure.
4. Maintenance of Safety Devices :
 - 4.1 All scaffolds, ladders and other safety devices mentioned or described herein shall be maintained in some conditions and no scaffold, ladder or equipment shall be altered or removed while it is in use. Adequate washing facilities should be provided at or near place or work.
5. Display or Safety Instructions :
 - 5.1 These 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 person responsible for compliance of the safety code shall be named therein by the Contractor.
6. Enforcement of Safety Regulations :
 - 6.1 To ensure effective enforcement of the rules and regulations relating safety precautions, the arrangements made by the contractor shall be open to inspection by the welfare Officer, Engineer-in-charge of safety Engineer of the owner or their representatives.
7. No Exemption :
 - 7.1 Notwithstanding the above clause 1.0 to 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.
 - 7.2 In addition to the above, the Contractor shall abide by the safety code provision as per C.P.W.D. Safety Code framed from time to time.

GC-93 ACCIDENTS :

It shall be the contractor's responsibility to protect against accidents on the work. He shall indemnify the Municipal Corporation against any claim for damage or for injury to persons or property resulting from, and in the course of work and also under the provision 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 persons or damage to property other than that of the contractors shall be promptly reported to the Engineer-in-charge stating clearly and in sufficient details and facts and circumstances of the accidents and the action taken. In all cases the contractor shall indemnify the Municipal Corporation against all loss of damage resulting directly or indirectly from the Contractor's failure to report in the manner aforesaid. This includes penalties or fine 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 workmen's compensation Act VIII of 1923 including all modification thereof whether such compensation may become payable by the contractor or by the Municipal Corporation as principal employer, the Engineer-in-charge may retain out of money due and payable to the contractor such sum or sums of money as may, in the opinion of the Engineer-in-charge be sufficient to meet such liability. On receipt of award from the labour commission in regard to quantum of compensation, the difference in amount will be adjusted.

GC-94

~~It is clarified that if the contractor makes his own arrangements for water required for construction and labour camp etc. by drilling bore, No water charges will be recovered from the contractor. On the otherhand, even if the contractor is not taking connection and makes other arrangement to use Municipal water by tanker or tapping water from near private connection even so water charges shall be recovered as per relevant condition of the tender.~~

GC-95. TESTING AND INSPECTION CHARGE :-

The contractor shall have to borne all charges for testing and inspection purpose. The contractor shall have to bear the to and from travelling allowance of SMC official.

GC-96. SPECIAL CLAUSES REGARDING REFUND/RECOVERY OF EXCESS/ADDITION SECURITY DEPOSIT :-

In case the total amount of work done is less by 5% of the contract value, prorate S.D. to that extent may be refunded to the contractor while releasing the payment of final bill. In short, the S.D.to be retained by the Corporation after payment of final bill shall be equal to 2% of the amount of final bill as per the prevailing norms or as per the norms decided from time to time.

The Additional S.D. shall be recovered from the running bill. When the total of any of work done by the Contractor up to running bills under consideration is more than 5% of the contract value. However, such S.D. shall be recovered in the round figure of Rs.1000/- i.e. the amount of work done when it exceeds 5% of the contract value it shall be rounded of to the nearest multiple of Rs. 25000/- such additional S.D. (4% of the additional amount) shall be recovered for the works amounting to Rs. 5/- Lacs or more.

GC-97.

If the contractor fails to complete the work and the Commissioner on behalf of the Corporation takes actions in accordance to Clause 3(a) or (b) or (c) of the contract then in such cases the remaining work shall be carried out at the risk and cost of the original contractor by advertising the tender for the remaining work and the whole administrative process right from inviting the tenders to finalizing the tender etc. shall have to be repeated. For this, a fixed amount of Rs. 1000/- shall be recovered from the original contractor towards the cost of re-advertisement and other administrative charges incurred by the department in finalizing the contract for the remaining work. If however, separate advertisement is issued for the instant work, actual cost of advertisement shall be recovered. Such recovery shall be in addition to the recovery to be made under such other relevant clauses.

GC-98.

No Contractor shall employ any person who is under the age of 15 years. If any contractor found employing person or persons under the age of 15 years, during course of the construction at any stage, legal actions shall be taken against him as stipulated in Child Labour (Prohibition & Regulation) Act 1986 and also, a penalty of Rs.20,000/-(Rupees Twenty thousand) shall be imposed which shall be deposited with District Collector in Child Labour Rehabilitation cum Welfare Fund.

GC-99.

The Engineer-in-charge shall have power to take any alteration in, or addition to the original specifications, drawings, designs and instruction that may appear to him to be necessary or advisable during the progress of the work, and the contractor shall be bound to carry out the work in accordance with any instructions in this connection which may be given to him in writing signed by the Engineer-in-charge and such alteration shall not invalidate the contract and any additional work which the contractor may be directed to do in the manner above specified as part of the work shall be carried out by the contractor on the same conditions in all respect on which he agreed to do the main work and at the same rates as are specified in the tender for the main work. And if the additional and altered work includes any class of work for which on rates is specified in this contract than such class of work shall be carried out at the rates entered in the schedule of rates of Municipal Corporation or at the rates mutually agreed upon between the Engineer-in-charge and the contractor whichever are lower if the additional or altered work for which no rate is entered in the schedule of Rates of Municipal Corporation is ordered to be carried out before the rates are agreed upon then the contractor shall, within seven days of the date of receipt by him of the order to carry out the work, inform the Engineer-in-charge of the rate

which it is his intention to charge for such class of work and if the Engineer-in-charge does not agree to this rate he shall by notice in writing be at liberty to cancel his order to carry out such class of work, and arrange to carry it out in such manner as he may consider advisable provided always that if the contractor shall commence the work or incur any expenditure in regards thereto before the rates shall have been determined as lastly herein before mentioned, then in such case he shall only be entitled to be paid in such case he shall only be entitled to be paid in respect of the work carried out or expenditure incurred by him prior to the date of the determination of the rate as aforesaid according to such rate or rates as shall be fixed by the Engineer-in-charge. In the event of a dispute, the decision of the Commissioner will be final.

Where, however, the work shall have to be executed according to the designs; drawings and specifications recommended by the contractor and accepted by the competent authority the alteration above referred to shall within the scope of such designs drawings and specification appended to the tender.

GC-100.

The contractor shall not be entitled to claim any compensation from Municipal Corporation for the loss suffered by him on account of delay by Municipal Corporation in the supply of materials entered in Schedule 'A' where such delay is caused by:

- (1) Difficulties relating to the supply of Railway wagons & availability of Government controlled materials-
- (2) Force Majeure.
- (3) Act of God.
- (4) Act of the Nation's enemies or any other reasonable cause beyond the control of Municipal Corporation.

In the case of such delay in the supply of material the Municipal Corporation shall grant such extension of time for the completion of the work as shall appear to the Commissioner to be reasonable in accordance with the circumstances of the case.

The decision of the Municipal Commissioner as to the extension of time shall be accepted as final by the contractor.

GC-101. Force Majeure.

101.1. Neither party shall be liable to the other for any loss or damage occasioned by or arising out of acts of god, and in particular, unprecedented Floods, volcanic eruption, earthquake or other convulsion of nature, and other acts such as but not restricted to general strike, invasion, the act of foreign countries, hostilities or war like operations before or after declaration of war, rebellion, military or usurp power, strikes or boycotts (other than those involving the Contractor or their respective employees/representatives or attributable to any act or omission of any of them), An act of war (whether declared or undeclared), invasion, armed conflict or act of foreign enemy, blockade, embargo, riot, insurrection, terrorist or military action, civil commotion, or politically motivated sabotage, Expropriation or compulsory acquisition by any Government Agency of any Project Assets or rights of the Contractor, which prevent performance of the contract and which could not have been foreseen or avoided by a contractor or Employer (the "Force Majeure").

101.2. On occurrence of Force Majeure Event, Parties are excused from the Performance of their Obligations.

101.3. In the Event of occurrence of Force Majeure Event both the party shall try to continue to perform their obligation stipulated in this contract. If Force Majeure Event subsists for 120 days then either party may by notice to other party terminate the Contract.

101.4. In the event that Parties are unable to agree in good faith about the occurrence of or existence of a Force Majeure event, such dispute shall be finally settled in accordance with the Dispute Resolution Procedure; provided that the burden of the proof as to the occurrence of Force Majeure Event shall be upon the Party claiming relief and/or excuse on account of such Force Majeure Event.

101.5. Termination of the Contract (a) shall not relieve the Contractor or Employer of any obligations hereunder which expressly or by implication survives Termination hereof, and (b) except as otherwise provided in any provision of the Tender expressly limiting the liability of either Party, shall not relieve either Party of any obligations or liabilities for loss or damage to the other Party arising out of or caused by acts or omissions of such Party prior to the effectiveness of such Termination or arising out of such Termination.

GC-102. Responsibility of contractor under Construction And Demolition Waste (C & D Waste) Rules 2016.

Contractor shall remove All Construction and Demolition Waste (C & D Waste) and clean the area every day, or depending upon (1) The type & schedule of the work, (2) The quantity and type of waste generated, appropriate storage and collection facility shall be developed at site. Reasonable time frame shall be worked out in consultation with engineer in charge of the project, for storage & usage of C & D Waste.

If it's found that contractor is irregular and showing negligence to management of C & D Waste, than If deem fit, Engineer in charge would arrange to dispose the said C & D Waste through an Authorized C & D Waste Contractor/agency of Surat Municipal Corporation and All the expenditure made towards disposal of this C & D Waste shall be recovered from the contractor as per the prevailing charges.

Contractor shall have to bear the expenses towards management of C & D Waste as per the prevailing norms, no extra payment shall be entertained for the same.

Contractor shall keep record of the generation and disposal of Construction and Demolition waste (C & D Waste) and proof of its disposal as per the provision of C & D Waste rules and he has to submit along with running bills

If contractor fails to upkeep and maintain records of C & D Waste generation- Disposal records etc. than it shall be calculated as per the provision of the Standing Committee Resolution no. 1621/2016, Dt:01/10/2016 and charges shall be recovered from due of contractor with Surat Municipal Corporation.

Contractor shall also ensure use of recycled products made from SMC authorized C & D Waste agency as far as possible to promote the C & D Waste management project.

Signature of Contractor with seal :

Name :-

Address :-

Date:-

**EXECUTIVE ENGINEER
TRAFFIC- BRTS PROJECT CELL
SURAT MUNICIPAL CORPORATION**

8.0 SCHEDULE - A

The Surat Municipal corporation shall not issue cement and reinforcement steel. Contractor shall make his own arrangement to procure all materials, cement and reinforcement steel.

The cement, reinforcement steel and rough kotah stone (water table) required for the above said work shall be procured by contractor at its own cost.

The brands for cement shall be **Ambuja, Ultratech, Sanghi, Hathi, Sidhhi & JK Laxmi** company confirming to IS-12269/87 latest amendment ISO-9000 of 53 grade only.

Approved make of TMT reinforcement steel :- **TATA, SAIL, Rastriya Ispat, Electrothurm, National, Gallantt Metal Ltd., JSW steel Ltd., Ramsarup and Polaad Rajuri Steel & TMT Bars Pvt. Ltd., Metaroll Ispat Pvt. Ltd, Mono Steel India Ltd, Bhagyalaxmi Rolling Mill Pvt. Ltd.** as per confirming to IS 1786/85 latest amendment TMT Fe-500/500D. TMT Steel shall be purchased by only manufacturing company/Authorised dealer/ Distributor/ Stockist only shall be allowed to use 6 mm plain steel shall be as per IS 2062/99 with latest emendment of any brand/make.

Any of the above mentioned brands of Cement and Reinforcement steel shall only be used by the contractor at the time of execution.

The test certificates regarding its property including indication of its Thermo-Mechanically treated must accompany every lot and shall be submitted to Surat Municipal Corporation before utilizing the same. Unless and until such certificate is submitted, the steel procure at site will not be allowed to be used.

Cement, Reinforcement steel and other materials:

The cement and steel shall not be issued by SMC

(1) Penalty for cement shall be levied as below against variation than the actual consumption:

- (a) No penalty if actual total consumption is equal to or more than standard theoretical total consumption. For over consumption of cement no extra payment shall be made.
- (b) The Basic Rate of Month of **June-2026** for Cement is **Rs.5,600/-** per MT (Without GST)
- (c) The Basic Rate of Month of **June-2026** for **(A) High Strength TMT Steel is Rs.50,500/- per MT (Without GST) AND (B) High Strength TMT CRS Steel is Rs.53,000/- per MT (Without GST)** for variation in steel consumption less than **7.5% standard theoretical consumption.**

- (2) The payment for reinforcement bar will be made on theoretical weight basis but not exceeding actual procurement at site. The weight shall be computed on the basis of the length of the steel used in the work multiplied by the standard unit weight of MS/HYSD (TMT) bar as mentioned in IS Code No. 1786/85.
- (3) No separate payment shall be made for any kind of wastage/excess consumption in the materials.
- (4) Ultimately the liability for assurance of the good quality work as per tender provision lies with the contractor.

Testing of Cement, Steel and other materials:

It should be specifically noted that the Cement, Steel, etc. brought by the contractor at site of work shall be used only after the same is tested at the approved laboratory as per the direction of Engineer-in-charge. The testing of all the materials shall be carried out as per relevant codes of I.S. All the charge for the transport and testing of the samples etc. shall have to be borne by the contractor. The frequency of testing such material shall be in accordance to the relevant Indian Standards as directed by Engineer-in charge. The contractor shall have to make his own arrangement for transportation of inspecting authorities/ agencies/PMC at his own cost.

Signature of the contractor with seal:

Date :

**Executive Engineer
Traffic-BRTS Project Cell
Surat Municipal Corporation**

9.0 MEMORANDUM

(1)	General Description of the Work	:-	ANNUAL RATE CONTRACT FOR CIVIL MAINTENANCE AND REPAIRING IN BRTS BUS SHELTERS, CITY BUS STOPS AND BUS DEPOTS IN NEW EAST (SARTHANA) ZONE IN SURAT CITY.
(2)	Estimated Cost	:-	Rs.24,30,508.57 Ps.
(3)	Earnest Money Deposit	:-	Rs.25,000/-
(4)	Security Deposit (refer IT -27)		
	(i) Initial Security Deposit	:-	Rs. 2% of the Tender Value.
	(ii) To be deducted from R.A.Bills	:	Rs. 2% of each R. A. Bill of total Amount of work done (Including GST).
	Total Security Deposit	:	Rs. 4% of the Tender Value.
(5)	Time allowed for the completion of the Work from date fixed in Work Order Letter to commence	:-	12 (Twelve) Months (Including Monsoon).
(6)	Percentage to be retained from running Account Bills	:-	5% (Five Percent) of total Amount Of work done (Including GST) (refer IT -27)
(7)	Penalty for delayed Work	:-	0.2 % (Zero point Two percent) of the Tender Value per day, maximum up to 10 % (Ten percent) of the Tender Value.
(8)	The progress of the Work shall confirm to the following schedule		
	10% of the work to be done in	:	25% of the time.
	40% of the work to be done in	:	50% of the time.
	70% of the work to be done in	:	75% of the time.
	100% of the work to be done in	:	100% of the time.
(9)	Defect Liability Period	:-	12 (Twelve) Months after completion
(10)	Water Charges	:-	Condition For The Water Supply & Electric Supply on next page no.61
(11)	Construction Cess will be deducted from respective R.A. Bills and Final bill in accordance with the prevailing norms of Govt. of Gujarat.	:-	1% of Work Done Amount in R.A. Bill

Signature of the contractor with seal:

Address:

Date :

**Executive Engineer
Traffic-BRTS Project Cell
Surat Municipal Corporation**

SURAT MUNICIPAL CORPORATION
TRAFFIC -BRTS PROJECT CELL
10.0 CONDITION FOR THE WATER SUPPLY & ELECTRIC SUPPLY

(1) FOR WATER CHARGE : In case of Municipal Network or distribution centre available or not at nearby area.

OPTION-1:

Contractor has to make his own arrangement for construction work whether from private boring or tankers. Contractor has to submit test report of water whether it is of good quality for construction work or not and contractor has to inform about it within 30 days of starting the work. (If the contractor makes his own arrangement for water required for construction and labour camp etc. by drilling own bore or tankers, no water charges will be recovered from the contractor.)

OPTION-2:

If contractor wants to use Municipal Water he has to follow procedure within below:

1. Contractor has to apply for water connection by Municipal Licensed plumber in prescribed form.
2. Contractor has to follow all procedure with his own expenses.
3. According to rule Municipal Corporation issue bill to contractor for consumption of water and contractor has to paid it within stipulated time and contractor has submit one copy of bill and payment receipt to concern department. If contractor fails to pay the bill the amount of bill/paid receipt can be recover from contractor's bill.
4. If Municipal Corporation network is not available then Contractor can make arrangement of water tanker from nearby distribution center after depositing required amount.
5. After completion of work contractor has to cancelled the water connection and inform the concern department.
6. If network and distribution center/network are both not available in that case contractor has to make his own arrangement for good quality construction water and has to follow the option-1.
7. If contractor is not acquiring water connection from Surat Municipal Corporation under option-2 but not found to be using any of the means of Surat Municipal Corporation water or not following either of the mentioned options, water charges shall be recovered at the rate of 3% (THREE Percent) of the civil items in which water consumed.

(2) FOR ELECTRICITY :

1. The contractor shall make his own arrangement at his cost for electric supply required for operating various plants and machineries required for the works and for general lighting purpose for site, office labour colony etc.
2. The energy bills shall also be paid by the contractor.

Signature of the contractor with seal:

Date :

Executive Engineer
Traffic-BRTS Project Cell
Surat Municipal Corporation

11.0 IMPORTANT INSTRUCTIONS-A TO THE CONTRACTOR

- (1) This tender document containing all pages duly signed by the tenderer, should be furnished to Corporation treasury along with the amount of earnest money deposit as mentioned in tender notice. If any of the drawings or papers removed from the tender, the tender shall be rejected and EMD shall be forfeited.
- (2) The tenderer who wants to propose something in written, he should write it on his letter pad or another paper. Anything written on tender papers shall not be considered by Corporation and Contractor shall not be intending to do so.
- (3) Following Certificate shall be enclosed with tender.
 - (a) Solvency Certificate amounting of 20% of Estimated amount.
 - (b) **Registration Certificate of required class given by Government or Semi-Government firm.**
 - (c) Income-Tax clearance certificate.
 - (d) List of work done by Contractor with its volume.
- (4) ~~This is annual rate contract, It the work given to one or more Contractors,~~ the time limit shall be as per memorandum of the tender.

Signature of the contractor with seal:

Date :

**Executive Engineer
Traffic-BRTS Project Cell
Surat Municipal Corporation**

12.0 IMPORTANT INSTRUCTIONS-B TO TENDERER

1.

Affix latest passport size photo of tenderer

Specimen Signature of the Contractor

2. AFFIX LATEST PASSPORT SIZE PHOTOGRAPH OF ALL PARTNERS IN CASE OF PARTNERSHIP AGENCY

1	2	3	4

Specimen signature of all partners in case of partnership agency.

1. _____

2. _____

3. _____

4. _____

Submission of Registered
Agreement is compulsory
in case of partnership
agency.

3. Submission of income tax return of last three years is compulsory for tenderer submitting agency.
4. Submission of sale tax certificate, with proof of residence is compulsory for tenderer.
5. In case of Government royalty applicable to tenderer, it is compulsory to submit a receipt of royalty payment with tender.
6. The Photograph and specimen signature of contractor will be cross checked, whenever contractor receives payment in account section of SMC.
7. The specimen signature of contractor will be cross checked by Account Department of SMC, in case of representative of Contractor along with letter of authority of a person who signed an agreement, receives payment.
8. In case of octroi applicable to the goods of supplier/tenderer, the tenderer/supplier has to submit an attested copies of photocopy of all octroi receipts.

Signature of the contractor with seal:**Address:****Date :**

**Executive Engineer
Traffic-BRTS Project Cell
Surat Municipal Corporation**

13.0 SPECIFICATIONS OF MATERIALS

M-1 WATER :

- 1.1 Water shall not be salty or brackish and shall be clean, reasonably clear and free from objectionable quantities of silt and traces of oil and injurious alkalies, salts, organic matter and other deleterious material which will either weaken the mortar or concrete or cause efflorescence or attack the steel in R.C.C. Container for transport, storage and handling of water shall be clean. Water shall conform to the standards specified in I.S. 456-2000.
- 1.2 If required by the Engineer-in-charge it shall be tested by comparison with distilled water. Comparison shall be made by means of standard cement tests for soundness, time of setting and mortar strength as specified in I.S. 269-1989. Any indication of unsoundness, change in time of setting by 30 minutes or more or decrease of more than 10 percent in strength of mortar prepared with water sample when compared with the results obtained with mortar prepared with distilled water shall be sufficient cause for rejection of water under test.
- 1.3 Water for curing mortar, concrete or masonry 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 surfaces.
- 1.4 Hard and bitter water shall not be used for curing.
- 1.5 Portable water shall generally be found suitable for curing mortar or concrete.

M-2 LIME :

- 2.1 Lime shall be hydraulic lime as per I.S. 712-1984. Necessary tests shall be carried out as per I.S. 6932 (Parts I to X) 1995.
- 2.2 The following field tests for limes are to be carried out ---
 - a] A very rough idea can be formed about the type of lime by its visual examination i.e. fat lime bears pure white colour, lime in form of porous lumps of dirty white colour, indicates quick lime, and solid lumps the unburnt lime stone.
 - b] Acid tests for determining the carbonate content in lime. Excessive amount of impurities and rough determination of class of lime.
- 2.3 Storage shall comply with I.S. 712-1984. The slaked lime, if stored, shall be kept in a weather proof and damp proof shed with impervious floor and sides to protect it against rain, moisture, weather and extraneous materials mixing with it. All lime that has been damaged in any way shall be rejected and all rejected materials shall be removed from site of work.
- 2.4 Field testing shall be done according to I.S. 162-1989 to show the acceptability of materials.

M-3 CEMENT :

- 3.1 Cement shall be ordinary portland cement of 53 grade as per I.S. 12269/87 (with latest amendment) namely Ambuja, Ultra tech, Sanghi, Hathi, Sidhdhi, J.K.Laxmi. Cement shall be as Schedule-A confirming to IS-12269:2013 with latest amendment ISO-9000 of 53 grade OPC only and ordinary portland slag cement as per I.S. 269-1989 or Portland slag cement as per I.S. 455-1976 and revised latest I.S.

M-4 WHITE CEMENT :

- 4.1 The white cement shall conform to I.S. 8042-1989.

M-5 COLOURED CEMENT :

- 5.1 Coloured cement shall be with white or grey portland cement as specified in the item of the work.
- 5.2 The pigments used for coloured cement shall be of approved quality and shall not exceed 10% of cement used in the mix. The mixture of pigment and cement shall be properly ground to have a uniform colour and shade. The pigments shall have such properties as to provide for durability under exposure to sun-light and weather.
- 5.3 The pigment shall have the property such that it is neither affected by the cement nor detrimental to it.

M-6 SAND :

6.1 Sand shall be natural sand, clean, well graded, strong, durable and gritty particles free from injurious amounts of dust, clay, kankar nodules, soft or flaky particles, shale, 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% of silt as determined by field tests. If necessary the sand shall be washed to make it clean.

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

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

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

I.S. Sieve Designation	% by weight passing sieve	I.S. Sieve Designation	% by weight passing sieve
4.55 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 :

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

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

7.4 The height of silt visible as settled layer above the stone dust shall be expressed as percentage of the height of the stone dust below. The stone dust containing more than 8% silt shall be washed so as to bring the silt content within the allowable limit.

7.5 The fineness modulus of stone dust shall not be less than 1.80.

M-8 STONE GRIT :

8.1 Grit shall consist of crushed or broken stone and be hard, strong, dense, durable, clean, of proper gradation and free from skin or coating likely to prevent proper adhesion of mortar. Grit shall generally be cubical in shape and as far as possible flaky elongated pieces shall be avoided. It shall generally comply with the provisions of I.S. 383-1990. Unless a special stone of a particularly quarry is mentioned, grit shall be obtained from the best black trap or equivalent hard stone as approved by the Engineer-in-charge. The grit shall have no deleterious reaction with cement.

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

I.S. Sieve Designation	% by weight passing sieve	I.S. Sieve Designation	% by weight passing sieve
12.50 mm	100%	4.75 mm	2.20%
10.00 mm	80-100%	2.36 mm	0.25%

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

8.4 The necessary tests for grit shall be carried out as per the requirements of I.S. 2338 (Parts I to VIII) 1988, as per instruction of the Engineer-in-charge. The necessity of test will be decided by the Engineering-in-charge.

M-9 CINDER :

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

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

9.3 The average grading for cinder aggregates shall be as mentioned below :

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

M-10 LIME MORTAR :

10.1 LIME : Shall conform to specification M-2. WATER : Water shall conform to specification M-1. SAND : Sand shall conform to specification M-6.

10.2 PROPORTION OF MIX : Mortar shall consist of such proportions of slaked lime and sand as may be specified in the item. The slaked lime and shall be measured by volume.

10.3 PREPARATION OF MORTAR : Lime mortar shall be prepared by wet process as per I.S. 1625-1971. Power driven mill shall be used for preparation of lime mortar. The slaked lime shall be placed in the mill in an even layer and ground for 180 revolutions with sufficient water. Water shall be added as required during grinding (care being taken not to add more water) that 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.

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

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

M-11 CEMENT MORTAR :

11.1 Water shall conform to specification M-1. Cement shall conform to specification M-3. Sand shall conform to M-5.

11.2 PROPORTION OF MIX : 11.2.1 Cement and sand shall be mixed to specified proportions, sand being measured by measuring boxes. The proportion of cement shall be by volume on the basis of 50 Kg./Bag of cement being equal to 0.0342 cu.m. The mortar may be hand mixed or machine mixed as directed.

11.3 PREPARATION OF MORTAR : 11.3.1 In hand mixed mortar, cement and sand in the specified proportions shall be thoroughly mixed dry on a clean impervious platform by turning over at least 3 times or more till a homogeneous mixture of uniform colour is obtained. Mixing platform shall be so arranged that no deleterious extraneous material shall get mixed with mortar or mortar shall flow out. While mixing, the water shall be gradually added and thoroughly mixed to form a stiff plastic mass of uniform colour so that each particle of sand shall be completely covered with a film of wet cement. The water cement ratio shall be adopted as directed.

11.4 The mortar so prepared shall be used within 30 minutes of adding water. Only such quantity of mortar shall be prepared as can be used within 30 minutes.

M-12 STONE COARSE AGGREGATE FOR NOMINAL MIX CONCRETE :

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

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

TABLE

I.S. Sieve Designation	Percentage Passing for single sized aggregates of nominal size			I.S. Sieve Designation	Percentage Passing for single sized aggregates of nominal size		
	40 mm	20 mm	16 mm		40 mm	20 mm	16 mm
80 mm	-	-	-	12.5 mm	-	-	-
63 mm	100	-	-	10 mm	0.5	0.20	0.30
40 mm	80-100	100	-	4.75 mm	-	0.50	0.50
20 mm	0-20	85-100	100	2.75 mm	-	-	-
10 mm	-	-	85-100				

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

12.3 The grading test shall be taken in the beginning and at the change of source of materials. The necessary tests indicated in I.S. 383-1990 and I.S. 456-2000 shall have to be carried out to ensure the acceptability. The aggregates shall be stored separately and handled in such a manner as to prevent the intermixing of different aggregates. If the aggregates are covered with dust, they shall be washed with water to make them clean.

M-13 BLACK TRAP OR EQUIVALENT HARD STONE COARSE :

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

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

13.3 The necessary tests indicated in I.S. 383-1990 and I.S. 456-2000 shall have to be carried out to ensure the acceptability of the material.

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

M-14 BRICK BATS AGGREGATE :

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

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

M-15 BRICKS :

15.1 The bricks shall be hand or machine moulded and made from suitable soils and kiln burnt. They shall be free from cracks and flaws not nodules of free lime. They shall have smooth rectangular faces with sharp corners and shall be of uniform colour. The bricks shall be moulded with a frog of 100mm x 40 mm and 10mm to 20mm deep on one of its flat sides. The bricks shall not break when dropped on the ground from a height of 600 mm.

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

15.3 The size of conventional bricks shall be as under ---
225 x 110 x 75mm.

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

Length : 3.00 mm

Width : 1.50 mm

Height : 1.50 mm

15.5 The crushing strength of the bricks shall not be less than 35 Kg./Sq.Cm. The average water absorption shall not be more than 20% by weight. Necessary tests for crushing strength and water absorption etc. shall be carried out as per I.S. 3495 (Part I to IV)-1992.

M-15(A) FLYASH BUILDING BRICKS :

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

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

The size of conventional brick shall be 230 mm x 110 mm x 70 mm.

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

Length : ± 4 mm

Width : ± 2 mm

Height : ± 2 mm

The physical characteristic of bricks shall be as follows.

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

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

M-16 STONE :

16.1 The stone shall be of the specified variety such as Granite/Trap stone/Quartzite or any other type of good hard stones. The stones shall be obtained only from the approved quarry and shall be hard, sound, durable and free from defects like cavities, cracks, sand holes, flaws, injurious viens, patches of loose or soft materials etc. and weathered portions and other structural defects or imperfections tending to affect their soundness and strength. The stone with round surface shall not be more than 5% of dry weight. When tested in accordance with I.S. 1134-1985. The minimum crushing of the strength of the stone shall be 200 Kg./Sq.Cm. unless otherwise specified.

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

16.3 The khanki facing stone shall be dressed by chisel as specified in the item for khanki facing in required shape and size. The face of the stone shall be so dressed that the bushing on the exposed face shall not project by more than 40 mm. from the general wall surface and on face to be plastered it shall not project by more than 19 mm nor shall it have depressions more than 10 mm from the average wall surface.

M-17 LATERITE STONE :

17.1 Laterite stone shall be obtained from the approved quarry. It shall compacted in texture, sound, durable and free from soft patches. It shall have a minimum crushing strength of 100 Kg/Sq.Cm. in its dry condition. It shall not absorb water more 20% of its own weight, when immersed for 25 hours in water. After quarrying, the stone shall be allowed to weather for some time before using in work.

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

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

17.4 Special corner stones shall be provided where so directed.

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

18.1 Mild steel bars reinforcement TMT/CRS Bars for R.C.C. work shall conform to I.S. 432 (Part-II)-1982 and shall be of tested quality. It shall also comply with the relevant part of I.S. 456-1978 and revised latest I.S. Code.

18.2 All the reinforcement shall be clean and free from dirt, paint, grease, mill scale or loose or thick rust at the time of placing.

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

(i)	6 mm	0.22 Kg/Rmt.
(ii)	8 mm	0.39 Kg/Rmt.
(iii)	10 mm	0.62 Kg/Rmt.
(iv)	12 mm	0.89 Kg/Rmt.
(v)	14 mm	1.21 Kg/Rmt.
(vi)	16 mm	1.58 Kg/Rmt.
(vii)	18 mm	2.00 Kg/Rmt.
(viii)	20 mm	2.47 Kg/Rmt.
(ix)	22 mm	2.98 Kg/Rmt.
(x)	25 mm	3.85 Kg/Rmt.
(xi)	28 mm	4.38 Kg/Rmt.
(xii)	32 mm	6.32 Kg/Rmt.
(xiii)	36 mm	8.00 Kg/Rmt.
(xiv)	40 mm	9.86 Kg/Rmt

M-19 HIGH YIELD STRENGTH STEEL DEFORMED BARS :

19.1 High yield strength steel deformed bars shall be either cold twisted or hot rolled and shall conform to I.S. 1739-1978 and I.S. 1139-1966 respectively.

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

M-20 HIGH TENSILE STEEL WIRES :

20.1 The high tensile wires for use in prestressed concrete shall conform to I.S. 2090-1983.

20.2 The tensile strength of the high tensile steel bars shall be as specified in the item. In absence of the given strength and minimum strength shall be taken as per para 6-1 of the I.S. 1785-1962. Testing shall be done as per I.S. requirements.

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

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

M-21 MILD STEEL BINDING WIRE :

21.1 The mild steel wire shall be of 1.63mm or 1.22mm (16 or 18 guage) diameter and shall conform to I.S. 280-1978.

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

M-22 STRUCTURAL STEEL :

22.1 All structural steel shall conform to I.S. 226-1975. The steel shall be free from the defects mentioned in I.S. 226- 1975 and shall have a smooth finish. The material shall be free from loose mill scale, rust pits or other defects affecting the strength and durability. Rivet bars shall conform to I.S. 1148-1992.

22.2 When the steel is supplied by the contractor test certificates of the manufacturers shall be obtained according to I.S. 226-1975 and other relevant Indian Standards.

M-23 GALVANISED IRON SHEETS :

23.1 The galvanized iron sheets shall be plain or corrugated sheets of gauge as specified in item. The G.I. Sheets shall conform to I.S. 277-1992. The sheets shall be undamaged in carriage and handling either by rubbing off of zinc coating or otherwise. They shall have clean and bright surface and shall be free from dents, bends, holes, rust or white powdery deposit.

23.2 The length and width of G.I. sheets shall be as directed as per site condition.

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

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

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

M-24 ASBESTOS CEMENT SHEETS :

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

24.2 Ridges and Hips :

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

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

M-25 MANGALORE PATTERN ROOF TILES :

25.1 The Mangalore pattern tiles shall conform to I.S. 654-1992 for Class 'AA' or 'A' type as specified in item. Samples of the tiles to be provided shall get approved from the Engineer-in-charge. Necessary tests shall be carried out as directed.

M-26 SHUTTERING :

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

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

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

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

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

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

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

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

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

M-27 EXPANSION JOINTS - PREMOULDED FILLER :

27.1 The item 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.

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

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

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

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

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

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

M-29 TEAK WOOD :

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

29.2 Teak wood shall generally be free from large, loose, dead or cluster knots, flaws, warps, twists, shakes, bends or any other defects. It shall generally be uniform in substance and of straight fibres as far as possible. It shall be free from rot, decay, harmful fungi and other defects of harmful nature, which 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 or resinous materials made to hide the defects shall render the pieces liable to rejection by the Engineer-in-charge.

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

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

29.5 First Class Teak Wood :

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

29.6 Second Class Teak Wood :

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

M-29-A NON-TEAK WOOD :

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

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

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

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

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

30.1 The solid core type flush door shutters shall be of decorative or non-decorative type as specified in the drawing. The size and thickness of the shutter shall be as specified in drawings or as directed. The timber species for core shall be used as per I.S. 2202-(Part-I)-1991. The timber shall be free from decay and insect attack. Knots and knot holes less than half the width of cross-section of the members, pitch streaks and harmless pin holes shall be permissible except in the exposed edges of the core members. The commercial plywood, cross bands shall conform to I.S. 303-1298.

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

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

30.4 The shutters shall be tested for ---

i] End Immersion Test : The test shall be carried out as per I.S. 2202 (Part-I) 1991. There shall be no delamination at the end of the test.

ii] Knife Test : The face panel when tested in accordance with I.S. 1659-1990 shall pass the test.

iii] Glue Adhesion Test : The flush door shall be tested for glue adhesive test in accordance with I.S. 2202(Part-I)- 1991. 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, hole and other permissible wood defects shall not be considered in assessing the sample.

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

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

M-31 ALUMINIUM DOORS, WINDOWS, VENTILATORS :

31.1 Aluminium alloy used in the manufacture of extruded window sections shall conform to I.S. designation HEA-WP of I.S.:733- 1991 and also to I.S. Designation WVG - WP OF I.S.:1285-1991. The sections shall be as specified the drawing and design. The fabrication shall be done as directed.

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

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

M-32 ROLLING SHUTTERS :

32.1 The rolling shutters shall conform to I.S. 6248-1991. 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 mm. thick and 80 mm. wide for shutters 3.5 m. in width and above unless otherwise specified.

32.2 Guide channels shall be of mild steel deep channel section and of rolled pressed or built up (fabricated) jointless construction. The thickness of sheet used shall not be less than 3.15 mm.

32.3 Hood covers shall be made of M.S. sheets not less than 0.92 mm. thick. For shutters having width 3.5 mts. and above, the thickness of M.S. sheet for the hood covers shall be not less than 1.25 mm.

32.4 The spring shall be of best quality and shall be manufactured from tested high tensile spring steel wire or strip of adequate strength to balance the shutters in position. The spring pipe shaft etc. shall be supported on strong M.S. or malleable C.I. brackets. The brackets shall be fixed on the or under the lintel as specified with rawl plugs and screws bolts etc.

32.5 The rolling shutters shall be of self rolling type upto 8 sq.m. clear area without ball bearing and upto 12 sq.m. clear area with ball bearing. If the rolling shutters are of larger then gear operated type shutters shall be used.

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

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

M-33 COLLAPSIBLE STEEL GATE :

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

- i] Pickets : These shall be of 20 mm. M.S. channels of heavy sections unless otherwise shown on drawings. The distance centre to centre of pickets shall be 12 cms. with an opening of 10 cms.
- ii] Pivoted M.S. flats shall be 20 mm. x 6 mm.
- iii] Top and bottom guides shall be from tee or flat iron of approved size.
- iv] The fittings like stoppers, fixing hold fasts, locking cleats, brass handles and cast iron rollers shall be of approved design and size.

M-34 WELDED STEEL WIRE FABRIC:

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

M-35 EXPANDED METAL SHEETS :

35.1 The expanded metal sheets shall be free from flaws, joints, welds, broken, stands, laminations and other harmful surface defects Expanded metal steel sheet shall conform to I.S. 412 - 1992 except that blank sheets need not be with guaranteed mechanical properties. The size of the diamond mesh of expanded metal and dimensions of strands (width and thickness) shall be as specified. The tolerance on nominal weight of expanded metal sheets shall be of + 10 per cent.

35.2 Expanded metal in panels shall be in one whole piece in each panel as far as stock sizes permit. The expanded metal sheets shall be coated with suitable protective coating to prevent corrosion.

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

36.1 Mild steel wire may be galvanised, as indicated. All finished steel wire shall be well cleanly drawn to the dimensions and size of wire as specified in item. The wire shall be sound, free from slits, surface flaws, rough jagged and imperfect edges and other harmful surface defects and shall conform to I.S. 280-1992.

M-37 PLYWOOD :

37.1 The Plywood for general purpose shall conform I.S. 303-1998. Plywood is made by cementing together thin boards or sheets of wood into panels. There are always an odd number of layers 3, 5, 7, 9 ply etc. The plies are placed so that the grain of each layer is at right angles to the grain in the adjacent layers.

37.2 The chief advantage of plywood over a single board of the same thickness is the more uniform strength of the plywood along the length and width of the plywood and greater resistance to cracking and splitting with change in moisture content.

37.3 Usually synthetic resins are used for glue. Phenolic resins are usually cured in a hot press which compresses and simultaneously heats the plies between hot plates which maintain a temperature of 90 degree C. to 140 degree C. and a pressure of 11 to 14 Kg./Sq.cm. on the wood. The time of heating may be anything from 2 to 60 minutes depending upon thickness.

37.4 When water glue are used the wood absorbs so much Water that the finished plywood must be dried carefully, When synthetic resins are used as adhesive the finished plywood must be exposed to atmosphere of controlled humidity until the proper amount of moisture has been absorbed.

37.5 According to I.S. : 303-1998 the plywood for general purpose shall be of three grades namely BWR, WWR and CWR depending upon the adhesives used for bonding the veneers and it will be further classified into six types namely AA, AB, AC, BB, BC and CC based on the quality of the two faces, each face being of three kinds namely A, B and C. After pressing, the finished plywood should be reconditioned to a moisture content not less than 8 percent and not more than 16 percent.

37.6 THICKNESS OF PLYWOOD BOARDS**TABLE**

Board	Thick
3 ply	3 mm
	4 mm
	5 mm
	6 mm
6 ply	5 mm
	6 mm
	8 mm
	9 mm
7 Ply	9 mm
	13 mm
	16 mm
	13 mm
9 Ply	16 mm
	19 mm
	19 mm
	22 mm
11 ply	22 mm
	25 mm

M-38 GLASS :

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

38.2 Sheet Glass :

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

38.2.2 For panes larger than 600 mm. x 600 mm. and upto 800 mm. x 800 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.

38.2.3 Sheet glass shall be patent flattened glass of best quality and for glazing and framing purposes shall conform to I.S. 761-1963. Sheet glass of the specified colours shall be used, if so shown on detailed drawings or so specified. For important buildings and for panes with any dimensions over 900 mm. plate glass of specified thickness shall be used.

38.3.0 Plate Glass :

38.3.1 When plate glass is specified it shall be "Polished Patent Plate Glass" of best quality. It shall have both the surface ground 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 the absence of any specified thickness, the thickness of plate glass to be supplied shall be 6 mm. and a tolerance of 0.20 mm. shall be admissible.

38.4.0 Obscured Glass :

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

38.5.0 Wired Glass :

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

38.6.0 Toughened Glass or Tempered Glass:

Tempered glass is an extremely strong glass which is heat treated to a uniform temperature of approximately 650deg C and rapidly cooled to induce compressive stresses of 770kg/sq m to 1462kg/sq m on the surfaces and edge compression of the order of 680kg/sq m. Any attempt to cut, drill, grind or sand blast after toughening may result in breakage and hence all holes etc as required shall be drilled prior to toughening the glass. No other glass but tempered glass shall be used for sliding doors, ticket counters and cutout coverings. The thickness of the glass shall be as per the drawings of the design consultants or as per the calculations of the manufacturer.

38.6.1 Properties of Tempered Glass / Toughened Glass

1. Density (approximate):	2.42-2.52 g/cubic cm
2. Tensile Strength:	120 to 200 N/sq .mm
3. Compressive Strength:	1000 N/sq.mm
4. Modulus of Elasticity:	70Gpa-
5. Coefficient of linear expansion:	9×10^{-6} m/Mk
6. U Value:	5.7 W/sq .m.K for 6mm thick clear
7. SF for 6 mm clear:	81 %
8. Shading coefficient of 6 mm clear:	0.93
9. Visible light transmission of 6 mm clear:	87 %
10. Thickness :	3mm to 19mm

38.7.0 Laminated Glass :

Laminated glass is a sandwich made of one piece of plastic Poly Vinyl Butyral (PVB) between two or more glasses. The PVB sticks with the glass, forms chemical as well as mechanical bonds. When laminated with annealed glass, the layer maintains the geometric integrity of the pane in case of breakage. Also it gives acoustic insulation as well as gives protection against damage caused due to UV radiation because it cuts almost 99% of UV radiation present in the sunlight. A Laminated glass is regarded as a safety glass by most of the standards. The glasses used for the purpose of making a laminated glass can be either float glass or toughened glass or as directed.

38.7.1 The Glass if otherwise specifically mentioned in the Bills of Quantities or design drawings shall be 4mm clear glass + 1.52PVB + 4mm clear glass of AIS, Saint Gobain, Asahi, ModiGuard or equivalent.

38.7.2 The framing around the glass shall be as per the designs and specifications.

38.7.3 Properties of Laminated Glass :

- PVB thickness --0.38mm, 0.76mm, 1.14mm, 1.52mm
- PVB colors --Clear, white, gray, purple, blue, green, yellow, orange, red
- Refractive Index -- 1.48
- Visible Light Transmittance, Clear -- 89%
- Shading Coefficient, Clear -- 0.92
- UV Screening, up to 380 nm -- 99%
- Tensile Strength -- 3220 psi
- Tensile Elongation -- 205% (JIS K6771)
- Specific Gravity -- 1.07
- Specific Heat -- 0.47 Btu/lb°F
- Thermal Conductivity (K value) -- 0.12 Btu/(ft²hr°F)
- Coefficient of Thermal Expansion -- 2.6 x 10⁻⁴ in./in.°F
- Emissivity -- 0.9

38.7.4 Sealants :

General: Provide products of type indicated, complying with the following requirements: Select glazing sealants that are compatible with one another and with other materials they will contact, including glass products, seals of insulating-glass units, and glazing channel substrates, under conditions of service and application, as demonstrated by sealant manufacturer based on testing and field experience. Comply with sealant and glass manufacturers' written instructions for selecting glazing sealants suitable for applications indicated and for conditions existing at time of installation.

38.7.5 Gasket :

Neoprene extrusions in shape and sizes indicated, fabricated into frames with moulded corners. These shall be of Neoprene, EPDM, Silicone, Thermoplastic polyolefin rubber or as approved.

M-39 ACRYLIC SHEETS :

39.1 Acrylic sheets shall be of thickness as specified in the item and of a specified shape and size as the case may be. Panels may be flat or curved. It 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 of larger thickness. It shall be extremely resistant to sunlight, weather and low temperatures. It shall not show any significant yellowing or change in physical properties or loss of light transmission over a longer period of use.

The sheet shall be impact resistant also. Sheets should be available in complete range of standard transparent, translucent and opaque colours. Sheets should be available in complete range of standard transparent, translucent and opaque colours. Sheets shall be of such quality that they can be cut, bent and jointed as desired. Solution for the joints shall be used as per the requirement of manufacture.

M-40 PARTICLE BOARD :

40.1 The particle boards used for face panels shall of best quality free from any defects. The particle boards shall be made with phenolmaldehyde adhesive. The particle boards shall conform to I.S. 3087-1990. "Specification for wood particle board for general purpose." The size and the thickness of the particle board shall be as specified.

M-41 EXPANDED POLYSTYRENE OR FRAMES STYROPER SLEBS :

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

M-42 RESIN BONDED FIBRE GLASS :

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

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

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

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

M-43 FIXTURES & FASTENINGS :

General ---

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

Holdfasts :

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

Butt Hinges :

- i] Railway standard heavy type butt hinges shall be used when so specified.
- ii] Tee and strap hinges shall be manufactured from M.S. sheet.

Sliding Door Bolts (Aldrops) :

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

Tower Bolts (Barrel Type) :

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

Door Latch :

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

Bathroom Latch :

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

Handle :

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

Door Stoppers :

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

Door Catch :

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

Wooden Door Stop With Hinge :

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

Casement Window Fastner :

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

Casement Stays (Straigot Peg.Stay) :

- i] The stays shall be made from a channel section having three holes at appropriate position so that the window can be opened either fully or partially as directed.
Size of the stay shall be 250 mm. to 300 mm. as directed.

Ventilator Catch :

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

Pivot :

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

M-44 PAINTS :

44.1 Oil Paints :

Oil paints shall be of the specified colour and shade, and as approved. The ready mixed paints shall only be used. However, if ready mixed paint or specified shade or tint is not available white ready mixed paint with approved stainer 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 redressed with paddle to a smooth homogeneous state. The paint shall show no curdling, livering, caking or colour separation and shall be free from lumps and skins.
- ii] The paint as received shall brush easily, possess good levelling properties and show no running or sagging tendencies.
- iii] The paint shall not skin within 48 hours in a three quarters filled closed container.
- iv] The paint shall dry to a smooth uniform finish free from roughness, grit unevenness and other imperfections.

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

44.2 Enamel Paints :

The enamel paint shall satisfy in general requirements as mentioned in specification of oil paints. Enamel paints shall conform to I.S. 2933-1991.

M-45 FRENCH POLISH :

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

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

The french polish so prepared shall conform to I.S. 348-1991.

M-46 MARBLE CHIPS FOR MARBLE MOSAIC TERRAZZO :

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

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

46.3 The marble chips shall be machine crushed. They shall be free from foreign matter, dust etc. Except as above the chips shall conform to I.S. 2114-1990.

M-47 FLOORING TILES :**47.1 A] Plain Cement Tiles -**

47.1.1 The plain cement tiles shall be of general purpose type. These are the tiles in the manufacture of which no pigments are used. Cement used in the manufacture of tiles shall be as per Indian Standards.

47.1.2 The tiles shall be manufactured from a mixture of cement and natural aggregates by pressure process. During manufacture, the tiles shall be subjected to a pressure of not less than 140 Kg./Sq.cm. The proportion of cement to aggregate in the backing of the tiles shall be not leaner than 1:3 by weight. The wearing face, though the tiles are of plain cement, shall be provided with stone chips of 1 to 2 mm size. The proportion of cement to the marble chips aggregate in the wearing layer of the tiles shall be three parts of cement to one part of chips by weight. The minimum thickness of wearing layer shall be 3 mm. The colour and texture of wearing layer shall be uniform throughout its face and thickness. On removal from mould, the tiles shall be kept in moist condition continuously atleast for seven days and subsequently, if necessary, for such long period as would ensure their conformity to requirements of I.S. 1237- 1990 requiring resistance to wear and water absorption.

47.1.3 The wearing face of the tiles shall be plain, free from projections, depressions and cracks and shall be reasonably parallel to the back face of the tile. All angles shall be right angle and all edges shall be sharp and true.

47.1.4 The tile sizes shall generally be square shape 24.85cm. x 24.85cm. or 25cm. x 25cm. The thickness of the tiles shall be 20 mm.

47.1.5 The tolerance of length and breadth shall be plus or minus 1 mm. The tolerance on thickness shall be plus 5 mm.

47.1.6 The tiles shall satisfy the tests as regards transverse strength, resistance to wear and water absorption as per I.S. 1237-1980.

47.2 B] Plain Coloured Tiles :

47.2.1 These tiles shall have the same specifications as for plain cement tiles as per (A) above except that they shall have a plain wearing surface wherein pigments are used. They shall conform to I.S. 1237-1990.

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

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

47.3 C] Marble Mosaic Tiles :

47.3.1 These tiles have the same specifications as per plain cement tiles except the requirements as stated below ---

47.3.2 The marble mosaic tiles shall conform to I.S. 1237-1990. The wearing face of the tiles shall be mechanically ground and filled. The wearing face of tiles shall be free of projections, depressions and cracks and shall be reasonably parallel to the back face of the tiles. All angles shall be right angles and all edges shall be sharp and true.

47.3.3 Chips used in the tiles be from smallest upto 20 mm. size. The minimum thickness of wearing layer of tiles shall be 6 mm. For pattern of chips to be laid on the wearing face, a few samples with or without their full size photographs as directed shall be presented to the Engineer-in-charge for approval.

47.3.4 Any particular samples, if found suitable shall be approved by the Engineer-in-charge, of he may ask for particular sized chips to be more or less in the sample presented. The samples shall have to be made by the contractor till a suitable sample finally approved for use in the work. The contractor shall ensure that the tiles supplied for the work shall be in conformity with the approved sample only, in terms of its dimensions, thickness of backing layer and wearing surface, materials, ingredients, colour shade, chips, distribution etc. required.

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

47.4 D] Chequered Tiles :

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

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

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

47.4.4 Tiles shall conform to relevant I.S. 1237-1990.

47.5 E] Chequered Tiles for Staircases :

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

- i] The length of a tile including nose shall be 330 mm.
- ii] The minimum thickness shall be 28 mm.
- iii] The nosing shall have also the same wearing layer at the top.

iv] The nosing edge shall be rounded.

v] The front portion of the tile for a minimum length of 75mm. from and including the nosing shall have grooves running parallel to nosing and at centres not exceeding 25mm. Beyond that the tiles shall have normal chequer pattern.

M-48 ROUGH KOTAH STONE :

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

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

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

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

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

M-49 POLISHED KOTAH STONES :

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

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

M-50 DHOLPUR STONE SLAB :

50.1 Dholpur stone slab shall be of best quality as approved by the Engineer-in-charge. The stone slab shall be without any veins, cracks, and flaws. The stone slab shall be even, sound and durable, regular in shape and uniform colour.

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

50.3 The sample of stone shall be got approved from the Engineer-in-charge for shade and tint for a particular work. It shall be ensured the stones to be used in a particular work shall not differ much in shade or tint from the approved sample.

M-51 MARBLE SLAB :

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

Marble slabs with natural veins, if selected shall have to be laid as per the pattern given by the Engineer-in-charge. Size of the slabs shall be minimum 450mm. x 450mm. and preferably 600mm. x 600mm. However, smaller sizes 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 I.S. 1130-1993 or as revised from time to time.

M-52 GRANITE STONE SLAB :

52.1 Granite shall be of approved colour and quality, The stone shall be hard even, sound and regular in shape and generally uniform in colour. It shall be without and soft veins, cracks or flaws.

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

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

M-53 P.V.C. FLOORING :

53.1 P.V.C. sheets for P.V.C. floor covering shall be homogenous flexible type, conformint to I.S. 3462-1991. The P.V.C. covering shall neither develop any toxic effect while put to use not shall give off any disagreeable odour.

53.2 Thickness of flexible type covering or tiles shall be as specified in the description of the item.

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

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

53.4 Adhesive :

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

M-54 FACING TILES :

54.1 The facing tiles (burnt clay facing bricks) shall be free from cracks, flaws, and nodules of free lime. They shall be thoroughly burnt and shall have plane rectangular faces with parallel sides and sharp straight right angled faces. The texture of the finished surface that will be exposed when in place, shall conform to an approved sample consisting not less than four stretcher bricks each representing resistance to penetration by rain and greater durability than common bricks. The tiles shall conform to I.S. 2691-1995.

54.2 The standard size of facing brick tiles shall be 19 x 9 x 4 cms. The facing brick tiles shall be provided with frog which shall conform to I.S. 1077-1992.

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

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

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

Facing dimensions.	Permissible tolerance.
Max. below 19 cms.	Max. 2.5 mm.
Max. above 19 cms.	Max. 3.0 mm

54.5 The average compressive strength obtained as a sample of five tiles when tested in accordance with the procedure as per I.S. 1077-1992 shall be not less than 175 Kg/Sq.cm. The average compressive strength of any individual brick shall not less than 160 Kg/Sq.cm.

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

54.7 The brick tiles when tested in accordance with I.S. 1077-1992 the rate of efflorescence shall not be more than "Slightly effloresced".

M-55 WHITE GLAZED TILES :

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

55.2 The tiles shall be of nominal size of 150mm. x 150mm. unless otherwise specified. The maximum variation from the stated sizes, other than the thickness of tile, shall be plus or minus 1.5mm. The thickness of the tile shall be 6mm. except as above the tiles shall conform to I.S. 777-1988.

M-56 GALVANISED IRON PIPES AND FITTINGS :

Galvanized iron pipe shall be of the medium type and of required diameter and shall comply with I.S. 1239-1990. 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 :

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

57.2 They shall be of screw down type and or brass chromium plated and of diameter as specified in the description of the item. They shall conform to I.S. 781-1990 and they shall be of best Indian make. They shall be polished bright.

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

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

M-58 GUN METAL WHEEL VALVE :

58-1 The gun metal wheel valve shall be of approved quality. These shall be of gun metal fitted with wheel and shall be of gate valve opening full way and of the size as specified. These shall conform to I.S. 778-1990.

M-59 WHITE GLAZED PORCELAIN WASH BASIN :

59.1 Wash basin shall be of white porcelain first quality best Indian make and it shall conform to I.S. 2556-(Part-IV)-1994 and I.S. 771-1990. The size of the wash basin shall be as specified in the item. The wash basin shall be of one piece construction with continued over-flow arrangements. All internal angles shall be designed so as to facilitate cleaning. Wash basin shall have single tap hole or two holes as specified. Each basin shall have a circular waste hole which is either rebated or bevelled internally

with 65 mm. dia. at top and 10 mm. depth to suit the waste fitting. The necessary stud slot to receive the bracket on the underside of the basin shall be provided. Basin shall have an internal soap holder recess which shall fully drain into the bowl.

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

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

60.1 The European type water closet shall be white glazed conforming to I.S. 2556-1994 and I.S. 771-1692.

60.2 'S' trap shall be provided as required with water seal not less than 50 mm.

The solid plastic seat and cover shall be of the best Indian make conforming to I.S. 2548-1996. They shall be made of moulded synthetic materials which shall be tough and hard with high resistance to solvents and shall be free from blisters and other surface defects and shall have chromium plated brass hinges and rubber butter of suitable size.

M-61 ORISSA TYPE WATER CLOSED :

61.1 The specification of Orissa type white glazed water closet of first quality shall conform to I.S. 2556 (Part-III) 1994 and relevant specification of Indian type water closet except that pan will be with the integral squaring pan of size 580 mm x 440 mm. with raised footrest.

M-62 INDIAN TYPE WATER CLOSET :

The Indian type white glazed water closet of first class quality, size as specified in the item and conforming to I.S. 771-1979 and I.S. 2556-(Part-II)-1994. Each pan shall have integral flushing ring of suitable type with adequate number of holes all around as directed to have satisfactory flushing. It shall also have an inlet at back of front for connecting flush pipe as directed. The inside of the bottom of the pan shall have sufficient slope from the front towards the outlet and the surface shall be uniform and smooth. Pan shall be provided with 100 mm. diameter 'P' or 'S' trap with approximately 50 mm. water seal and 50 mm. diameter vent horn.

M-62A : FOOT RESTS :

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

M-63 GLAZED EARTHEN WARE SINK :

The glazed earthenware sink shall be of specified size, colour and quality. The sink shall conform to I.S. 771- Part-II-1992. The brackets for sinks shall conform to I.S. 775-1990.

The pipes shall conform to I.S. 1239-Part-I-1990 and I.S. 404-1993 for steel and lead pipes respectively. 32 mm. brass waste coupling of standard pattern with brass chain and rubber plug shall be provided with sink.

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

The lipped type urinal shall be flat back or corner type as specified in the item and shall conform to I.S. 771-1992. It shall be of best Indian make and size as specified and approved by the Engineer-in-charge. The flat back or corner type urinal must be of first class quality, free from any defects, cracks etc.

M-65 LOW LEVEL ENAMEL FLUSHING TANK:

65.1 The low level enamel flushing tank shall be of 15 litres capacity. It shall conform to I.S. 774-1990. The flushing cistern shall be of best quality and free from any defects. The flushing tank shall have outlet 32 mm diameter. The outlet shall be connected with W.C. Pan by lead pipe of P.V.C. pipe as specified. The flushing tank shall be provided with inlet and outlet for fixing G.I. inlet pipes and over flow pipes. The flushing cistern shall be provided with chromium plated handle for flushing. The flushing tank shall be provided with bracket of cast iron so that it can be fixed on wall at specified height. The brackets shall conform to I.S. 775-1990.

M-66 CAST IRON FLUSHING CISTERN :

66.1 The cast iron flushing cistern shall be of 15 litres capacity. It shall conform to I.S. 774-1990. The flushing cistern shall be of best quality free from any defects.

66.2 The flushing cistern shall have outlet of 32 mm diameter. The outlet shall be connected to lead pipe of 32 mm diameter. The lead pipe shall conform to I.S. 404 (Part-I) 1993. For fixing G.I. inlet pipes and overflow pipe 20 mm dia. inlet and outlet shall be provided. The flushing cistern shall be provided with 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 anticorrosive paint and two coats of paints. The flushing cistern shall be fixed on to C.I. brackets. The brackets shall conform to I.S. 775-1990.

M-67 FLUSH COCK :

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

M-68 CAST IRON PIPES AND FITTINGS :

68.1 All soil, waste, vent and antisiphonage pipes and fittings shall conform to I.S. 1729-1991. The pipes shall have spigot and socket ends with head on spigot end. The pipes and fittings shall be true to shape, smooth, cylindrical their inner and outer surfaces being as nearly as practicable concentric. They shall be sound and nicely cast and shall be free from cracks, laps, pin holes or other imperfections and shall be neatly dressed and carefully fettled.

68.2 The end of pipes and fittings shall be reasonably square to their axis.

68.3 The sand cast iron pipes shall be of the diameter as specified in the description and shall be in length of 1.5 M., 1.8 M. & 2.0 M. including socket ends of the pipe unless shorter length are either specified or required at junction etc. The pipes and fittings shall be supplied without ears unless specified or directed otherwise.

68.4 Tolerances : The standard weights and thickness of pipes shall be as shown in the table below. A tolerance upto minus 10% may however be allowed against these standard weights.

Sr. No.	Nominal dia of bore	Overall Thick	Wight of pipe excluding ears		
			1.5 m long	1.m long	2 m long
1.	75 mm	5.00 mm	12.83 Kg.	16.52 Kg.	18.36 Kg.
2.	100 mm	5.00 mm	18.14 Kg.	21.67 Kg.	24.15 Kg.
3.	150 mm				
4.	250 mm				

A tolerance upto minus 15% 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-68-A P.V.C. Pipes & Fittings:-

1. All soil, waste and vent pipes & fittings shall conform to I.S. 4985-1988 & I.S. 13592:1992. The pipes are provided with an integral rubber ring type socket at one end while the other end is kept plain, smooth & free from burrs. The pipes and fittings shall be true to shape, smooth & cylindrical. They shall be free from cracks, laps, pinholes or other imperfection and shall be nearly dressed and carefully fettled.

2. The P.V.C. Pipes shall be of the diameter as specified in the description and shall be in length of 6.0, 3.0 & 1.8 m including socket ends of the pipe unless shorter length are either specified or required at junction etc. Tolerances on specified length shall be + 10 mm and - 0 mm.

3. Rubber real rings for joints and Access Doors shall be manufactured in accordance with IS: 5382-1998. There are made out of natural rubber with a shore 'A' hardness of 40+5.

4.1 The mean outside diameter, outside diameter at any point and wall thickness manufactured plain or with socket shall be as shown in the following table:-

* All dimensions in millimeters.

Sr. No.	Nominal/Outside dia	Mean outside Diameter		Outside diameter at		Wall thickness	
		Min.	Max.	Min.	Max.	Min.	Max
1.	75	70.0	75.3	74.1	75.9	3.2	3.8
2.	100.	110.00	100.4	108.6	111.4	3.2	3.8

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

* All dimensions in millimeters.

Sr..	Nominal outside diameter	Minimum wall thick of sockets on pipes.		Socket Depth min.	Mean inside diameter of society at mil point	
		S2, Min	S3, Min		Min	Max
1.	75	2.9	2.4	40.00	75.1	75.3
2.	110	2.9	2.4	48.0	110.1	110.4

* The outside diameter of pipe shall be obtained by the method given in IS: 12235(Part-1)-1998, wall thickness shall be measured by the method given in IS:12235(Part-2)1998.

4.3 The permissible variation between the mean outside diameter & the nominal outside diameter of a pipe shall be positive in the form + x, where x is less than or equal to greater of the following two values.

- 0.03 mm, and
- 0.003 x nominal outside diameter- rounded off to the next higher 0.1 mm.

4.4 The permissible variation between the outside diameter at any point (d1) & the nominal outside diameter (de) of a pipe shall not exceed the greater of the following two values.

- 0.5mm, and
- 0.012 de rounded off to the next higher 0.1

4.5 The thickness of fittings and their socket & spigot dimensions shall conform to the thickness and dimensions specified for the corresponding sizes of straight pipes.

M-69 NAHNI TRAP :

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

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

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

M-70 GULLY TRAP :

Gully trap shall conform to I.S. 651-1992. 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 dimensions 300mm. x 300mm. the cover weighing not less than 4.53 Kg. and the frame not less than 2.72 Kg. The grating cover and frame shall be of sound and good casting and shall have truly square machined seating faces.

M-71 GLAZED STONE WARE PIPE AND FITTINGS :

The pipes and fittings shall be of best quality as approved by the Engineer-in-charge. The pipe shall be of best quality manufactured from stone-ware of fire clay, salt glazed thoroughly burnt through the whole thickness, of a close even texture, free from air blows, fire blisters, cracks and other imperfections, which affect the serviceability. The inner and outer surfaces shall be smooth and perfectly glazed. The pipe shall be capable to withstand pressure of 1.5 m. lead without showing signs of leakage. The thickness of the wall shall not be less than (1/12)th of the internal dia. The depth of socket shall not be less than 38 mm. The socket shall be sufficiently large to allow a joint of 6 mm. around the pipe. The pipes shall generally conform to relevant I.S. 651-1992.

M-72 WALL PEG SAIL :

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

M-73 G.I. WATER SPOUT :

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

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

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

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

M-75 CRYDON BALL VALVE :

Ball valve of screwed type including polythene float and necessary lever etc. shall be of the size as mentioned in the description of item and shall conform to I.S. 1703-1989.

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

76.1 Bitumen felt shall be on the fiber bases and shall be of type 2, self finished felt grade-2 and shall conform to I.S. 1322-1998.

M-77 SELECTED EARTH :

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

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

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

M-78 CRACKSEAL :

Crackseal manufactured by Chemistic/Chemisol Indian Ltd., is an acrylic base ready application compound.

M-79 CAST IRON STEPS :

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

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

M. 80. CERAMIC TILES :

80.1 Ceramic tiles shall be of commercial quality from manufacturers such as Orient, Kajaria, Johnson, Nitco, Somani, Bell as approved by the Engineer incharge.

80.2 Ceramic tiles shall be lighlweight, with 6 mm. thickness with +- 5.0 % deviation. Therefore, they require thinner floor bedding compare to mosaic/stone flooring. Onlaying, they reqi ire no further polishing making the floor ready to live and use.

80.3 Ceramic tiles shall be of dimensions of 300 mm. x 300 mm. with +- 0.50 % deviation. All the sides shall be straight & square and the deviation allowed shall be maximum + - 0.40 %.

80.4 Ceramic tiles shall have plain and smooth surface quality, free of visual defects to the extent of minimum 95 % of tiles.

80.5 Ceramic tiles shall have no warping; their surface shall be flat, with maximum +- 0.5% deviation allowed.

80.6 Ceramic tiles shall have water absorption of no more than 4.0 %.

80.7 The bending strength of the ceramic tiles above 300 Kgs./Cm².

80.8 The scratch resistant as per Moh's scale shall be minimum 5. The tiles shall be of group III qualify abrasion resistant.

- 80.9 The crazing resistance of the ceramic tiles shall be in conformity with norms.
- 80.10 The resistance to staining of the ceramic tiles shall be minimum class II.
- 80.11 Ceramic tiles shall be resistant to all acids and alkalis except hydrofluoric acid and its compounds.
- 80.12 The thermal shock resistance shall be up to 10 cycles.

M. 81. VITRIFIED FLOOR TILES :

- 81.1 Vitrified floor tiles shall be of the best quality from manufacturers such as Orient, Kajaria, Johnson, Nitco, Somani, Bell, Asian, Euro as approved by the Engineer in charge. They shall conform to the IS 4457.
- 81.2 They shall be monolithic and available in anti-skid finish, having the size of 300 mm. x 300 mm. x 10 mm. thick.
- 81.3 They shall be rectified, which is the process of sizing & squaring, leading to almost perfect edges and enabling tile installation with very minor joints, giving the installed tiles a joint-free look. They shall be pre-sized and pre-polished.
- 81.4 Maximum deviation in length $\pm 0.3\%$, maximum deviation in thickness $\pm 2.0\%$, maximum wedging allowed ± 0.270 , maximum surface flatness shall be $\pm 0.2\%$, water absorption capacity $< 0.5\%$, maximum Mohs hardness 8.0, flexural strength shall be $> 45 \text{ N/mm}^2$, maximum Abrasion resistance 144 mm^3 , maximum thermal expansion $< (\times 10^{-6})$ maximum thermal shock resistance shall be of no damage, resistance to acid (wt. loss) $< 0.4\%$, Skid resistance (friction coefficient) > 0.6 , breaking strength shall be 2600 N , density of (g/cm^3) shall be 2.4 & no moisture expansion.

M. 82. CONCRETE TILES :

- 82.1 The plain cement concrete tiles shall be manufactured using the basic raw material of white cement with the addition of special chemical & quartz chips, which give the tiles extra strength. The concrete tiles shall be highly durable having very superior structure properties such as high transverse and compressive strength, very low water absorption and very low surface abrasion, supplied by manufacturer such as Roughwalk series, "Mozzaterra" by "Vyara Tiles", or Terrarock Tiles by Super Tiles & Marble Pvt. Ltd. or equivalent, as approved by the Architect and Engineer-in-Charge.

The tiles shall be manufactured using a vibration system and rubber moulds, under pressure. The tiles shall be subjected to a pressure of not less than 140 Kg./Cm^2 . The proportion of cement to aggregate, in the backing of the tiles shall be not less than 1 : 3, by weight.

The tiles shall be hot blasted to give it a special texture. The top shall be treated with two coats of acrylic coating, and factory polished and honed, ready to be fixed in the exterior.

- 82.2 The concrete tiles shall be generally square in shape having all angles at perfect right angles and all the edges being sharp & true, having a size of $400 \text{ mm.} \times 40 \text{ mm.} \times 34 \text{ mm.}$ thick. The tolerance allowed in length & breadth shall be $\pm 1.0 \text{ mm.}$ & tolerance allowed in thickness shall be $\pm 5 \text{ mm.}$
- 82.3 The tiles shall satisfy the test as regards transverse strength, resistance to wear absorption as per IS : 1237.

Water' Absorption :

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

Result : Absorption permissible, shall be at the most 1% (1C) %.

Transverse strength test :

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

Result : When wet : 80 Kg./Cm^2 .

When dry : 120 Kg./Cm^2 .

Abrasion test:

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

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

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

M. 83 ACRYLIC EMULSION PAINTS :

- 83.1. It shall be from ICI, Nerolac, Asian Paints, Berger or equivalent, as approved by the Architect and Engineer-in-Charge. It shall conform to the relevant IS codes.
- 83.2. It shall be used on both interiors and exteriors, on all different types of plaster, wooden surfaces, stone, brickwork, asbestos cement sheets, hard and soft boards, etc. It shall render rich smooth finish and shall provide a tough film that forms a suitable protection against all elements.
- 83.3. It shall be water thinnable. It shall require no primer. On a well prepared surface, it shall be applied, after one coat of cement primer, in case it is an interior surface and waterproof cement coating, in case it is an exterior surface. On a new but highly absorbent surface, a thin coat of the same shall be applied by adding two parts of water by volume to two parts of acrylic emulsion by volume. On previously painted surfaces, one coat of the same shall be applied by thinning four parts of the emulsion with one or two parts of water. It shall be applied by brush, roller or spray. It shall have a covering capacity of 25 - 30 S.Mts./Liter, depending on the surface and shade used. It can be washed to remove the day-to-day dirt, after the surface has been painted, minimum for a month.

M-84 BARBED WIRE

- 84.1. The barbed wire shall be of galvanised steel and it shall generally conform to I.S. 278-1978. The barbed wire shall be of types-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 fine 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.
- 84.2. The barbs shall carry four points and shall be formed by twisting two point wires, each two turns tightly round one line wire making altogether four complete turns. 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.
- 84.3. The line and point wires shall be circular in 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.
- 84.4. The lengths per 100 Kg. of barbed wire I.S. type I shall be as under: Nominal 1000 meter Minimum 934 meter Maximum 1066 Meter.

SIGNATURE OF THE CONTRACTOR WITH SEAL:

DATE:

**EXECUTIVE ENGINEER
TRAFFIC -BRTS PROJECT CELL
SURAT MUNICIPAL CORPORATION**

14.0 GENERAL TECHNICAL SPECIFICATIONS FOR WORKS

GENERAL :

1. In the specification "as directed"/"Approved" shall be taken to mean "as directed"/approved by the Engineer-in-charge.
2. Wherever a reference to any Indian Standard appears in the specifications, it shall be taken to mean as a reference to the latest edition of the same in force on the date of agreement.
3. In "Mode of Measurement" in the specification wherever a dispute arises in the absence of specific mention of a particular point or aspect, the provisions on these particular point or aspects in the relevant Indian Standards shall be referred to.
4. All measurements and computations, unless otherwise specified, shall be carried out nearest to the following limits :
 - (i) Length, width and depth/height 0.01 Running Metre.
 - (ii) Areas 0.01 Square Metre.
 - (iii) Cubic Contents 0.01 Cubic Metre.

In recording dimensions of work.
The sequence of length, width and height (depth) or thickness shall be followed.
5. The distance which constitutes lead shall be determined along the shortest partial route and not necessarily the route actually taken. The decision of the Engineer-in-charge in this regard shall be taken as final.
6. Where no lead is specified, it shall mean "all leads".
7. Lift shall be measured from plinth level.
8. Definite particulars covered in the items of work, though not mentioned or elucidated in its specifications shall be deemed to be included therein.
9. Reference to specifications of materials as made in the detailed specification the items of works is in the form of a designation containing the number of the specification of the material and prefix 'M' e.g. 'M-s'.
10. Approval of the samples of various materials given by the Engineer-in-charge shall not absolve the contractor from the responsibility of replacing defective material brought on site or materials used in the work found defective at a later date. The contractor shall have no claim to any payment or compensation whatsoever on account of any such materials being rejected by the Engineer-in-charge.
11. The contract rate of the item of work shall be for the work completed in all respects.
12. No collection of materials shall be made before it is got approved from the Engineer-in-charge.
13. Collection of approved materials shall be done at site of work in a systematic manner. Materials shall be stored in such a manner as to prevent damage, deterioration or intrusion of foreign matter and to ensure the preservation of their quality and fitness for the work.
14. Materials, if and when rejected by the Engineer-in-charge, shall be immediately removed from the site of work.
15. No materials shall be stored prior to, during and after execution of a structure in such a way as to cause or lead to damage on overloading of the various components of the structure.

16. All work shall be carried out in a workmanlike manner as per the best techniques for the particular item.
17. All tools, templates, machinery and equipment for correct execution of the work as well as for checking lines, levels, alignment of the works during execution shall be kept in sufficient numbers and in good working condition on the site of the work.
20. The mode procedure and manner of, execution shall be such that it does not cause damage or overloading of the various components of the structure during execution of after completion of the structure.
21. Special modes of construction not adopted in general Engineering practice, if proposed to be adopted by the Contractor, shall be considered only if the contractor provides satisfactory evidence that such special mode of construction is safe, sound and helps in speedy construction and completion of work to the required strength and quality. Acceptance of the same by the Engineer-in-charge shall not, however, absolve the contractor of the responsibility of any adverse effects and consequences of adopting the same in the course of execution of completion of the work.
22. All installations pertaining to water supply and fixtures thereof as well as drainage lines and sanitary fittings shall be deemed to be completed only after giving satisfactory tests by the Contractor.
23. The contractor shall be responsible for observing the rules and regulations imposed under the "Minor Minerals Act", and such other laws and rules prescribed by Government from time to time.
24. All necessary safety measures and precautions (including those laid down in the various relevant Indian Standards) shall be taken to ensure the safety of men, materials and machinery on the works as also of the work itself.
25. The testing charges of all materials shall be borne by the Contractor.
24. Approval to any or the executed items for the work does not in any way relieve the contractor of his responsibility for the correctness, soundness and strength of the structure as per the drawings and specifications.

SIGNATURE OF THE CONTRACTOR WITH SEAL :

DATE:

**EXECUTIVE ENGINEER
TRAFFIC -BRTS PROJECT CELL
SURAT MUNICIPAL CORPORATION**

15. ITEMWISE DETAILED TECHNICAL SPECIFICATIONS

Item - 1.

Demolition including stacking of serviceable materials and disposal of unserviceable materials with all lead and lift (i) RCC work

1.1 WORKMANSHIP :-

The term Demolition shall consist of one or more parts of the building as specified or shown in the drawing. Demolition implies taking up or down or breaking up. This shall consist of demolishing whole or part of work including all relevant items as specified or shown in the drawings. The demolition shall always be planned before hand and shall be done in reverse order of the one in which the structure was constructed. This scheme shall be got approved from the Engineer-in-charge before stating the work. This however will not absolve the contractor from the responsibility of proper and safe demolition. Necessary propping, the shoring and or under pinning shall be provided for the safety of the adjoining work or property, which is to be left intact, before dismantling and demolishing is taken up and the work shall be carried out such that no damage is caused to the adjoining property. Temporary enclosures or partitions shall also be provided wherever required. Necessary precautions shall be taken to keep dust nuisance down as and where necessary. Dismantling shall be done in a systematic manner. All materials which are likely to be damaged by dropping from a height or demolishing roofs, masonry etc. shall be carefully removed first. The dismantled articles shall be passed by hand where necessary, lowered to the ground (as not thrown) and then properly stacked as directed.

All materials obtained from demolition shall be the property of Corporation unless otherwise specified and shall be kept in safe custody until handed over to any store to Surat Municipal Corporation as specified by the Engineer-in-charge.

Any serviceable materials, obtained during dismantling demolition, shall be separated out and stacked properly on site or any store of S.M.C. as directed, with all lead and lift. All unserviceable materials, rubbish etc. shall be stacked as directed by Engineer-in-charge. On completion of work the site shall be cleared of all debris rubbish and cleaned as directed.

1.2 Rates :

Measurements of all work except hidden work shall be taken before demolition or dismantling and no allowance for increase in bulk shall be allowed. The demolition of lime concrete shall be measured under this item. Specification for deduction for voids, openings etc. shall be on same basis as the employed for construction of work.

All work shall be measured in decimal system as fixed in its place subject to the following limit, unless otherwise stated hereinafter : (a) Dimensions shall be measured to the nearest 0.01 mt. (b) Areas shall be worked out to the nearest 0.01 cum.

The rate shall include cost of all labour involved and tools used in demolishing and dismantling including scaffolding. The rate shall also include the charges for separating out and stacking the serviceable materials properly and disposing the unserviceable materials with all lead and lift. The rate also includes for temporary shoring for the safety of the portion not required to be pulled down or of adjoining property and providing temporary enclosures or partitions where considered necessary.

The rate shall be for a unit of one **Cubic metre(C.M.)**.

Item - 2.

Demolition and disposal of unserviceable materials with all lead and lift (D) Plain concrete.

2.1 The relevant specifications of **Item-1** shall be followed but read Unreinforced cement concrete instead of R.C.C. work. The unserviceable materials shall be disposed of at all leads and lifts. The rate excludes scraping straightening of reinforcement but includes cutting of reinforcement.

2.2 The rate shall be for a unit of one **Cubic Metre(C.M.)**.

Item - 3.

Demolition of brick work and stone masonry including stacking of serviceable materials and disposal of unserviceable materials with all lead and lift

(i) On cement mortar.

3.1 The relevant specifications of **Item-1** shall be followed but read brick and stone masonry instead of R.C.C. work. The unserviceable materials shall be disposed of at all leads and lifts. The rate excludes scraping straightening of reinforcement but includes cutting of reinforcement.

3.2 The rate shall be for a unit of one **Cubic Metre (C.M)**.

Item No.4 :-

Dismantling steel work including distempering and stacking the materials with all lead and lift.

4.1 Details specification same as per the **Item-1**.

4.2 The work shall be carried out as per instructions of Engineer-in-charge.

4.3 The rate shall be per **KG (Kilogram)**.

Item No.5 :-

Dismantling of sheet roofing including ridges, Hips, Valleys, Gutters etc. stacking of serviceable materials and disposal of unserviceable materials with all lead and lift. (i) G.I. sheet roofing.

(i) G.I. sheet roofing.

5.1 Details specification same as per the **Item-1**

5.2 The work shall be carried out as per instructions of Engineer-in-charge.

5.3 The rate shall be per **Square Metre**.

Item No.6 :-

Dismantling tiles of stone floors laid in mortar including stacking of serviceable materials and disposal of unserviceable materials with all lead and lift.

(i) Dismantling of Kota stone flooring and steps

(ii) Dismantling of Marble

(iii) Dismantling of Tiles flooring / Dedo

(iv) Dismantling of Granite flooring and steps

(v) Dismantling of Paver block flooring

6.1 Details specification same as per the **Item-1**

6.2 The work shall be carried out as per instructions of Engineer-in-charge.

6.3 The rate shall be per **Square Metre**.

Item No.7 :-

Excavation for foundation including sorting out & stacking of useful materials & disposing of the excavated stuff upto 50 mt. Lead & all lift, watering etc. Comp. (A) Loose or Soft soil-With Manual Labour

(1) Up to 1.5 Mt. depth

(2) 1.5 Mt. to 3.0 mt. depth

In general the work shall be carried out as per the standard specifications of P.W.D./C.P.W.D/GWSSB, relevant drawings and as per the instructions of Engineer-in-Charge. Work shall be carried out as per item description.

7.1.0 GENERAL

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

7.2 CLEARING THE SITE

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

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

7.3 SETTING OUT

After clearing the site, the centre lines will be given by the Engineer-in-charge. The contractor shall assume full responsibility for alignment, elevation and dimension of each and every part of the work. The contractor shall supply labour, materials etc. required for setting out the reference marks and bench marks and shall maintain them as long as required and directed.

7.4 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 shuttering at his own cost and as approved by the Engineer or his Consultant. The payment for such precautionary measures shall be included in this work. The bottom of the excavated area shall be leveled both longitudinally & 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 as directed. The extra depth or width shall be made up with concrete of the same proportion as specified for the foundation concrete at the cost of the contractor. The excavation upto 1.5 Mts. depth shall be measured under this item. The site conditions may require excavation in parts as per schedule of excavation. No extra payment will be claimed for this operation schedule.

7.5 DISPOSAL OF EXCAVATED MATERIALS

7.5.1 No materials excavated from the foundation trenches, of whatever kind they may be, are to be placed even temporarily upto 1.5 Mts. or at the distance prescribed by the Engineer, from the outer edge of excavation. All materials excavated shall remain the property of the Corporation. Rate of excavation shall include sorting out of useful materials and stacking them separately as directed within the specified lead. Materials suitable and useful for backfilling or other use shall be stacked in convenient places but not in such a way as to obstruct free movement of men, animals and vehicles or encroach upon the area required for constructional purposes. The site shall be left clean of all debris on completion.

7.5.2 Disposal of excavated materials is subject to the following - Unsuitable materials obtained from clearing site and excavation shall be disposed off within a lead of 50 Mts. as directed. Useful materials obtained from clearing site & excavation shall be stacked within lead of 50 Mts. beyond the building area as directed. Materials suitable for back-filling shall be stacked at convenient places within a lead of 50 Mts. and will be allowed to be used by the contractor on payment at rates laid down in the contract or if not so laid down, at scheduled rates of the Division or at mutually agreed rates if there are no such rates in the schedule of rates.

7.6.0 MODE OF MEASUREMENT AND PAYMENT

7.6.1 The measurement of excavation in trenches for foundation shall be made according to the sections of trenches shown on the drawing or as per sections given by the Engineer-in-charge or as directed. No payment shall be made for surplus excavation made in excess or above requirements or due to stopping and sloping back as found necessary on account of conditions of soil and requirements of safety or construction schedule requiring excavation to be done in parts.

7.6.2 No extra payment shall be made for temporary pumping of water / sewage due to abnormal adverse conditions /climate.

7.6.3 The rate shall be for a unit of one **Cubic Meter**.

Item No. 8 :-

Providing & laying cement concrete 1:4:8 (1 cement : 4 sand : 8 graded stone agg. 40 mm nominal size) & curing comp. incl.cost of form work in (A) Foundation and Plinth

In general the work shall be carried out as per the standard specifications of P.W.D./C.P.W.D/GWSSB, relevant drawings and as per the instructions of Engineer-in-Charge. Work shall be carried out as per item description.

8.1.0 Materials

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

8.2.0 Workmanship**8.2.1 General**

8.2.1.1 Before casting concrete the bed of foundation trenches shall be cleared of all loose materials, leveled, watered and rammed as directed

8.2.2 Proportion of Mix:

8.2.2.1 The proportion of cement, sand and coarse aggregate shall be one part of cement. 4 parts of sand and 8 parts of stone aggregates and shall be measured by volume.

8.2.3 Mixing:

8.2.3.1 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 case 10% more cement than otherwise 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.

8.2.4 Transporting & Placing the Concrete:

8.2.4.1 The concrete shall be handed from the place, of mixing to the final position in not more than 15 minutes by the method as directed and shall be placed into its final-position, compacted and finished within 30 minutes of mixing with water i.e. before the setting commences.

8.2.4.2 The concrete shall be laid in layers of 15 cms. to 20 cms.

8.2.5.1 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.

8.2.6 Curing:

8.2.6.1 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.

8.2.7 Mode of Measurement & Payment:

8.2.7.1 The concrete shall be measured for its length, breadth and depth, limiting dimensions to those specified on plan or as directed.

8.2.7.2 The rate shall be for a unit of one **Cubic Metre (C.M)**.

Item No.9:-

Providing & laying cement concrete 1:2:4 (1 cement:2 sand:4 graded stone agg. 20 mm nominal size)& curing comp. Includ.cost of form work but exclu. Cost of reinforcement for reinforced concrete work in : (A) Foundation, footing, Base of columns and Mass concrete.

1.0 Materials :-

Water shall conform to M-1, Cement shall conform to M-3. Sand shall conform to M-6. Grit shall conform to M-8. Graded stone aggregate 20 mm nominal size shall conform to M-12.

1.1 General :-

1.2 The concrete mix is not required to designed by preliminary tests. The proportion of the concrete mix shall be 1:2:4 [1 cement: 2 coarse sand: 4 graded stone aggregate 20 mm nominal size] by volume Concrete work shall have exposed concrete surface or as specified the item.

1.3 The designation ordinary M-100, M-150, M-200, M-250 specified as per I.S. corresponding approximately to 1:3:6, 1:2:4, 1:1.5:3 and 1:1:2 nominal mix of ordinary concrete by volume respectively with conforming to IS:456.

1.4 The ingredients required for ordinary work, containing one bag of cement of 50 kg. by weight [0.0342 cu.m.] for different proportion of mix shall be as under.

Grade	Total quantity of dry aggregate by volume per 50 Kg. of cement to be taken as the sum of individual volume of fine and coarse aggregate maximum	Proportion of fine aggregate of coarse aggregate	quantity of water per 50 Kg. of cement maximum
M-100 (1:3:6)	300 Litres	Generally 1:2 but subject to an upper limit of 1:1.5 and a lower limit of 1:2.5.	34 Litres
M-150 (1:2:4)	220 Litres		32 Litres
M-200 (1:1.5:3)	160 Litres		30 Litres
M-250 (1:1:2)	100 Litres		27 Litres

1.5 The water cement ratios shall not be more than those specified in the table. The cement content of the mix specified in the table shall be increased if the quantity of water in a mix has to be increased to overcome the difficulties of placement and compaction so that the water cement ratio specified in the table is not exceeded.

1.6 Workability of the concrete shall be controlled by maintaining a water cement ratio that is found to give a concrete mix which is just sufficiently wet to be placed and compacted without difficulty with the means available.

1.7 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 the 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.

1.8 For reinforced concrete work, coarse aggregates having a nominal size of 20 mm generally considered satisfactory.

1.9 For heavily reinforced concrete members as in the case of the ribs of main beams the nominal maximum size of coarse aggregate should usually be restricted to 5 mm, less than the minimum clear distance between the main bars, or 5 mm, less than the minimum cover to the reinforcement whichever is smaller.

1.10 Where the reinforcement is widely spaced as in solid slabs, limitations of size of the aggregate may not be so important and the nominal maximum size may some times be as great as or greater than the minimum cover.

1.11 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.

2.0 WORKMANSHIP :

2.1 General :- The bars shall be kept in position by the following method:

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 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 chair spacers or supports bars at 1.0 to 1.2 metres centers.

In case of columns and wall, the vertical bars shall be kept in position by means of timber templates with slots accurately cut in them, the templates shall be removed after concreting has been done below it. The bars may also be suitably tied by means of annealed steel wires to the shuttering to maintain their position during concreting.

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.

2.2 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 sizes shall be used for measuring sand and aggregate. The size of the boxes [internal] shall be 35x25 cms. and 40 cms. deep. While measuring the aggregate and sand, the boxes shall be filled without shaking, ramming or hammering. The proportioning of sand shall be on the basis of its dry volume and in case of damp sand, allowances for bulkage shall be made.

2.3 Mixing :-

2.3.1 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 half minute. Mixing shall be continued till materials are uniformly distributed and uniform colour of the entire mass is obtained and each individual particle of the coarse aggregate shown complete coating of mortar containing its proportionate amount of cement. In no case shall the mixing be done for less than two minutes after all ingredients have been put into the mixer.

2.3.2 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 watertight 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 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 of uniform colour. Specified quantity of water shall then be added gradually through a rose can and the mass turned over till a mix of required consistency is obtained. In hand mixing, quantity of cement shall be increased by 10 percent above that specified.

2.3.3 Mixer which have been out of use for more than 30 minutes shall be thoroughly cleaned before putting in a new batch, unless otherwise agreed to by the Engineer-in-charge. The first batch of concrete from the mixture shall contain only two thirds of normal quantity of coarse aggregate. Mixing plant shall be thoroughly cleaned before changing from one type of cement concrete to another.

2.3.4 Consistency :

The degree of consistency which shall depend upon the nature of the work and methods of vibration of concrete, shall be determined by regular slump test in accordance with I.S. 1199 : 1959. The slump of 10 mm to 25 mm shall be adopted when vibrators are used and 80 mm when vibrators are not used.

2.3.5 Inspection :

2.3.5.1 Contractor shall give the Engineer-in-charge due notice before placing any concrete in the forms to permit to inspect and accept the work and forms as to their strength, alignment and general fitness but such inspection shall not relieve the contractor of his responsibility for the safety of men, machinery, materials and for results obtained. Immediately before concreting, all forms shall be thoroughly cleaned.

- 2.3.5.2 Centering design and its erection shall be got approved from the Engineer- in- charge. One carpenter with helper shall invariably kept present throughout the period of concreting. Movement of labour and other persons shall be totally prohibited for reinforcement laid in position. For access to different parts suitable mobile platform 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.
- 2.3.6 Transporting and laying :-
- 2.3.6.1 The method of transporting and placing concrete shall as approved. Concrete shall be so transported and placed that no contamination segregation or loss of its constituent material takes place.
- 2.3.6.2 All form work shall be cleaned and made free from standing water dust snow or ice immediately before placing of concrete. No concret shall be placed in any part of structure until the approval of Engineer-in-charge.
- 2.3.6.3 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 construction 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 metre when internal vibrators are used and not exceeding 0.30 metre in all other cases.
- 2.3.6.4 Unless otherwise agreed to by the Engineer-in-charge, concrete shall not be dropped into place from a height exceeding 2 meters.
- 2.3.6.5 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 layers of mortar shall be freshly mixed and placed immediately before placing of new concrete. Where concrete has not fully hardened, all laitance shall be removed by scrubbing the wet surface with wire or bristle brushes, care being taken to avoid dislodgement of any particles, of coarse aggregate. The surface shall then be thoroughly wetted, all free water removed, and then coated with neat cement grout, The first layers 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 spot.
- 2.3.6.6 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.
- 2.3.6.7 Concrete shall be judged to be compacted when the mortar fills the spaces between the coarse aggregate and begins to cream upto form an even surface. Compaction shall be completed before the initial setting starts i.e. within 30minutes of addition of water to dry mixture. During compaction. It shall be observed that needle vibrators are not applied on reinforcement which is likely to destroy the bond between concrete and reinforcement.
- 2.3.7 Curing :-
Immediately after compaction, concrete, 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.
- 2.3.8 Sampling and Testing of concrete :-
- 2.3.8.1 Samples from fresh concrete shall be taken as per IS 1199:1999 and cubes shall be made, cured and tested at 7 days and 28 days as per requirements in accordance with IS 516:1959. A random sampling procedure shall be adopted to ensure that each concrete batch shall have a reasonable chance of being tested i.e. the sampling should be spread over the entire period of

concreting and cover all mixing units. The minimum frequency of sampling of concrete of each grade shall be in accordance with following.

2.3.8.2	Quantity of concrete in the work	No. of samples
	1-5 Cmt.	1
	6-15 Cmt.	2
	16-30 Cmt.	3
	31-50 Cmt.	4
	51-and above	4+one additional sample for each additional 50 cmt. or part there of.

Note:- Atleast one sample shall be taken from shift. The test specimens shall be made from each sample, five for testing at 7 days and the remaining five at 28 days. The samples of concrete shall be taken on each day of the concreting as per above frequency. The number of specimens may be 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.

2.3.8.3 The average strength of the group of cubes cast for each day shall not be less than the specified cube strength of 150 kg/cm² at 28 days. 20% of the cubes cast for each day may have value less than the specified strength provided the lowest value is not less than 85% of the specified strength. If the concrete made in accordance with the proportion given for a particular grade does not yield the specified strength such concrete shall be classified as belonging the appropriate lower grade. Concrete made in accordance with the proportions given for a particular grade shall not, however, be placed in a higher grade on the ground that the test strength are higher than the minimum specified.

2.3.9 Stripping :

2.3.9.1 The Engineer- in- charge shall be informed in advance by the contractor of his intention to struck the form work. While fixing the time for removal of form work, due consideration shall be given to local conditions, character of the structure, the weather & 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 period specified in the Item No.4 for respective item of form work.

2.3.9.2 All form work shall be removed without causing any shock or vibration as would damage the concrete. Before the soffit are removed, the concrete surface shall be exposed, where necessary in order to ascertain that the 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 than 25 mm. Cover to the finished concrete surface. Where it is intended to re-use the from work, it shall be cleaned and made good to the satisfaction of the Engineer- in- charge. After removal of form work and shuttering, the EXECUTIVE ENGINEER shall inspect the work and satisfy by random checks that concrete prosuded is of good quality.

2.3.9.3 Immediately after the removal of forms all exposed bolts etc. Passing through the cement 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 holder be filled by cement mortar. All fins caused by from joints, all cavities produced by the removal of form ties and all other holes and depression, 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 the proportions used in the grade of concrete that is being finished and so as dry consistency as is possible to use. Considerable pressure shall be applied in filling and pointing to ensure thorough filling in all avoids. Surfaces which are pointed shall be kept moist for a period of 24 hours.

2.3.9.4 If rock pockets/honeycombs in the opinion of the Engineer-in- charge are of such an extent or character as to effect the strength of the structure materially or to endanger the life of the steel reinforcement, he may declare portions of the structure affected.

- 3.0 Mode of measurement and payment :
- 3.1 The consolidated cubical contents of concrete work as specified in item shall be measured. The concrete laid in excess of section shown on drawings or as directed shall not be measured. No deductions 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.
 - [c] The volume occupied by reinforcement shall not be deducted from R.C.C.work.
- 3.2 The rate includes cost of all materials labour, tools and plant required for mixing, placing imposition 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.
- 3.3 The rate shall be for a unit of one **Cubic Metre (C.M)**.

Item No. 10 :-

Providing & laying C.C 1:3:6 (1 cement : 3 coarse sand : 6 Crushed stone agg 20 m.m Nominal size) & curing comp. incl. cost of form work in : (a) foundation & Plinth

In general the work shall be carried out as per the standard specifications of P.W.D./C.P.W.D/GWSSB, relevant drawings and as per the instructions of Engineer-in-Charge. Work shall be carried out as per item description.

10.1.0 Materials

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

10.2.0 Workmanship

- 10.2.1 Relevant Specifications of **Item No.9** shall be followed except that cement concrete shall be mixed in the preparation of 1:3:6 instead of 1:4:8 by volume.

10.3.0 Mode of measurement and payment

- 10.3.1 The concrete shall be measured for its length, breadth and depth, limiting dimensions to those specified on plans or as directed.
- 10.3.2 The rate shall be for a unit of one **Cubic Metre (C.M)**.

Item No.11:-

Providing and laying cement concrete work 1:1.5:3 [1 cement :1.5 coarse sand: 3 graded stone aggregates 20 mm nominal size] and curing complete including cost of form work and excluding cost of reinforcement for reinforced concrete work in [A] foundation, footing, Base of columns and mass concrete.

11.1.0 Materials :-

Water shall conform to M-1. Cement shall conform to M-3. Sand shall conform to M-6. Grit shall conform to M-8. Graded stone aggregate 20 mm nominal size shall conform to M-12.

11.2.0 General :-

- 11.2.1 The concrete mix is not required to designed by preliminary tests. The proportion of the concrete mix shall be 1:1.5:3 [1 cement: 1.5 coarse sand: 3 graded stone aggregate 20 mm nominal size] by volume concrete work shall have exposed concrete surface or as specified the item.
- 11.2.2 The designation ordinary M-100, M-150, M-200, M-250 specified as per I.S. corresponding approximately to 1:3:6, 1:2:4, 1:1.5:3 and 1:1:2 nominal mix of ordinary concrete by volume respectively with conforming to IS:456.
- 11.2.3 The ingredients required for ordinary work, containing one bag of cement of 50 kg. by weight [0.0342 cu.m.] for different proportion of mix shall be as under.

Grade	Total Quantity of Dry Aggregates by mass per 50 kg of Cement, to be Taken as the sum of the Individual masses of fine and coarse aggregates (Kg.) (Maximum)	Proportion of fine aggregate of coarse aggregate	quantity of water per 50 Kg. of cement maximum
M-5	800	Generally 1:2 but subject to an upper limit of 1:1.5 and a lower limit of 1:2.5.	60 Litres
M-7.5	625		45 Litres
M-10	480		34 Litres
M-15	330		32 Litres
M-20	250		27 Litres

- 11.2.4 The water cement ratios shall not be more than those specified in the table. The cement content of the mix specified in the table shall be increased if the quantity of water in a mix has to be increased to overcome the difficulties of placement and compaction so that the water cement ratio specified in the table is not exceeded.
- 11.2.5 Workability of the concrete shall be controlled by maintaining a water cement ratio that is found to give a concrete mix which is just sufficiently wet to be placed and compacted without difficulty with the means available.
- 11.2.6 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 the 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.
- 11.2.7 For reinforced concrete work, coarse aggregates having a nominal size of 20 mm generally considered satisfactory.
- 11.2.8 For heavily reinforced concrete members as in the case of the ribs of main beams the nominal maximum size of coarse aggregate should usually be restricted to 5 mm, less than the minimum clear distance between the main bars, or 5 mm, less than the minimum cover to the reinforcement whichever is smaller.
- 11.2.9 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 sometimes be as great as or greater than the minimum cover.
- 11.2.10 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.
- 11.3.0 WORKMANSHIP :
- 11.3.1 General :- The bars shall be kept in position by the following method:
 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 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 cabin spacers or supports bars at 1.0 to 1.2 metres centres.
 In case of columns and wall, the vertical bars shall be kept in position by means of timber templates with slots accurately cut in them, the templates shall be removed after concreting has been done below it. The bars may also be suitably tied by means of annealed steel wires to the shuttering to maintain their position during concreting.
 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.

- 11.3.2 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 sizes shall be used for measuring sand and aggregate. The size of the boxes [internal] shall be 35x25 cms. and 40 cms. deep. While measuring the aggregate and sand, the boxes shall be filled without shaking, ramming or hammering. The proportioning of sand shall be on the basis of its dry volume and in case of damp sand, allowances for bulking shall be made.
- 11.3.3 Mixing :-
- 11.3.3.1 For all work, concrete shall be mixed in a mechanical mixer which alongwith other accessories shall be kept in first class working condition and so maintained throughout the construction. Measured quantity of aggregate, sand and cement required for each batch shall be poured into the drum of the mechanical mixer while it is continuously running. After about half a minute of dry mixing measured quantity of water required for each batch of concrete mix shall be added gradually and mixing continued for another one and half minute. Mixing shall be continued till materials are uniformly distributed and uniform colour of the entire mass is obtained and each individual particle of the coarse aggregate shown complete coating of mortar containing its proportionate amount of cement. In no case shall the mixing be done for less than two minutes after all ingredients have been put into the mixer.
- 11.3.3.2 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 watertight 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 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 of uniform colour. Specified quantity of water shall then be added gradually through a rose can and the mass turned over till a mix of required consistency is obtained. In hand mixing, quantity of cement shall be increased by 10 percent above that specified.
- 11.3.3.3 Mixer which have been out of use for more than 30 minutes shall be thoroughly cleaned before putting in a new batch, unless otherwise agreed to by the Engineer-in-charge. The first batch of concrete from the mixture shall contain only two thirds of normal quantity of coarse aggregate. Mixing plant shall be thoroughly cleaned before changing from one type of cement concrete to another.
- 11.3.4 Consistency :
The degree of consistency which shall depend upon the nature of the work and methods of vibration of concrete, shall be determined by regular slump test in accordance with I.S. 1199 : 1959. The slump of 10 mm to 25 mm shall be adopted when vibrators are used and 80 mm when vibrators are not used.
- 11.3.5 Inspection :
- 11.3.5.1 Contractor shall give the Engineer-in-charge due notice before placing any concrete in the forms to permit to inspect and accept the false work and forms as to their strength, alignment and general fitness but such inspection shall not relieve the contractor of his responsibility for the safety of men, machinery, materials and for results obtained. Immediately before concreting, all forms shall be thoroughly cleaned.
- 11.3.5.2 Centring design and its erection shall be got approved from the Engineer-in-charge. One carpenter with helper shall invariably be kept present throughout the period of concreting. Movement of labour and other persons shall be totally prohibited for reinforcement laid in position. For access to different parts suitable mobile platform 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.
- 11.3.6 Transporting and laying :-
- 11.3.6.1 The method of transporting and placing concrete shall as approved. Concrete shall be so transported and placed that no contamination segregation or loss of its constituent material takes place.

- 11.3.6.2 All form work shall be cleaned and made free from standing water dust snow or ice immediately before placing of concrete. No concret shall be placed in any part of structure until the approval of Engineer-in-charge.
- 113.6.3 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 construction 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 metre when internal vibrators are used and not exceeding 0.30 metre in all other cases.
- 11.3.6.4 Unless otherwise agreed to by the Engineer-in-charge, concrete shall not be dropped into place from a height exceeding 2 meters.
- 11.3.6.5 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 layers of mortar shall be freshly mixed and placed immediately before placing of new concrete. Where concrete has not fully hardened, all laitance shall be removed by scrubbing the wet surface with wire or bristle brushes, care being taken to avoid dislodgement of any particles, of coarse aggregate. The surface shall then be thoroughly wetted, all free water removed, and then coated with neat cement grout, The first layers 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 spot.
- 11.3.6.6 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.
- 11.3.6.7 Concrete shall be judged to be compacted when the mortar fills the spaces between the coarse aggregate and begins to cream upto form an even surface. Compaction shall be completed before the initial setting starts i.e. within 30minutes of addition of water to dry mixture. During compaction. It shall be observed that needle vibrators are not applied on reinforcement which is likely to destory the bond between concrete and reinforcement.
- 11.3.7 Curing :-
Immediately after compaction, concrete, weather including rain, running water, shocks, vibration, traffic, rapid tempreature changes frost and drying out process it shall be covered with wet sacking, hossion or other similar absorbent material approved, soon after the initial set and shall be kept continuously wet for a period of not less than 14 days from the date of placement. Masonary work over foundation concrete may be started after 48 hours of its laying but curing of concrete shall be continued for a minimum period of 14 days.
- 11.3.8 Sampling and Testing of concrete :-
- 11.3.8.1 Samples from fresh concrete shall be taken as per IS 1199:1999 and cubes shall be made, cured and tested at 7 days and 28 days as per requirements in accordance with IS 516:1959. A random sampling procedure shall be adopted to ensure that each concrete batch shall have a reasonable chance of being tested i.e. the sampling should be spread over the entire period of concreting and cover all mixing units. The minimum frequency of sampling of concrete of each grade shall be in accordance with following.
- 11.3.8.2
- | Quantity of concrete in the work | No. of samples |
|----------------------------------|---|
| 1-5 Cmt. | 1 |
| 6-15 Cmt. | 2 |
| 16-30 Cmt. | 3 |
| 31-50 Cmt. | 4 |
| 51-and above | 4+one additional sample for each additional 50 cumt. or part thereof. |

Note:- Atleast one sample shall be taken from shift. The test specimens shall be made from each sample, five for testing at 7 days and the remaining five at 28 days. The samples of concrete shall be taken on each day of the concreting as per above frequency. The number of specimens may be 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.

11.3.8.3 The average strength of the group of cubes cast for each day shall not be less than the specified cube strength of 150 kg/cm² at 28 days. 20% of the cubes cast for each day may have value less than the specified strength provided the lowest value is not less than 85% of the specified strength. If the concrete made in accordance with the proportion given for a particular grade does not yield the specified strength such concrete shall be classified as belonging to the appropriate lower grade. Concrete made in accordance with the proportions given for a particular grade shall not, however, be placed in a higher grade on the ground that the test strength are higher than the minimum specified.

11.3.9 Stripping :

11.3.9.1 The Engineer-in-charge shall be informed in advance by the contractor of his intention to strike the form work. While fixing the time for removal of form work, due consideration shall be given to local conditions, character of the structure, the weather & 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 period specified in the Item No.4 for respective item of form work.

11.3.9.2 All form work shall be removed without causing any shock or vibration as would damage the concrete. Before the soffit are removed, the concrete surface shall be exposed, where necessary in order to ascertain that the concrete has sufficiently hardened. Centring 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 than 25 mm. cover to the finished concrete surface. Where it is intended to re-use the form work, it shall be cleaned and made good to the satisfaction of the Engineer-in-charge. After removal of form work and shuttering, the Executive Engineer shall inspect the work and satisfy by random checks that concrete produced is of good quality.

11.3.9.3 Immediately after the removal of forms all exposed bolts etc. passing through the cement 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 hole shall 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 depression, 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 the proportions used in the grade of concrete that is being finished and so 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.

11.3.9.4 If rock pockets/honeycombs in the opinion of the Engineer-in-charge are of such an extent or character as to effect the strength of the structure materially or to endanger the life of the steel reinforcement, he may declare portions of the structure affected.

11.4.0 Mode of measurement and payment :

11.4.1 The consolidated cubical contents of concrete work as specified in item shall be measured. The concrete laid in excess of section shown on drawings or as directed shall not be measured. No deductions 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.

[c] The volume occupied by reinforcement shall not be deducted from R.C.C. work.

- 11.4.2 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.
- 11.4.3 The rate shall be for a unit of **Cubic Metre (C.M)**.

Item No.12:-

Providing & laying ordinary cement concrete 1:1.5:3 (1cement:1.5sand: 3 graded stone agg. 20 mm nominal size) finishing smooth curing etc. comp. Includ. Cost of form work but excl. cost of reinforcement for R.C.C. Work in : Up to G.L./P.L.

(A) COLUMNS:

- [i] Having cross sectional area 0.05 to 0.08 Square metre
- [ii] Having cross sectional area more than 0.08 Square metre and upto 0.12 Square metre
- [iii] Having cross sectional area more than 0. Square metre and upto 0.18 Square metre

[B] Beams :

- [i] Having cross sectional area 0.05 to 0.08 Square metre.
- [ii] Having cross sectional area more than 0.08 Square metre upto 0.12 Square metre.
- [iii] Having cross sectional area more than 0.12 Square metre.

12.1.0 Materials and workmanship:-

The relevant specifications of **Item No.11** shall be followed for concrete work and shall be followed for form work and centering work. The relevant specification Item No.11 shall be followed for the finishing work in mortar 1:3 [1 cement:3 fine sand] Before the Plastering is done. The surface of the concrete shall be raked roughened Punch for Proper bond Except the reinforced concrete works shall be carried out for the columns, beams slabs and lintels.

- [A] The cross sectional are of columns shall be Specified in item.
- [B] The cross sectional area of beam intel shall be specified in item.
- [C] The thickness of the slabs shall be specified in the item.
- [D] The thickness of the lintel chhajs shall be specified in the item.

12.2.0 Mode of measurement and payment :-

- 12.2.1 The Consolidated Cubical Contents of Concrete work as Specified in item shall be measured. The concrete laid in excess of sections shown on drawings or as directed shall not be measured. No. deductions shall be made for [A] Ends of dis-similar materials such as joints, bems, posts, girders, refters, purlin trusses, corbels and steps etc. upto 500 sq.cm. in section. [B] Opening upto 0.1 Square metre.
- 12.2.2 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 include the cost of form work. [The rate also includes smooth plaster.]
- 12.2.3 The volume occupied by reinforcement shall not be deducted from R.C.C.work.
- 12.2.4 The rate shall be for a unit of one **Cubic Metre (C.M)**.

Item No.13:-

Providing & fixing IS Mark TMT Bar FE 500D reinforcement for R.C.C. work including bending, binding and placing in position etc. comp. Upto G.L./P.L.

In general the work shall be carried out as per the standard specifications of P.W.D./C.P.W.D/GWSSB, relevant drawings and as per the instructions of Engineer-in-Charge. Work shall be carried out as per item description.

13.1.0 Materials

- 13.1.1 Mild Steel bars shall conform to M-18. Mild steel binding wires shall conform to M-21.

13.2.0 Workmanship

- 13.2.1 The work shall consist of furnishing and-placing reinforcement to the shape and dimensions shown as on the drawings or as directed
- 13.2.2 Steel shall be clean and free from rust and loose mill scale at the time of fixing in position and subsequent concreting.
- 13.2.3 Reinforcing steel shall conform accurate to the dimensions given in the bar bending schedules shown on relevant drawings. Bars shall be bent cold to specified shape and dimensions or as directed, using a proper 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 injure the material. Bars bent during transport or handling shall be straightened before being used on the work. They shall not be heated to facilitate bending Unless otherwise specified a "U" type hook at the end of each bar shall invariably be provided to main reinforcement. The radius of the bend shall not be less than twice the diameter of the round bar and the length of the straight part of the bar beyond the end of the curve shall be at least four times the diameter of the round bar. In case of bars which are not round and in case of deformed bars, the diameter shall be taken as the diameter of circle having an equivalent effective area. The hooks shall be suitably encased to prevent any splitting of the concrete.
- 13.2.4 All the reinforcement bars shall lie 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 for 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 blocks or other approved devices Reinforcement after being placed in position shall be maintained in a clean condition until completely embedded in concrete. Special care shall be exercised to prevent any displacement of reinforcement in concrete already placed. To prevent reinforcement from corrosion, concrete cover shall be provided as indicated on drawings. All the bars protruding from concrete and to which other bars are to be lapped and which are likely to be exposed for a period exceeding 10 days shall be protected by a thick coat of neat cement grout.
- 13.2.5 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.
- 13.2.6 As far possible, bars of full length shall be used. In case this is not possible. Over lapping of bars shall be done as directed When practicable, overlapping bars shall not touch each other, but be kept apart by 25 mm. 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.
- 13.2.7 Whenever indicated on the drawings or desired by the Engineer-in-charge, bars shall be jointed 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.
- 13.2.8 When permitted or specified on the drawings, joints of reinforcement bars shall be welded so as to transmit their full stresses. Welded joints shall preferably be located at points when steel will not be subject to more than 75 percent of the maximum permissible stresses and welds so staggered that at any one section not more than 20 percent of the rods are welded. Only electric arc welding using a process which excludes air from the molten metal and conforms to any or all other special provisions for the work shall be accepted. Suitable means shall be provided for holding bars securely in position during welding. It shall be ensured that no voids are left in welding and when

welding is done in two or three stages, previous surface shall be cleaned properly. Ends of the bars shall be cleaned of all loose scale, rust, stains, paint and other foreign matter before welding. Only competent welders shall be employed on the work. The M.S. electrodes used for welding shall conform to I.S.814. Welded pieces of reinforcement shall be tested. Specimen shall be taken from the actual site and their number and frequency of test shall be as directed.

13.3.0 Mode of Measurements & Payment

- 13.3.1 For the purpose of calculating consumption, wastage shall not be permitted beyond 5 percent. Excess consumption over 5% will be charged at penal rate.
- 13.3.2 Reinforcement shall be measured in length including overlaps, separately for different diameters as actually used in the work. Where welding or coupling is resorted to in place lap joints, such joints shall be measured for payment as equivalent length of overlap as per design requirement. From the length so measured, the weight of reinforcement shall be calculated in tones on the same basis of as per M-18 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.
- 13.3.3 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.
- 13.3.4 The rate shall be for a unit of One **KG (Kilogram)**.

Item No.18 :-

Brick work using common burnt clay building bricks having crushing strength not less than 35 kg./Sq.Cm. in foundation and plinth in Cement Mortar 1:6 (1- Cement : 6 -fine sand) (C) Fly Ash Bricks

18.1.0 MATERIALS

Water shall conform to M-1, Cement shall conform to M-3, Sand shall conform to M-6, Flyash Building Bricks shall conform to M-15(A), Cement mortar shall conform to M-11.

18.2.0 WORKMANSHIP

- 18.2.1 Proportion : The proportion of cement mortar shall be 1:6 (1 cement, 6 fine sand) by volume.
- 18.2.2 Wetting of bricks : The bricks required for masonry work 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.
- 18.2.3 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. Closures in such case shall be cut to required size and used near the ends of the 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 home 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 walls shall be taken up truly in plumb. All courses shall be 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 in uniform.
- The brick shall be laid with frogs up wards. A set of tools comprising of wooden straight edges, mason's spirit level, square half metre rub, and pins, string and plumb shall be kept on the site of work for frequent checking during the progress of work.
- Both the faces of walls of thickness greater than 23 cms. shall be kept in proper place. All the connected brick work shall be kept not more than one metre over the rest of the work. Where this is not possible, the work shall be raked back according to bond (and not left toothed) at an angle not steeper than 45 degrees.

- All fixtures, pipes, outlet of water, hold fasts of doors and windows etc. which are required to be built in wall shall be embedded in cement mortar.
- 18.2.4 Joints : Bricks shall be so laid that all joints are quite flush with mortar. Thickness of joints shall not exceed 12 mm. The face joints shall be raked out as directed by raking tool daily during the progress of work, when the mortar is still green so as to provide key for plaster or pointing to be done.
The face of brick shall be cleaned the very day on which the brick work is laid and all mortar dropping removed.
- 18.2.5 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.
- 18.2.6 Preparation of Foundation Bed : If the foundation is to be laid, directly on the excavated bed, the bed shall be leveled, cleared of all loose materials, cleaned and wetted before starting masonry.
If masonry is to be laid on concrete footing the top of concrete shall be cleaned and moistened. The contractor shall obtain the engineer's approval for the foundation bed, before foundation masonry is started. When pucca flooring is to be provided flush with the top to plinth, the inside plinth offset shall be kept lower than the outside plinth top by the thickness of the flooring.
- 18.2.7 Fixtures - The frames of doors, windows, cup-boards etc. shall be housed into the brick work at the correct location and level as directed. The heavy steel doors, window frames etc. shall be built in with brick work, but for ordinary steel doors and windows required opening for frames, hold-fasts etc. shall be left in the wall and frames embedded later on in order to avoid damage to the frames.
- 18.2.8 Scaffolding - Necessary scaffolding shall be provided. The supports of the scaffolding shall be sound and strong tied together with horizontal pieces, over which the scaffolding plunks shall be fixed. Simple scaffolding shall be allowed normally. In this case scaffolding hole shall rest in hole header horizontal course only. Minimum number of holes shall be left in brick work for supporting horizontal scaffolding poles. The contractor is responsible for providing and maintaining sufficiently strong scaffolding so as to withstand all loads likely to come upon it.
- 18.2.9 Packing out of Joints - For the face of brick work, where plastering is to be done, joints shall be raked out to a depth not less than thickness of joints. The face of brick work shall be cleaned and mortar dropping removed on very same day that brick work is laid.
- 18.3.0 MODE OF MEASUREMENTS & PAYMENT :**
- 18.3.1 The measurements of this item shall be taken for the brick masonry fully completed for limiting dimensions not exceeding those shown on the plans or as directed shall be final.
- 18.3.2 No deductions shall be made from quantity of brick work. No extra payment will be made for embedding in masonry holes in respect of the following items ---
- i] Ends of joints, beams, posts, girders, rafters, purlins trusses corbel, steps etc. where cross sectional area does not exceed 500 Sq.Cm.
 - ii] Opening not exceeding 1000 Sq.Cm.
 - iii] Wall plate and bed plates, bearing of slab, chajjas, and like whose thickness does not exceed 10 Cms. and the bearing does not extend the full thickness of wall.
 - iv] Drainage holes and recesses for cement concrete blocks to embed hold fasts for doors, windows etc.
 - v] Iron fixtures; pipes upto 300 mm. dia. hold fasts of doors and windows built into masonry and pipes etc. for concealed wiring.
 - vi] Forming charges of section not exceeding 350 Sq.Cm. in masonry.
 - vii] Apertures for fire places, shall not be deducted nor shall extra labour required to make splaying of jambs, throating and making arches over the aperture be paid for separately.
- 18.3.3 The rate shall be for a unit of one **Cubic Metre (C.M)**.

Item No.19 :-

Filling available excavated earth (excluding rock) in trenches. plinth, sides of foundations etc. in layers not exceeding 20 cm. in depth consolidating each disposed layer by ramming and watering.

In general the work shall be carried out as per the standard specifications of P.W.D./C.P.W.D/GWSSB, relevant drawings and as per the instructions of Engineer-in-Charge. Work shall be carried out as per item description.

19.1.0 Workmanship

- 19.1.1 The earth to be used for filling shall be free from salts, organic or other foreign matter. All clods of earth shall be broken.
- 19.1.2 Filling with excavated earth shall be done in regular horizontal layers each not exceeding 20 cm in depth. All lumps and clods exceeding 8 cm in any direction shall be broken. Each layer shall be watered and consolidated with steel rammer or ½ tonne roller. Where specified, every third and top must layer shall also be consolidated with power roller of minimum 8 tonnes. Wherever depth of filling exceeds 1.5 metre vibratory power roller shall be used to consolidate the filling unless otherwise directed by Engineer-in-charge. The top and sides of filling shall be neatly dressed. The contractor shall make good all subsidence and shrinkage in earth fillings, embankments, traverses etc. during execution and till the completion of work unless otherwise specified.
- 19.1.3 The plinth shall be similarly filled with earth in layers not exceeding 20 cms. adequately watered and consolidated by ramming with iron or wooden rammers. When filling reaches finished level the surface shall be flooded with water for at least 24 hours and allowed to dry and then rammed and consolidated.
- 19.1.4 The finished level of filling shall be kept to shape intended to be given to floor.
- 9.1.5 In case off large heavy duty flooring like factory flooring, the consolidation may be done by power rollers, where so specified. The extent of consolidation required, shall also be as specified.
- 9.1.6 The excavated stuff of the selected type shall be allowed to be used in filling the trenches and plinth. Under no circumstances black cotton soil be used for filling the plinth.

19.2.0 Mode of Measurements & Payment

- 19.2.1 The payment shall be made for filling in plinth and trenches. No deduction shall be made for shrinkage or voids, if consolidated as instructed above.
- 19.2.2 The rate shall be for a unit of one **Cubic Metre(C.M)**.

Item No.20 :-

Providing and applying 20 mm thick sand faced cement plaster on walls upto height 10 metres above ground level consisting of 12mm thick backing coat of C.M. 1:3 (1-cement : 3-sand) and 8mm thick finishing coat of C.M. 1:1 (1-cement : 1- sand) etc. complete.

- 20.1.0 Materials :-
Water shall conform to M-1 cement mortar shall conform to M-11.
- 20.2.0 Workmanship :-
- 20.2.1 The work shall be carried out in two coats. The backing coat [basecoat] shall be 12 mm. thick in C.M. 1:3. The relevant specifications of Item No.17 shall be followed except that the thickness of back coat shall be 12 mm. average and the proportion shall be of cement mortar 1:3 [1 cement:3 sand]. 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 subsequent coat shall be applied after this coat has been allowed to set for 3 to 5 days, depending upon the weather conditions. The surface shall not be allowed to dry during this period.
The second coat shall be completed to 8 mm thickness in C.M. 1:1 as described above, including raisign 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.
- 20.2.2 Curing :-
The curing shall be started overnight after finishing of plater.The plaster shall be kept wet for a period of 7 days. During this period, it shall be protected from all damages.
- 20.3.0 Mode of Measurements and payment :-

20.3.1 The rate shall be for a unit of one **Square Metre**.

Item No.21 :- Providing and laying cement concrete 1:1.5:3 [1 Cement, 1.5 coarse sand:3 graded stone aggregates 20 mm nominal size] and finishing smooth with cement plaster in cement mortar 1:3 and curing etc. completing. including the cost of form work but excluding the cost of reinforcement for R.C.C. work in upto two level [A] Columns: [i] Having cross sectional area upto 0.08 sq.mt. [ii] Having cross sectional area more than 0.08 sq.mt. and upto 0.12 sq.mt. [iii] Having cross sectional area more than 0.12 sq.mt. [B] Beams : [i] Having cross sectional area upto to 0.08 sq. meter. [ii] Having cross sectional area more than 0.08 sq.mt. upto 0.12 sq.meter. [iii] Having cross sectional area more than 0.12 sq.mt. [C] Slabs: [i] Slabs upto 8 cms.thickness [ii] Slabs having more than 8 cms. and upto 10 cms.thickness [iii] Slabs having more than 10 cms. and upto 13 cms. thickness [iv] Slab having more than 13 cms thickness [D] Lintels: [E] Chhajjas

21.1.0 Materials and workmanship:-

The relevant specifications of **Item No.15** shall be followed for concrete work and shall be followed for form work and centering work. The relevant specification Item No.11 shall be followed for the finishing work in mortar 1:3 [1 cement:3 fine sand] Before the Plastering is done. The surface of the concrete shall be raked roughened Punch for Proper bond Except the reinforced concrete works shall be carried out for the columns, beams slabs and lintels.

[A] The cross sectional are of columns shall be Specified in item.

[B] The cross sectional area of beam lintel shall be specified in item.

[C] The thickness of the slabs shall be specified in the item.

[D] The thickness of the lintel chhajjas shall be specified in the item.

21.2.0 Mode of measurement and payment :-

21.2.1 The Consolidated Cubical Contents of Concrete work as Specified in item shall be measured. The concrete laid in excess of sections shown on drawings or as directed shall not be measured. No. deductions shall be made for [A] Ends of dis-similar materials such as joints, bems, posts, girders, refters, purlin trusses, corbels and steps etc. upto 500 sq.cm. in section. [B] Opening upto 0.1 Square Metre.

21.2.2 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 include the cost of form work. [The rate also includes smooth plaster.]

21.2.3 The volume occupied by reinforcement shall not be deducted from R.C.C. work.

21.2.4 The rate shall be for a unit of one **Cubic Metre**.

Item No.22 :- Providing & laying ordinary cement con.1:1.5:3 (1cement:1.5sand:3 graded graded stone agg. 20 mm nominal size) finishing smooth curing etc. comp. Incl.. Cost of form work but excl. Cost of reinforcement for R.C.C. Work in : (A) Stair cases including landings etc. (B) Vertical and horizontal fins- Ground Floor

22.1.0 Materials and workmanship:-

The relevant specifications of **Item No.15** shall be followed for concrete work and shall be followed for form work and centering work. The relevant specification Item No.11 shall be followed for the finishing work in mortar 1:3 [1 cement:3 fine sand] Before the Plastering is done. The surface of the concrete shall be raked roughened Punch for Proper bond Except the reinforced concrete works shall be carried out for the columns, beams slabs and lintels.

[A] The cross sectional are of columns shall be Specified in item.

[B] The cross sectional area of beam lintel shall be specified in item.

[C] The thickness of the slabs shall be specified in the item.

[D] The thickness of the lintel chhajjas shall be specified in the item.

22.2.0 Mode of measurement and payment :-

22.2.1 The Consolidated Cubical Contents of Concrete work as Specified in item shall be measured. The concrete laid in excess of sections shown on drawings or as directed shall not be measured. No. deductions shall be made for [A] Ends of dis-similar materials such as joints, bems, posts, girders, refters, purlin trusses, corbels and steps etc. upto 500 sq.cm. in section. [B] Opening upto 0.1 Sq.M.

- 22.2.2 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 include the cost of form work. [The rate also includes smooth plaster.]
- 22.2.3 The volume occupied by reinforcement shall not be deducted from **R.C.C.work**.
- 22.2.4 The rate shall be for a unit of one **Cubic Metre**.

Item No.23 :- Providing & fixing IS Mark TMT Bar FE 500d reinforcement for R.C.C. Work incl. bending, binding & placing in position etc.comp.---Ground Floor

23.1.0 MATERIALS AND WORKMANSHIP :

The relevant specification of **Item No.17** shall be followed except that the work shall be carried out for super structure above floor two level.

23.2.0 MODE OF MEASUREMENT & PAYMENT :

The relevant specifications of Item No.17 shall be followed.

The extra payment shall be made for additional lift above floor two level to each additional floor over and above the work shall be measured and paid under this item.

The rate shall be for a unit of one **KG (Kilogram)**.

Item No.24 :- Brick work using common burnt clay building bricks having crushing strength not less than 35 kg./Sq.Cm. in Cement Mortar 1:6 (1- Cement : 6 -fine sand)(C) Fly Ash Bricks - Ground Floor

24.1.0 MATERIALS AND WORKMANSHIP :

The relevant specification of Item No.18 shall be followed except that the work shall be carried out for super structure above floor two level.

24.2.0 MODE OF MEASUREMENT & PAYMENT :

The relevant specifications of Item No.18 shall be followed.

The extra payment shall be made for additional lift above floor two level to each additional floor over and above the work shall be measured and paid under this item.

The rate shall be for a unit of one **Cubic Metre**.

ITEM NO.25 :- Half brick masonry in common brunt clay building bricks having crushing strength not less than 35 Kg/Sq.Cm. in Cement mortar 1:4 (1- Cement : 4 - coarse sand) in foundation and plinth G.F (C) Fly Ash Bricks

25.1.0 MATERIALS

25.1.1 Flyash Building Brick shall confirm to M-15, Water shall confirm to M-1, Cement shall confirm to M-3, Sand shall confirm to M-6, Cement mortar shall confirm to M-11.

25.2.0 WORKMANSHIP

252.1 Relevant specifications of bricks, wetting and laying of bricks, joints, curing etc. shall confirm to item No. 18 except the brick work of half bricks shall be carried out.

25.2.2 Cement mortar used in masonry work shall be in proportion of 1 part of cement and 3 parts of sand by volume.

25.2.3 All bricks shall be laid strecher 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 veritcal. the bricks shall be laid with frogs upwards. A set of masons tools shall be maintained on work as required for frequent checking.

25.3.0 MODE OF MEASUREMENTS & PAYMENTS

25.3.1 The half brick masonry work in foundation and plinth shall be measured under this item, the limiting dimensions shall not exceed those shown in the plan or as directed. Any work done extra over the specified dimensions shall be ignored.

25.3.2 The rates included laying of 2 Nos. of 6 mm M.S. bars after every three course.

25.3.3 The relevant specifications of Item No.18 shall be followed. The length shall be measured nearest to 1 Cm.

25.3.4 The rate shall be for a unit of **Square Metre**.

Item No.26 :-

Providing & Applying 10mm.th.cement plaster in single coat on brick/ concrete walls similar surfaces for plastering & finished even & smooth with a floating coat of cement slurry mixed with admixture of lime or neeru in required proportion etc. comp. in C.M 1:3 (1 cement : 3 sand). (A) for wall and similar surfaces. (B) for ceilings and soffits of stairs.

26.1.0 MATERIALS

Water shall conform to M-1. The cement mortar of proportion 1:3 shall conform to M-11.

26.2.0 WORKMANSHIP

26.2.1 Scaffolding - Wooden bellies, bamboos, planks, treatles and other scaffolding shall be sound. These shall be properly examined before erection and use. Stage scaffolding shall be provided for ceiling plaster which shall be independent of the walls.

26.2.2 Preparation of Background - The surface shall be cleaned of all dust, loose mortar droppings, traces of algae, afflorsence and other foreign matter by water or by brushing. Smooth surface be roughened by wire brushing if it is not hard and hacking if it is hard. In case of concrete surface, if a chemical retarder has been applied to the form work, the surface shall be roughened by wire brushing and all the resulting dust and loose particles cleaned off and care shall be taken that none of the retarders is left on the surface. Trimming of projections on brick/concrete surfaces where necessary shall be carried out to get an even surface.

Raking of joints in case of masonry work where necessary, shall be allowed to dry out for sufficient period before carrying out the plaster work.

The work shall not be soaked but only damped evenly before applying the plaster. If the surface becomes dry, such areas shall be moistened again.

For external plaster, the plastering operation shall be started from top floor and carried downwards. For internal plaster, the plastering operations may be started wherever the building frame and cladding work are ready and the temporary supports of the ceiling resting on the wall of the floor have been removed. Ceiling plaster shall be completed before starting plaster to walls.

26.2.3 APPLICATION OF PLASTER

The plaster about 15 x 15 Cms. shall be first applied horizontally and vertically at not more than 2 metres intervals over the entire surface to serve as gauge. The surface gauges shall be truly in place of the finished plastered surface. The mortar shall then be applied in uniform surface slightly more than the specified thickness then brought to a true surface by working a wooden straight edge reaching across the gauges with small upward and sideways movements at a time. Finally, the surface shall be finished off true with a trowel of wooden flat according as a smooth or a sandy granular texture is required. Excessive trowelling or overworking the float shall be avoided. All corners, arises, angles and junctions shall be truly vertical or horizontal as the case may be and shall be carefully finished. Rounding or chamfering, corners, junctions etc. shall be carried out with proper templates to the size required.

Cement plaster shall be used within half an hour after addition of water. Any mortar or plaster which is partially set shall be rejected and removed forthwith from the site. In suspending the work at the end of the day, the plaster shall be left out clean to the line both horizontally and vertically. When recommencing the plaster, the edges of the old work shall be scrapped clean and wetted with cement putty before plaster is applied to the adjacent areas to enable the two to properly join together. Plastering work shall be closed at the end of the day on the body of the wall and nearer that 15 cms. to any corners or arises. It shall not be closed on the body of features such as plaster bands and cornices not at the corners or arises. Horizontal points in plaster work shall not also occur on parapet tops and copings as those invariably lead to leakage. No portion of the surface shall be left out initially to be packed up later on.

Each coat shall be kept damp continuously till the next coat is applied for a minimum period of 7 days. Moistening shall commence as soon as plaster is hardened sufficiently. Soaking or walls shall be avoided and only as much water as can be readily absorbed shall be used, excessive

evaporation on the sunny or windward side of building in hot air to dry weather shall be prevented by hanging mattings or gunny bags on the outside of the plaster and keeping them wet.

26.3.0 MODE OF MEASUREMENTS & PAYMENT

- 26.3.1 The rate shall include the cost of all materials, labour and scaffolding etc. involved in the operations described under workmanship.
- 26.3.2 All plastering shall be measured in square metres unless otherwise specified. Length, breadth or height shall be measured correct to a centimetre.
- 26.3.3 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.
- 26.3.4 This item includes plastering upto floor two level.
- 26.3.5 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.
- 26.3.6 Soffits of stairs shall be measured as plastering on ceilings. Blowing soffits shall be measured separately.
- 26.3.7 For jambs, soffits, sills etc. for openings not exceeding 0.5 Sq.Mts. each in area for ends of joints, beams, posts, girders, step etc. not exceeding 0.5 Sq.Mts. each in area for and for openings exceeding 0.5 Sq.Mts. and not exceeding 3 Sq.Mts. 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.Mts. each and no addition shall be made for reveals, jambs, soffits, sills etc. of these openings for finish to plaster around ends of joints, beams, posts etc.
 - b] Deduction for openings exceeding 0.5 Sq.Mts. but not exceeding 3 Sq.Mts. each shall be made as follows and no additions shall be made for reveals, jambs, soffits sills etc. of these openings --
 - i] When both faces of all wall are plastered with same plaster, deduction shall be made for one face only.
 - ii] When two faces of wall are plastered with different types of plaster or if one face is plastered and the other pointed, deductions shall be made from the plaster or pointing on the side of frame for doors, windows etc. on which width of reveals is less than that on the other side but no deduction shall be made on the other side. Where width of reveals on both faces of all are equal, deductions of 50% of area of opening on each face shall be made from areas of plaster and/or pointing as the case may be.
- 26.3.8 For openings having door frames equal to projecting beyond the thickness of wall, full deductions for opening shall be made from each plastered face of the wall.
- 26.3.9 In case of opening of area above 3 Sq.Mts. each deductions shall be made for opening but jambs, soffits and sills shall be measured.
- 26.3.10 The rate shall be for a unit of one **Square Meters** .

Item No.27 :-

Providing & Applying 15mm. th. cement plaster in single coat on brick/ concrete walls similar surfaces for plastering & finished even & smooth with a floating coat of cement slurry mixed with admixture of lime or neeru in required proportion etc. comp. in C.M 1:3 (1 cement : 3 sand) (A) For Wall and Similar Surfaces Up to G.L./P.L.

In general the work shall be carried out as per the standard specifications of P.W.D. / C.P.W.D / GWSSB, relevant drawings and as per the instructions of Engineer-in-Charge. Work shall be carried out as per item description.

27.1.0 Materials

27.1.1 Water shall conform to M-1. The cement mortar of proportion 1:3 shall conform to M-11.

27.2.0 Workmanship

27.2.1 Scaffolding:

Wooden bullies, bamboos, planks, trestles and other scaffolding shall be sound. These shall be properly examined before erection and use. Stage scaffolding shall be provided for ceiling plaster which shall be independent of the walls.

27.2.2 Preparation of back-ground :

27.2.2.1 The surface shall be cleaned of all dust, loose mortar droppings, traces of algae, efflorescence and other foreign matter by water or by brushing. Smooth surface shall be toughened by wire brushing if it is not hard and by hacking if it is hard. In case of concrete surface, if a chemical retarded has been applied to the form work, the surface shall be roughened by wire brushing and all the resulting dust and loose particles cleaned off and care shall be taken that none of the readers if left on the surface. Trimming of projections on brick/concrete surfaces where necessary shall be carried out to get an even surface.

27.2.2.2 Raking of joints in case of masonry where necessary shall be allowed to dry out for sufficient period before carrying out the plaster work.

27.2.2.3 The work shall not be soaked but only damped evenly before applying the plaster. If the surface becomes dry, such area shall be moistened again.

27.2.2.4. For external plaster, the peasting operation shall be started from top floor and carried downwards. For internal plaster, the plastering operations may be started wherever the building frame and cladding work are ready and the temporary supports of the ceiling resting on the wall of the floor have been removed. Ceiling plaster shall be completed before starting plaster to walls.

27.2.3 Application of plaster:

27.2.3.1 The plaster about 15x15 cms. shall be first applied horizontally and vertically at not more than 2 meters intervals over the entire surface to serve as gauge. The surfaces of these gauges shall be truly in plane of the finished plastered surface. The mortar shall then be applied in uniform surface slightly more than the specified thickness, then brought to a true surface by working a wooden straight edge reaching across the gauges with small upward and sideways movements at a time. Finally, the surface shall be finished off true with a trowel or wooden float according as a smooth or a smooth or a sandy granular texture is required Excessive troweling or overworking the float shall be avoided. All corners, arises, angles and junctions shall be truly vertical or horizontal as the case may be and shall be carefully finished. Hounding or chamfering, corners, arises junctions etc. shall be carried out with proper templates to be size required.

27.2.3.2 Cement plaster shall be used within half an hour after addition of water. And mortar or plaster which is partially set shall be rejected and removed forthwith from the site.

27.2.3.3 In suspending the work at the end of the day, the plaster shall be left out clean to the line both horizontally and vertically, when recommencing the plaster, the edges of the old work shall be scraped clean and wetted with cement putty before plaster is applied to the adjacent areas to enable the two to properly join together. Plastering work shall be closed at the end of the day on the body of the wall and nearer than 15 cm. to any corners or arises. It shall not be closed on the body of features such as plaster bands and cornices not at the corners or arises. Horizontal joints in plaster work shall not also occur on parapet tops and copings as these invariably lead to leakage. No portion of the surface shall be left out initially to be packed up later on.

27.2.3.4 Each coat shall be kept damp continuously till the next coat is applied or for a minimum period of 7 days. Moistening shall commence as soon as plaster is hardened sufficiently. Soaking of walls shall be avoided and only as much water as can be readily absorbed shall be used, excessive evaporation on the sunny or windward side of building in hot air or dry weather shall be prevented by hanging matting or gunny bags oh the outside of the plaster and keeping them wet.

27.3.0 Mode of measurements & payment

- 27.3.1 The rate shall include the cost of all materials, labour and scaffolding etc. involved in the operations described under workmanship.
- 27.3.2 All plastering shall be measured in square meters unless otherwise specified. Length breadth or height shall be measured correct to a centimeter.
- 27.3.3. 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.
- 27.3.4 This item includes plastering up to floor two level.
- 27.3.5 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.
- 27.3.6 Soffits of stairs shall be measured as plastering on ceilings, following soffits shall be measured separately.
- 27.3.7 For jambs, soffits, sills 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 manners.
- (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 reveals, jambs, soffits, sills etc. of these openings, for finish to plaster around ends of joints, beams posts etc.
 - (b) Deduction for openings exceeding 0.5 sq. mt but not exceeding 3 sq.mt. each shall be made as follows and no addition shall be made for reveals, jambs, soffits, sills etc. of these openings, (i) When both faces of all wall are plastered with same plaster, deduction shall be made for one face only, (ii) When two faces of wall are plastered with different types of plasters or if one face is plastered and the other pointed, deductions shall be made from the plaster or pointing on the side of frame for door, window etc. on which width of reveals is less than that on the other side but no deductions shall be made on the other side. Where width of reveals on both faces of all are equal, deductions of 50% of area of opening on each face shall be made from areas of plaster and / or pointing as the case may be.
- 27.3.8 For openings having door frames equal to or projecting beyond the thickness of wall, full deduction for opening shall be made from each plastered face of the wall.
- 27.3.9 In case of openings of area above 3 sq. mt. each, deduction shall be made for openings but jambs, soffits and sills shall be measured.
- 27.3.10 The rate shall be for a unit of **Square Metre**.

Item No.28 :- Providing 20 mm thick double coat mala cement plaster on brick / concrete work for plastering comprising of base coat 12 mm thick cement plaster in cement mortar (1 Cement : 4 coarse sand) in rough finishing and 8 mm thick top coat of cement mortar 1:2 (1 Cement : 2 Coarse sand) finished with trowel including scaffolding curing etc. complete.

28.1.0 MATERIALS AND WORKMANSHIP :

The relevant specification of Item No.20 shall be followed except that the work shall be carried out for super structure above floor two level.

28.2.0 MODE OF MEASUREMENT & PAYMENT :

The relevant specifications of Item No.20 shall be followed.

The extra payment shall be made for additional lift above floor two level to each additional floor over and above the work shall be measured and paid under this item.

The rate shall be for a unit of one **Square Metre**.

Item No.29 :- Providing throating or plaster drip and moulding it to R.C.C. chajja etc. comp.. For all floor

29.1.0 Materials :-

Water shall conform to M-1. Cement shall conform to M-3. Sand conform to M-6. Cement mortar shall conform to M-11.

29.2.0 Workmanship :-

The work shall be carried out as directed. The proportion of mix for finishing, touching shall be in C.M. 1:2 by volume. Curing shall be done for not less than 7 days. The work shall be carried out in best workman like manner. The throating or plaster drip and moulding shall be one centimetre in thickness.

29.3.0 Mode of Measurements and payment :-

29.3.1 The rate includes cost of all materials and labour required to complete the item.

29.3.2 The rate shall be for a unit of one **Running Metre**.

Item No.30 :- Providing 20 mm deep finished groove in plaster in line and level etc. Comp. For all Floor (M.R.)

30.1.0 Materials :-

Water shall conform to M-1. Cement shall conform to M-3. Sand conform to M-6. Cement mortar shall conform to M-11.

30.2.0 Workmanship :-

The work shall be carried out as directed. The proportion of mix for finishing, touching shall be in C.M. 1:2 by volume. Curing shall be done for not less than 7 days. The work shall be carried out in best workman like manner. The throating or plaster drip and moulding shall be one centimetre in thickness.

30.3.0 Mode of Measurements and payment :-

30.3.1 The rate includes cost of all materials and labour required to complete the item.

30.3.2 The rate shall be for a unit of **Running Metre**.

Item No. 31:- Preparing surface, providing and applying 30mm thick aggregate plaster in 1:4 base coat (15mm thick) ven & smooth coats for external surfaces including adding of waterproofing compound of Sika, Fosroc, CICO as per manufacturer's instructions and second and finishing coat of 15mm thick in cement mortar mixed with aggregates/ stone chips of approved shade, colour and mix in 1:1:1 (1cement : 1 sand : 1 stone chips with dolomite powder), necessary scaffolding (double legged) without making holes in walls, making surface rough, curing, making sharp and clear grooves, drip moulds, patta - patti, zari filling in between joints of brick and RCC surfaces by raking up the joint and preparing joints by pointing / grouting square crushed aggregates as per design and details as directed and to the satisfaction of the Engineer in Charge etc. Complete at all levels. The rates shall include for applying of Zycoseal or any other weatherproof transparent coating of approved make on the aggregate plastered surface. The item includes base coats of rough plaster including grooves as per details / design / pattern.

31.1 Materials:

Water, Cement, Sand, White cement, pigments etc shall be as mentioned earlier. Aggregates shall be crushed stone chips of upto 3-5mm in size and of approved colour, mix and source by the Consultants / Engineer in charge. The proportions of cement, stone chips with dolomite powder and sand shall be 1:1:1 unless otherwise specified.

31.2 Workmanship:

Mortar of desired grade shall be mixed as mentioned above in the specifications. First coat of plaster shall be also laid in plumb, line and level as mentioned in the above paragraph and shall be 15mm thick in cement mortar (1cement: 4sand). The second coat shall be 5mm thick aggregates/ stone chips mixed with mortar of grade 1cement:1stone chips with dolomite powder: 1graded sand.

The base surface shall have keys for receiving the finishing coat. It shall be cured for 48 hours and then allowed to dry out, before being treated again with water as in the case of original surface. The final coat shall be of a specially prepared mixture of ordinary grey and / or white cement with the required pigment blended with (if required), stone chips with dolomite and sand in proportion as described above and shall

be applied to a finished thickness of 15mm. It shall be pressed, level trowelled and finished with a steel trowel. Trowelling should be kept to a minimum as excessive trowelling may cause hair cracks and crazing. Floating shall be carried out only after the final rendering has slightly dried out. The impression of joints to the pattern shown in the drawings or as directed by the Consultant shall then be marked on the face of the topping by pressing a light string with a trowel. Grooves shall then be formed with the help of an Aluminum channel of required size as per the Architectural drawings and they shall be finished neatly. The whole work shall be done as per the pattern of the sample approved by the Consultant. The surface shall be well cured for atleast 14 days. All the edges shall be made to correct line, level and plumb and sides shall be chiseled and made straight.

31.3 Details specification same as per the Item and as per instructions by Engineer-in-charge.

31.4 Method of Measurements : All plaster works shall be measured in square meters and as per the guidelines of SP:27 and IS 1200. The rate shall be for a unit of **Square Metre**.

Item No.32:-

Providing and laying polished Kota stone slab flooring over 20mm (Average) thick base of cement mortar 1:6 (1-cement : 6-coarse sand) or L.M. 1:1.5 (1-Lime putty :1.5 - coarse sand) laid over and jointed with grey cement slurry mixed with pigment to match the shade of slab including rubbing and polishing etc. complete. (A) 25mm thick

32.1.0 Materials :-

Water shall confirm to M-1. Lime mortar shall confirm to M-10. Cement mortar shall confirm to M-11. Polished kota stone shall confirm to M-49.

32.2.0 Workmanship :-

32.2.1 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 on coarse sand before paving. All angles and edges of the slabs shall be true square and free iron chipping and giving a plane surface. The thickness shall be as specified in the item.

32.2.2 Bedding for the kotah stone slabs shall be cement mortar 1:6 [1 cement : 6 coarse sand] or L.M. 1:1.5 of thickness 20 mm as given in the description of the item. Subgrade shall be cleaned wetted and mopped. Mortar of the specified mix and thickness shall then be spread, on an area sufficient to receive one kotah stone slab. The slab shall 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 in hollows or depressions. The mortar 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 topped 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 slab fixed in the floor adjoining the wall shall enter not less than 10 mm. under the plaster, skirting or dedo. The junction between the wall and floor shall be finished neatly. The finished surface shall be in true levels and slopes as directed.

32.2.3 The floor shall be kept wet for a minimum period of 7 days so that bedding and joints set properly.

32.2.4 Polishing shall be normally commenced after 14 days of laying the stone slab. First polishing shall be done with carborundum stone, of 120 grade grit fitted in the heavy machine and then second polishing shall be done with carborundum stone 220 to 350 grade grit fitted in heavy machine. Water shall properly be 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 clean and dry surface then the polishing machine fitted with beds shall be run over it.

32.2.5 The holes required for Nahni traps, pipes and any other fitting shall be made without extra cost.

32.3.0 Mode of Measurements & payments:-

The rate shall include the cost of all materials and labour involved in all the operations described above. The kotah stone flooring shall be measured in square metres correct to two places of decimal, length and breadth shall be measured correct to a centimeters and between the finished face of skirting dado or wall plaster and no deduction shall be made nor extra paid for opening in floor of areas upto 0.1 **Square Metre**.

The rate shall be for a unit of **Square Metre**.

Item No.33 :-

Providing and laying polished kota stone slab 25mm thick in risers of steps,skirting Dado and pillars laid on 10mm thick cement mortar 1:3 (1- Cement : 3 coarse sand) and jointed with gray cement slurry mixed with pigment to match the shade of slab including rubbing and polishing etc. complete.

33.1.1 Materials :-

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 and consider 25mm th.

33.2.0 Workmanship :-

33.2.1 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 on coarse sand before paving. All angles and edges of the slabs shall be true square and free iron chipping and giving a plane surface. The thickness shall be as specified in the item.

33.2.2 Bedding for the kotah stone slabs shall be cement mortar 1:3 [1 cement : 3 coarse sand] of thickness 20 mm as given in the description of the item. Subgrade shall be cleaned wetted and mopped. Mortar of the specified mix and thickness shall then be spread, on an area sufficient to receive one kotah stone slab. The slab shall 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 in hollows or depressions. The mortar 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 topped 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 slab fixed in the floor adjoining the wall shall enter not less than 10 mm. under the plaster, skirting or dado. The junction between the wall and floor shall be finished neatly. The finished surface shall be in true levels and slopes as directed.

33.2.3 The floor shall be kept wet for a minimum period of 7 days so that bedding and joints set properly.

33.2.4 Polishing shall be normally commenced after 14 days of laying the stone slab. First polishing shall be done with carborundum stone, of 120 grade grit fitted in the heavy machine and then second polishing shall be done with carborundum stone 220 to 350 grade grit fitted in heavy machine. Water shall properly be 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 clean and dry surface then the polishing machine fitted with beds shall be run over it.

33.2.5 The holes required for Nahni traps, pipes and any other fitting shall be made without extra cost.

33.3.0 Mode of Measurements & payments:-

The rate shall include the cost of all materials and labour involved in all the operations described above. The kotah stone flooring shall be measured in square metres correct to two places of decimal, length and breadth shall be measured correct to a centimeters and between the finished face of skirting dado or wall plaster and no deduction shall be made nor extra paid for opening in floor of areas upto 0.1 **Square Metre**.

The rate shall be for a unit of **one Square Metre**.

Item No. - 34.

Providing and laying in position 30mm thick well dressed River finish rough Green Kota stone in flooring, benches and skirting of 75mm flushed with wall plaster surface etc, (including chipping and

chasing in wall) of required size and pattern as specified by Engineer in Charge and details over 20mm thick bedding of cement mortar 1:5 and jointed with grey cement slurry mixed with pigment to match the shade of the stone slab including rubbing and edge polishing, tools and tackles complete at all levels as directed to the satisfaction of the Engineer in charge. Rates are inclusive of cleaning with water and oxalic acid. River finishing of the kota stones shall be done only by experts using excellent quality Dupont make or abrasives and wire brush of different numbers at factory level before bringing the same to site. The kota stone surface shall not have any kind of protruding layers on its surface and shall have a more or less even kind of granular rough texture and shall be non-slippery. Samples shall be approved well in advance prior to use. The rates shall be inclusive of river finishing process and no extra shall be paid for samples given for approvals. The exposed edge of the stone shall be of uniform thickness and polished with providing grooves as specified by Engineer in Charge.

34.1 The material shall conform M-49.

Machine cut rough river finish treated green kota stone slabs shall be of specified size and thickness shall be laid on floor and to desired levels and slopes and patterns as per the designs of the Consultants. Colour shall be uniform and the slabs free from all defects. Tiles use at site shall be machine-cut.

In machine-cut tiles, edges shall be protected from any damage in transit. No breakage shall be permitted. All edges shall be sharp, perfectly rectangular. Edges shall be pencil-rounded and polished for exposed corners and faces.

34.2 Bedding :

Cement sand mortar ratio of 1:5 (1 cement:5 sand) shall be provided for bedding. Surface shall be wetted and cleaned thoroughly. Mortar shall be spread uniformly, tamped and leveled with a 3m straight edge. The bed shall be keyed prior to finishing of the day's work. Thickness shall be as specified but at no point shall the bed be less than 10mm.

34.3 Laying of stone :

A thick cement slurry/paste or equivalent ready made slurry bond coat of approved manufacturer shall be spread over the bedding and cleared stone laid over this grouted area. Grouting shall be such that the area is covered within 15-20 minutes. Joints shall be as thin as possible and limited to 1-2mm at the maximum. Laying shall start after due consideration is given to following points and approved by the consultant. Datum levels of floors in rooms, adjacent rooms, passages, etc., Stones in openings and doors are equally placed, Passage may be laid first to achieve evenness in doors, Stones in room shall be symmetrical and equal cut tiles shall be around the edges. In case of differently coloured stones in passages and rooms, a dividing strip shall be provided and changeover of color shall be under the shutter. In case there is any other architectural or structural feature, the same shall be considered and the pattern adjusted accordingly. Stones may be allowed to go under plaster or dado about 10 mm. Stones shall be made flush with the wall plaster, thereby making a groove in-between the plastered surface and the stone surface. After the stones are laid, surplus cement slurry from the joints shall be cleaned. The following day the joints shall be cleaned, washed and wire brushed. Grouting of joints shall be carried out with unsanded readymade grouts gray cement that matches the colour of stones. Grout shall be worked into joint. Excessive grouts shall be cleaned off. The floor shall be kept wet for a period of 7 days. No traffic shall be allowed on the bedding and bedded tiles for at least 2 days.

34.4 Polishing :

Polishing and grinding shall be done only after 14 days. Machine cutting or grinding shall be carried out. At first the grinding shall be with rough stone and grinding shall be uniform. It shall be cleaned with water. All pinholes and opened out joints shall be grouted with matching coloured cement grouts. It shall be cured for a period of 7 days by Keeping it moist. This shall be carried out only for edges of the stone or as indicated in the drawings of the consultants. Second coat cutting/grinding shall be done with carborundum stone of medium grade. The same procedure as for the first coat shall be repeated till curing is completed. The final cutting/grinding shall be with a fine stone grade and shall be done with ample water. The floor shall then be washed, cleaned and dried with a soft cloth or linen.

34.5 The following additional points should be taken into consideration while laying the stone:

1. Veins of stone must match

2. Colour and shade differences should be adjusted to create an uniform appearance and hence dry laying shall be approved by the consultant prior to actual laying.
3. All closing pieces/cut pieces, etc. shall be as per drawing.
4. The flooring shall be protected till the site is handed over to the Employer.
5. Acid washing after polishing shall not be carried out.
6. Floor shiner shall be gently applied to enrich the aesthetic look of the stone flooring. The shiner thus used shall be meant to be applied on kota stone flooring and shall be approved by the Engineer in charge prior to use and shall be from a reputed make.

34.6 The rate shall be for a unit of **Square Metre**.

Item No.35 :-

Providing & laying granite slab 18 mm thick in flooring, treads of steps and landing laid on bed of 20mm thick cement mortar 1:6 (1 Cement : 6 coarse sand) or lime mortar 1:1.5 laid and finished with flush pointing in white or colour cement including rubbing and polishing complete. (Basic Rate:- Rs.1347.46/S.M.)

Details specification as per **Item No.32**.

The rate shall be for a unit of one **Square Metre**.

Item No.36 :-

Providing & laying granite slab 18mm thick in skirting, risers of steps, dedo and pillars laid on 10mm thick cement mortar 1:4 (1 Cement : 4 Coarse sand) and finished with flush pointing in white or colour cement including rubbing & polishing comp.. (Basic Rate:- Rs.1347.46/S.M.)

Details specification as per **Item No.32**.

The rate shall be for a unit of one **Square Metre**.

Item No. :- 37

Providing & laying granite slab 18mm thick in Window-Door seal Frame Etc laid on 10mm thick cement mortar 1:4 (1 Cement : 4 Coarse sand) with nessary adhesive material and finished with flush pointing in white or colour cement, including rubbing & polishing comp.. (Basic Rate:- Rs.1000.0/S.M.)

23.1.1 Materials

Water shall conform to M-1. Lime mortar shall conform to M-10. Cement mortar shall conform to M-11. Graite stone slab 18 mm. thick shall conform to M-16 & M-49.

Workmanship

Dressing of slabs :

Every stone shall be cut to required size and fine chisel dressed to give a smooth and even surface on all sides to full depth. A straight edge laid along the sides of the stone shall be fully in contact with it Chisel dressing shall also be done on top surface to remove any waviness. The sides and top surface of marble slabs shall be machine rubbed or table rubbed with coarse sand before using. All angles and edges or slabs shall be true, square and free from chipping.

37.2.2 The thickness of stone shall be 25 mm. The allowable tolerance shall be 2 mm. allowable. The 'tolerance shall + 5 mm. in length and breadth.

37.2.3. Bedding:

Bedding of marble slabs shall either be lime mortar 1:1.5 (1 lime putty : 1.5 coarse sand) or cement mortar 1:6 (1 cement : 6 coarse sand) of average thickness 20 mm. thick as given in description of item. Minimum thickness at any place shall not be less than 10 mm.

37.2.4. Laying

The surface of sub-grade shall be cleared, wetted and mopped. Mortar of specified mix and thickness shall then be spread on an area sufficient to receive one marble slab. The slab be washed clean before laying. It tie laid on top pressed and tapped gently to bring it in level with other slabs. It shall then be lifted and a side. The top surface of the mortar shall then be corrected by adding fresh mortar at hollows, or depressions. The mortar shall then be allowed to harden it over this surface cement slurry or honey like

consistency at 4.4 Kg. of cement per sq. meter. The edges of slabs already paved shall be buttered with gray cement. The slab shall then be gently placed in position and tapped with wooden mallet till it is properly bedded in level with and close to the adjoining slab. The joints shall be as fine as possible. Surplus cement on the surface of the slab shall be removed. The slab fixed in the floor adjoining the walls shall enter not less than 10 mm. under the plaster skirting or dedo. The junction between the walls and floors shall be finished neatly. The finished surface shall be true to level and slopes as directed.

37.2.5. Curing : The floor shall be cured for a minimum period of seven days.

37.2.6. Polishing and finishing:

Unevenness at the meting edges of slab shall be removed by fine chiseling. Finishing etc. shall be done as per relevant specifications terrazzo tiles flooring except that cement slurry with/without pigments shall not be applied on the surface before each polishing.

37.3.0. Mode of measurements and payment

37.3.1. Marbles stone flooring with various kinds of marble shall be measured in sq. meter. The length and breadth shall be measured between-the finished face of skirting or dedo or wall plaster No deduction shall be made nor extra shall be paid for any opening in the floor or area up to 0.05 sq. mt. Nothing extra shall be paid for laying stone at different levels in the same room. Treads and steps of stairs paved with marble stone slabs shall be also be measured under flooring.

37.3.2. The rate shall be for a unit of one **Square Metre**.

Item No.38 :-

Labour Charges For Edge Finished For Granite

Detailed specification as directed by Engineer-in-charge.

The rate shall be for a unit of **one Running Metre**.

ITEM NO.39 :-

Providing & laying Vitrified tiles of 8mm thick of Orient, Kajaria, Jhonson, Nitco, Somani, Bell, Asian or Euro make in flooring,treads of steps & Landing laid on bed of 20 mm (Average) base of cement mortar 1:6 (1 Cement : 6 Coarse sand) on new surface or fixing on existing flooring by adhesive material including dismantling of existing flooring and jointed with colour cement slurry including finished with flush pointing & cleaning the surface etc. comp.Size 24" x 24" For Antiskid tiles

39.1.0 MATERIALS

Water shall conform to M-1. Cement mortar shall conform to M-11. Vitrified tiles shall conform to M-35.

39.2.0 WORKMANSHIP

39.2.1 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 levels and allowed to harden enough to offer a rigid cushion to tiles and to enable the mason to place wooden planks across and squat on it. The white glazed tiles shall be laid on cement mortar bedding of 12mm. 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 on an 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 Kgs./Cement/Sq.Mts. of honey like consistency shall be spread over the mortar bedding as directed. The edges of 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 theretocentre line both ways. The nahn 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 edge 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 tiles finally in an even plane the flooring shall be kept wet and allowed to stay 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 precautions and measures shall be taken to ensure that the tiles are not damaged in any way till the completion of the construction.

39.3.0 MODE OF MEASUREMENTS & PAYMENTS

39.3.1 The work done shall be measured in Sq.Mts. for visible area of work done. The length and width of the flooring shall be measured between the faces of skirtings or dados or plastered face of wall as the case may be. The paving under dado or skirting shall not be measured. No deductions shall be made for extra paid for any opening in the floor of area upto 0.1 Sq.Mts. Nothing extra shall be paid for laying the floors at different levels in the same rooms.

39.3.2 The rate shall be for a unit of one **Square Metre**.

ITEM NO.40 :-

Providing and laying Vitrified tiles 8 to 10 mm thick, 24" x 24" in flooring treads of steps and landing laid on a bed of 12mm thick cement mortar 1:3 (1 cement : 3 coarse sand) finishing with flush pointing in white cement.

40.1.0 MATERIALS

Water shall conform to M-1. Cement mortar shall conform to M-11. Vitrified tiles shall conform to M-81

40.2.0 WORKMANSHIP

40.2.1 Preparation of Surface - In case of brick masonry work, the joints shall be raked out to a depth of at least 15 mm. the surface shall be chiselled and roughened with wire brushes. The surface shall be cleaned and wetted thoroughly before commencing the laying work.

Laying - The wall surface shall be covered with 10mm. thick plaster of cement mortar 1:3 mix and allowed to harden. The plaster shall be roughened with wire brushes both ways. The back of tiles shall be floated with grey cement slurry and edges with white cement slurry set in bedding mortar. The tiles shall be gently tapped in position one after the other keeping the joints as thin as possible. Dado shall be truly horizontal and the joints vertical or as per the required pattern.

Risers of steps, skirting and dado shall rest on top of treads or flooring. Where full size tiles cannot be fixed, they shall be cut to the required size and the edges to be smoothened.

The joints shall be cleaned and flush pointed with white cement. The surface shall be kept wet for seven days. After curing the surface shall be washed clean.

40.3.0 MODE OF MEASUREMENTS & PAYMENTS

40.3.1 The rate shall include the cost of all materials and labour required for various operations described above. Risers of steps, skirting and dado shall be measured in Sq.Mts. Length and height shall be measured along the finished face of the skirting or dado including curves, where special such as covers, internal and external angles etc. used. The length and height shall be measured correct to the cms. except in case of risers and skirting where height shall be measured correct to 3mm.

40.3.2 The rate shall be for a unit of one **Square Metre**.

Item No.41 :-

Providing and laying Vitrified tiles 8 to 10 mm thick, 24" x 24" in skirting risers of steps and dado on 10mm thick cement plaster 1:3 (1 cement : 3 coarse sand) and jointed with white cement slurry.

Details specification as per **Item No.40**.

The rate shall be for a unit of one **Square Metre**.

Item No.42 :-

Providing and laying chequered precast concrete tiles 22mm thick with aggregate of sizes upto 6mm in floors treads of steps and landing on 20mm thick bed of C.M. 1:6 (1 cement : 6 sand) or L.M. 1:1.5 (1 Lime putty : 1.5 sand) jointed with neat cement slurry with pigments to match the shade of the tiles.

42.1.0 Materials :

Water shall conform to M-1 cement shall conform to M-3. Lime Mortar shall conform to M-10. Cement mortar shall conform to M-11. The precast chequered tiles of 20 mm thick shall be of light shade using white cement and conform to M-47-D.

42.2.0 Workmanship :

42.2.1 The work shall be carried out as per I.S.1443-1972.

42.2.1 Bedding :

Before spreading the mortar, the sub-base of the floor shall be cleaned of all dirt, scum and loose materials and then well wetted without forming any pools of water on the surface. In case of R.C.C.floors, the top shall be left a little rough, all points of level for the finished surface shall be marked out. The lime water of proportion 1:6 (1 cement : 6 coarse sand) jointed with neat cement slurry mixed with pigment to match the shade of the tiles as directed shall be then evenly and smoothly spread over the base. Bedding layer or mortar shall be not less than 10 mm and average thickness of bedding shall be 25 mm.

42.2.2 Laying :

Before laying the terrazzo (Marble/Mosaic) tiles, the tiles shall be thoroughly wetted with water. Neat cement grout of required consistency at 4.4 kg.cement/sqmt shall be spread on the mortar bed. The tiles shall be laid on the neat cement float and shall be evenly and firmly bedded to the required level and slops. There shall be no hollows left. The joints shall be of uniform thickness and in straight line as per the pattern. The surface of flooring shall be checked frequently with a straight edge at-least two metres long so as to obtain a true surface with required slope. The tiles which are fixed in the adjoining the wall shall go about 10 mm under plaster. Skirting or dado shall be left unfinished for about 50 mm above finished floor level and unfinished strip then left earlier shall be finished. In places where full tiles can not be fixed. The tiles shall be cut to the size and smoothened at edges to give straight and true joints.

After the tiles have been laid, the surplus cement slurry and the joints shall be cleaned and washed fairly deep before cement hardens. The day after tiles have been laid, the joints shall be cleaned of every cement grout with a wire brush to a depth of about 5 mm and then grouted with white cement with or without pigment to match the shade of the topping of tiler.

42.2.4 Curing :

The flooring shall be kept wet with damp sand or water for seven days. It shall be kept undisturbed at least for 14 days. The grinding shall normally be commenced after 14 days.

42.2.5 Polishing :

After the tiles are properly cured, first grinding shall be done with carborundum stone of 48 to 60 grade grit fitted in machine. Water shall be properly used during grinding. When the chips show up and the floor has been uniformly rubbed, it shall be cleaned with water, baring all pin holes. It shall then be covered with a thin coat of white cement mixed with or without pigments to match the colour of the topping of the tiles. Pin holes if any shall thus be filled. This grout shall be kept moist for a week. Thereafter second grinding shall be started with carborundum of 120 grit. Grouting and curing shall follow again. Final grinding shall be done when other works are finished. The machine shall be fitted with carborundum of grit 220 to 350 using water in abundance. The floor shall then be washed clean with water. Oxalic acid powder shall then be dusted at 33 grams per square metre on the surface and the surface rubbed with machine fitted with hessian bobs or rubbed hard with pad of wooden rags, The floor shall then be washed clean and dried with a soft cloth or Linen. The finished floor shall not sound hollow when tapped with a mallet. If any tiles is disturbed or damaged it shall be refitted or replaced properly jointed and polished. Testing of the tiles shall be carried out by the contractor at his own cost as per I.S. requirement for required tests.

42.3.0 Mode of Measurements and payment :

The terrazo tiles flooring shall be measured in Sq.metre for visible area of work done. No deductions shall be made nor extra paid for any opening in the floor area upto 0.1 Sq.mt. Nothing extra shall be paid for use of cut tiles or for laying the floors at different levels in the same room or court yard. Mosaic tiles laid in floor borders and bands etc. shall be measured in the same ITEM and nothing extra shall be payable on account of these or similar bonds formed of half or multiples of half size, standard tiles or other uncut tiles. The treads of stairs and steps paved with tiles without nosing shall also be measured under this ITEM. Extra rate shall however be paid for such area where width of treads does not exceed 30 cms. The rate shall include the cost of all materials, labour involved in all the operations as described above.

The rate shall be for a unit of one **Square Metre**.

Item No..43:-

Providing 100mm thick readymade C.C. kerb of strength M-20 (size 300mm x 380mm) purchased from SMC's approved paverblock manufacturer & setting in line, level and in truly vertical position, including filling joints in C.M. 1:1 (1 part of cement : 1 part of stone dust) smooth pointing in C.M. 1:1 (1 part of cement : 1 part of coarse sand) including watering etc. complete and as directed by engineer in charge. For rounding at the edge of footpath (For fanning portion)

Item includes all materials, labour, equipment, tools, plants, watering, cleaning etc. complete.

RAW MATERIAL:**CEMENT:-**

The cement used in the manufacture of high quality precast concrete paving block shall be conforming to IS 12269 (53 grade) ordinary Portland Cement or IS 8112 (43 grade ordinary Portland cement). The minimum cement content in concrete used for making paver blocks should be 310 kg/Cu.M. And the upper limit of cement shall not be more than 425kg/Cu.M.

AGGREGATES :-

The fine and coarse aggregates shall consist of naturally occurring crushed or uncrushed materials which, apart from the grading requirements comply with IS 383-1970. The fine aggregates used shall contain a minimum of 25% natural silicon sand. Lime stone aggregates shall not be used. Aggregates shall contain no more than 3% by weight of clay and shall be free from deleterious salts and contaminants.

WATER :-

The water shall be clean and free from any deleterious matter. It shall meet the requirements stipulated in IS:456-2000.

OTHER MATERIALS :-

Any other material/ingredients used in the concrete shall confirm to latest IS specifications.

C.C.BLOCK CHARACTERISTICS:

The C.C. block should have perpendicularities after release from the mould and the same should be retained until the laying.

The concrete mix design should be followed for each batch of materials separately and automatic batching plant is to be used to achieve uniformity in strength and quality.

The C.C. block shall be manufactured in single layer only. Skilled labours should be employed for laying blocks to ensure line and level, for laying, desired shape of the surface and adequate compaction of the sand in joint.

The C.C. block must be of size 300 mm x 100 mm x 380 mm and casted in M-200 Grade with 4" (110 mm) radius counting at the top and 2 (two) nos. 12 mm keys at the other vertical face as directed by Engineer-in-charge.

When foot path meets with a junction or approach road at the end of foot path, a turning radius equal to the width of foot path should be made as pe below and as directed by Engineer-in-charge.

Sr. No.	Turning Radiua to be fix	No. of R.C.C. Block	Size of Block in rounding
1	1.00 mt.	4 Nos.	Out 370 mm x inner 340 mm x thickness 100 mm x Height 380 mm
2	1.50 mt.	6 Nos.	
3	2.00 mt.	8 Nos.	

Strength is measure of the ability of the concrete kerb unit to withstand load. It is determined under laboratory conditions using bending strength. A load is uniformly applied through a 401mm swivel parallel and rigid bearers rounded to a radius of 201mm until failure is reached. For each kerb the individual strength in MPa is determined using the second moment of area. For each of calculation, the second moment of area and distance from the centroid to the extreme tensile fibre are incorporated for the profiles specified within the standard. For other profiles please refer to individual manufacturers who will supply the relevant information. The bending strength in MPa is recovered to check compliance with BS EN, The number of the kerbs per sample will vary depending on previous production performance assessed statistically by attributes of variables.

The characteristic bending strength shall not be less than the value corresponding to the class in the table that follows. None of the individual results shall be less than the corresponding minimum bending strength in the table. Where kerbs, due to their geometry, cannot be tested according to this standard they shall be considered to be in the same class as tested kerbs provided they have at least the Bending strength classes.

Class	Marking strength (MPa)	Characteristic strength (MPa)	Minimum bending strength
1	S	3.5	2.8
2	T	5.0	4.0
3	U	6.0	4.8

WEATHERING RESISTANCE:

Is a measure of the ability of the concrete kerb to withstand weathering specific conditions exist such as frequent contact of the surface with de-icing salt under frost conditions. It can be assessed under laboratory conditions by measuring the amount of spalled material from a surface under the cycle of freezing thawing action using a de-icing salt solution, or, if non-de-icing salt is used, then the measurement of the porosity by measuring the water absorption of the kerb could be used.

ABRASION RESISTANCE:

Is a measure of the ability of the concrete kerb to withstand erosion caused by trafficking in service. It is assessed under laboratory conditions by abrading the surface of the kerb with a flow of a hard abrasive material while applying a known force. The resulting loss of material from the kerb surface is measured by determining the abraded width.

SLIP/SKID RESISTANCE:

Is a measure of the ability of the concrete kerb laid in service to withstand slipping for pedestrians and skidding for vehicles. The unpolished slip resistance value is determined using standard rubber material attached to a pendulum friction tester and tested under wet conditions. To determine the polished paver value (PPV) for all paving units BS 7932:1988 should be used. This test method measures the slip resistance of the kerb after it has been synthetically trafficked (or polished) under laboratory conditions to replicate the performance of kerb during their life under traffic conditions. For more details please contact Interpave.

Kerb and edgings are mainly used as edge restraint to paved surfaces or where changes in surface materials or levels occur. They retain any unbound construction material, e.g. laying course material, within the paved area and help support the applied loads by preventing horizontal displacement of the pavement construction. Channels may be used in these applications as well but can also be used to intercept and transport surface water. In vehicular areas kerb, edging and channel units will inevitably be over-run or suffer side impact from vehicle tyres sometime in their service life. By selecting the appropriate units and ensuring correct installation they will give long and durable service.

TOLERANCES:

Performance deviations the value for possible deviation from manufacturer's declared values are as follows.

Length:

1% to the nearest mm, with a minimum of 4mm and not exceeding 10mm.

Other dimensions:

Other faces : 3% to the nearest mm, with a minimum 3 mm not exceeding 5 mm.

Other parts : 5% to nearest mm, with a minimum of 3 mm not exceeding 10 mm.

Flatness and straightness:

Length of gauge mm	Permissible deviation mm
300	+/- 1.5
400	+/- 2.0
500	+/- 2.5
800	+/- 4.0

The difference between any two measurements of single kerb shall be \leq -5mm.

Installation of concrete kerbs, edging and channel units has five main stages:

- Preparation of support layers.
- Construction of unit foundation.
- Laying to line and level.
- Bedding of units.
- Haunching of units.

The unit foundation itself must be supported, either on an extension to the underlying pavement sub layers or, for thin pavements (e.g. edgings on pedestrian footwear), directly on an adequate subgrade. The depth of the unit and that of the pavement construction will determine on which pavement layer the kerb foundation will sit.

Products should be laid using one of the following alternative methods:

1. Units set on a race of freshly mixed concrete.
2. Units bedded on a mortar bed on top of a hardened concrete race or onto a mortar bedding on a carriageway.
3. Units bonded to the pavement surface.

LAYING OF C.C. BLOCK AS KERB :

C.C. block shall be placed in line, level and in true vertical position with 12 mm gap including filling joints in C.M. 1:1 (1 Part of cement : 1 part of stone dust) and smooth pointing in C.M. 1:1 (1 cement of cement : 1 part of stone dust) including watering.

At the Residential unit, it shall be kept 8" (200 mm) open above water table and at the commercial complex, it shall be kept 3" (75 mm) open above water table and as directed by Engineer-in-charge.

SAMPLING AND TESTING PROCEDURE FOR C.C. BLOCK:

Sample size:

- Internal : Average of minimum 3 samples per 3000 blocks - for paver block manufacturers.
- External : Minimum 3 blocks per 3000 blocks.

Sampling for testing :

Sampling for testing of C.C. kerb shall be done in accordance with Appendix-A in item no.6.

Compressive strength : testing for 28 days compressive strength shall be undertaken.

Abrasion Resistant: It is assessed under laboratory conditions by abrading the surface of the kerb with a flow of a hard abrasive material applying a known force. The resulting loss of material from the kerb surface is measured by determining the abraded width.

Bending strength : The characteristic bending strength shall be less than the value corresponding to the class. None of the individual results shall be less than the corresponding minimum bending strength.

The rate shall be for a unit of one R.M.

For ensuring quality control and workmanship, above test shall be taken at 01 (One) test per each 1000 (One thousand) Nos. of C.C. block.

The C.C. block shall be got tested at (R&B) field laboratory of GERI (R&B) or S.V.N.I.T., or Govt. approved laboratory.

Laying on pavement surface:

The units may be laid directly onto a suitable pavement surface which should extend to a width to fully support the units and any required haunching. The units are bonded to the surface using a suitable synthetic resin compound or with a modified strengthened mortar.

Jointing:

Concrete kerbs are generally laid with unfilled, close joints with a minimum joint width of 12 mm they must not be butt-jointed. Mortar joints should be filled by 1:1 (1 Cement : 1 stone dust) and enlashed with the mortar which should be freshly mixed, consisting of 1:1 (1 Cement : stone dust) where mortar joints are used, they should be properly filled and fully compacted. Joint width should be 12 mm.

Where units are laid over or adjacent to a jointed concrete pavement, suitable joints should extend through the line of the units at the joints and continue through the kerb face. When mortar joints are used, movement joints should be provided. These movement joints should be formed of 12 mm thick easily compressible material, extend through the kerb face. Mortar should be used as soon as possible and any material that has begun to set or has been mixed for more than two hours discarded.

Contractors need to plan the work to ensure risk is kept to an acceptable level. This may involve the following actions.

- Rethink the phasing of the kerb installation to maximise the number of kerbs being laid at one time.
- Lay direct from the pack rather than double handling by stringing out ahead of final laying.
- Use machinery capable of handling both packs and individual kerbs.
- Use machinery solutions for the handling of non standard kerb details such as feature kerbs, transition kerbs, drop kerbs, quadrants (cheeses) and radius kerbs.
- Ensure that workers are trained in the safe use of mechanical lifting equipment.
- Provide training in safe lifting techniques for works involved with kerb laying.
- Consider use of alternative lighter weight kerb components for certain circumstances.

Kerb laying by hand involves a serious risk of injury to those who are doing the work and therefore employers need to take action to control this risk. When taking the risk, the best solutions will be those which address all three main hazards, the weight of the kerb, the repetitive nature of the operation and poor posture during work. The hierarchy to find the best solution, the manual handling hierarchy of control measures is suggested. You should try to adopt the solution nearest the top of hierarchy first, as these will give the best level of risk control. In rare cases, where it is not possible to use any mechanical solutions, short stretches of kerb may be laid manually. Where this is necessary workers should be trained in good handling techniques. The use of lighter weight kerbs or devices that allow two people to share the lift will reduce the risk of injury.

GENERAL GUIDANCE:

It is important that work procedures are drawn up before commencement to identify any hazards. Failure to do this can result in lack of co-ordination of materials and multiple handling of product. Correct personal protective clothing should be provided.

Planning the work:

Work should be planned and coordinated to avoid unnecessary handling.

For operations where fork lift vehicles are used, kerbs should be stacked onto timber plates. Ensure that pallets are robust as the failure of a pallet could allow kerbs to fall.

Stripping and wrapping of packs should only be removed just prior to use of the kerbs.

Care should be taken when cutting bands and/or removing wrapping to avoid kerbs falling.

Accurate placement of the concrete bed will minimise shovelling operations.

Accurate preparation of the concrete bed and any excavated trench will reduce the amount of adjustment to kerbs once laid.

Where power tools are used for cutting these should be concrete cutters with diamond blades and water flow lubrication for cooling and dust suppression.

The rate should be for a **unit of One Running Meter(R.M)**.

Item No.44:-

Providing & fixing interlocking type Cement Concrete paver block of approved shape & design having 60 mm thickness (M-40) purchased from SMC's approved paverblock manufacturer only on fine sand bedding. Item includes leveling by using vibratory plates compacted machine. Item also includes all materials, Labour, equipments, tools, plants, watering, cleaning etc. complete

In general the work shall be carried out as per the standard specifications of P.W.D. / C.P.W.D / GWSSB / MoRT&H, relevant drawings and as per the instructions of Engineer-in-Charge. Work shall be carried out as per item description.

44.1 Scope

83.1.1 The work shall consist of construction of pavement using interlocking concrete paver block of approved pattern and colour at such areas shown in the drawing.

44.2 Material

44.2.1 Cement

The cement used in the manufacture of high quality precast concrete paving block shall be conforming to IS 12269 (53 grade) ordinary Portland Cement or IS 8112 (53 grade ordinary Portland cement). The minimum cement content in concrete used for making paver blocks should be 380 kg/Cu.M. And the upper limit of cement shall not be more than 425kg/Cu.M. Fly ash also can be used in the mix replacing Ordinary Portland Cement to the extent of 35 per- cent. Entire quantity of cement required to manufacture paving blocks shall be procured by contractor/manufacturer at his own cost.

44.2.2 Aggregates

The fine and coarse aggregates shall be sound and free from soft or honeycombed pieces and shall consist of naturally occurring crushed or uncrushed materials which, apart from the grading requirements comply with IS 383-1970. The fine aggregates used shall contain a minimum of 25% natural silicon sand. Lime stone aggregates shall not be used. Aggregates shall contain no more than 3% by weight of clay and shall be free from deleterious salts and contaminants. The size of Coarse aggregate shall lie between 6 mm and 12 mm and the gradation shall be in the recommended range for cement concrete mixes in general.

44.2.3 Water

The water shall be clean and free from any deleterious matter. It shall meet the requirements stipulated in IS:456- 2000.

44.2.4 Other Materials

Any other material/ingredients used in the concrete shall conform to latest IS specifications.

44.3 Composition of Block pavement

44.3.1 General:

Except for the top wearing part , the base and sub base layers shall be provided as shown in the drawing.

44.3.2 Block shape, size and Thickness:

The shape, pattern, colour and the size of interlocking concrete block shall be in accordance with the drawing or as approved by the Engineer-in-charge.

The thickness of Interlocking block shall be as per drawing or as directed by the Engineer. All blocks used in the paving shall be of the same thickness, with maximum allowable tolerance limit of ± 3 mm. Similarly, variation in length and width of blocks should be limited to ± 2 mm for ensuring uniform joint width and avoiding staggering effect.

44.3.3 Sand bedding and Jointing:

Thickness of sand bedding layer shall range within 20 to 40mm. The sand bedding layer shall be of uniform thickness. The sand bedding of varying thickness shall not be acceptable. The lower layers shall be profiled to proper level and finish. The sand used shall be free from plastic clay and shall be angular type. The sand shall not be degraded type Sand produced from lime stone shall not be allowed. The bedding sand shall consist of clean well graded sand passing through 4.75 mm sieve and suitable for concrete. The bedding should be from either a single source or blended to achieve the following grading.

In Sieve Size % Passed

9.52 mm 100

4.75 mm 95-100

2.36 80-100

1.18 60-100

[174]

600 Microns 25-60

300 Microns 10-30

150 Microns 5-15

75 Microns 0-10

Use of Single-sized, gap graded sands or sands containing excessive amount of fines or plastic fines is prohibited. The sand particles should preferably be sharp not rounded. The sand used for bedding shall be free of any deleterious soluble salts or other contaminants likely to cause efflorescence.

Joints between the blocks shall be filled by fine sand. Normally, the bottom 20 to 30mm of the joint

gets filled with bedding sand, whereas, the remaining space is filled with jointing sand by brooming it from the top. The joints are normally 2 to 4 mm wide.

Sand used for joint filling shall pass a 2.36 mm (No.8) sieve and shall be free of soluble salts or contaminants likely to cause efflorescence. The same shall comply with the following grading limits.

In Sieve Size % Passed

2.36 mm 100

1.18 mm 90-100

600 microns 60-90

300 microns 30-60

150 microns 15-30

75 microns 10-20

The Contractor shall supply a sample of the jointing sand to be used in the contract prior to delivering any such materials to site for incorporation into the works. Certificates of test results issued by a recognized testing laboratory confirming that the samples conform to the requirements of these specifications shall accompany the sample.

44.3.4 Base and sub base layers

The materials used for base construction and its thickness shall be as indicated in the drawing.

44.3.5 Edge Restrain Block and Kerbs

The paver block surfaces are to be skirted all round with kerbing using solid concrete blocks of M50 (various size) and M25 (various size) as directed by the Engineer.

The edge blocks shall be so designed that the rotation or displacement of blocks is resisted. These blocks are made of concrete of high strength. These members shall be manufactured or constructed in situ to have at least 28 day compressive strength of 50MPa & 25MPa or flexural strength of 4.95 MPa & 3.5 MPa respectively. For Flexural strength, individual variation shall not be +15% of average. As far as possible the edge blocks shall have vertical face towards the inside of blocks. The kerbing should be embedded for 100 mm depth. The concrete used for kerbing shall be cured properly for minimum 7 days.

44.4 Pavement Blocks

44.4.1 Characteristics of Blocks

The type and shape of blocks shall be as per drawing or approved by the Engineer.

The concrete pavers blocks shall have perpendicularities after release from the mould and the same shall be retained until the laying. The blocks should have uniform chamfers to facilitate easy drainage of surface run off. The paver blocks should have uniform interlocking space of 2 mm to 3 mm to ensure compacted sand filling after vibration on the paver's surface. The surface shall be of anti-skid and anti glare type. The concrete mix design should be followed for each batch of materials separately and automatic batching plant is to be used to achieve uniformity in strength and quality. The pavers shall be manufactured in single layer only. The salient mix design aspects of Pavement blocks shall be as follows:

Characteristic Requirements Remarks

Water cement ration: 0.34 to 0.38 These values are for general guidance only. The actual mix design has to be made to suit each individual requirement. Water content of the mix 5 to 7% Quantity of Cement in the mix Not less than 380 kg/cum depending on the equipment being used for block making, and not more than 425kg per cum. Fly ash can be used in the mix replacing OPC to an extent 35 per cent. Aggregate / Cement Ratio 3.1 to 6.1 The proportion of coarse aggregate in the mix is typically 40 per cent and fine aggregate

(sand) 60 per cent Strength Minimum compressive strength of a single block shall be above 25/50 MPA respectively as per item of Schedule-B Addition of pigments Inorganic pigments mostly metal oxides may be used. Organic pigments not allowed. Pigments shall be finer than cement. Pigment volume ranges between 5 to 9 percent of cement content. Addition of pigments shall not result in reduction of flexural or

compressive strength of concrete. Other additives Under special circumstances, super plasticizers at around 0.4 per cent of cement by weight may be added for early strength. With prior permission of Engineer-in-charge.

44.4.2 Paving Block Manufacturing;

The Concrete blocks shall be manufactured using appropriate mechanical equipment having suitable provisions for applying high pressure together with controlled vibration. Essentially, the manufacturing process involves compacting concrete in a steel mould clamped to a vibrating table by hydraulic pressure. The hand cast concrete blocks shall not be acceptable for use in the works. Concrete is fed into the mould from a hopper by a drawer- if a second hopper is added, a block can be made of two kinds of concrete having “backing” and “facing” surface. In the “facing” of the block the top 5 mm has greater amounts of cement and sand to make it more durable and skid resistant and extra pigment is added for the coloured face vis-à-vis the rest of the block. In the first stage of compaction, previbration is effected by running the vibrators attached to the vibratory table, the frequency generally being in the range of 50 to 100Hz. In the second stage of compaction, compression pressure is applied to tamper the heads, also fitted with vibrators for a high level of surface finish. Blocks are extruded from the mould by forcing down the temper heads, after vibrating table is disengaged from the mould. The blocks thus prepared are stacked either in single layer or multiple layers for curing depending on the plant used being single layer or multi-layer. The pavers are to be skirted all round with kerbing using solid concrete blocks.

44.4.3 Dimensional and other requirements of Paving Blocks:

Dimensional requirements of paving blocks for normal works shall be as under:

Particulars Requirements

Length of paving block Not greater than twice the mean width. Maximum length 280 mm Width 75 to 140mm with a maximum chamfer of 10mm. Range of chamfer: 3 -5 mm Minimum thickness 60 mm Sides of block Perpendicular to the top and bottom except the top edge may be chamfered. Dimensional tolerances Plan Dimension +/- 2mm Thickness +/- 3 mm Average water absorption of the block Not more than 5 per cent. For normal paving work the length of paving block shall be not greater than twice the mean width, the thickness is a minimum of 60 mm; the maximum length generally not exceeding 280 mm.

For Tactile Blocks Test Specification For M25 grade

Compressive strength Min 25 N/Sq.mm

Flexural Strength Min 3.5N/Sq.mm

Abrasion Resistance Max 1.5mm

Water Absorption Max 5.8%

44.5 Workmanship

44.5.1 General

The construction of block pavement involves preparation of sub grade, and base course layers, bedding sand and finally laying of blocks. Skilled labour should be employed for laying blocks to ensure line and level for laying, desired shape of the surface and adequate compaction of the sand in the joints The Contractor shall deploy such work force who have been trained in laying of paving blocks.

44.5.2 Preliminary works

The Contractors shall ensure that the manhole/pipeline cable trenches/circular drainage system etc. raised to driveway level using the requisite materials as directed by the Engineer. The areas of potholes/deep depressions at the isolated locations shall be filled up before laying the paver blocks. No extra pavements will be made for this purpose.

No undulation shall be allowed on the paver block after the traffic is allowed. Proper slope for drainage of water needs to be ensured by the Contractor. All necessary materials, tools, tackles are required to be arranged by the Contractor.

44.5.3 Preparation of Sub grade:

Sub grade shall be compacted using vibratory rollers in layers of 100 mm thickness as per IRC; 36-1970. The prepared sub grade shall be graded and trimmed to a tolerance of +/- 20mm of the design levels and its surface evenness shall have a tolerance within 15mm under a 3 m straight edge.

44.5.4 Base course:

The base course shall be Dry lean Concrete as indicated in drawing. The thickness of Base course layer shall be in accordance with the drawing.

The base layers shall be constructed to proper level and grade in order to maintain surface regularity of the block pavement.

The finished surface of the base course shall match with design profile of the concrete block within +/- 10mm.

44.5.5 Placing and screeding of bedding sand:

The bedding sand layer shall be from either a single source or blended to achieve the grading and specification requirements as specified in Technical Specification clause 101.3.3 Sand bedding and Jointing.

The thickness of the sand bed after compaction shall be in the range of 20-25 mm, whereas, in the loose form it can be 25 to 30mm. Bedding sand shall not be used to fill up local depressions on the surface of the base or sub base. The depressions if any shall be repaired in advance before placing sand.

Sand to be used for spreading shall be uniformly in loose condition and shall have uniform moisture content within the range of 6 to 8%. Requirement of sand for a day's work shall be prepared and stored in advance and covered with tarpaulin or polythene sheets to protect against rain, sun and variation of moisture content.

The processed sand shall be spread in loose state with the help of screed boards to the thickness specified in the drawing. The screed boards shall be provided with nails at 2-3 m apart which when dragged gives the desired thickness. The length of nail should be taken into account the surcharge to be provided in the un-compacted thickness. Alternately, the screed can be dragged on edge strips kept on both sides as guides. Asphalt paver can be employed. The sand layer than be 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. The compacted uniform thickness shall be as per drawing and within +/- 5 mm. Thickness variation shall not be used to correct irregularities in the base course surface. Local correction can be done either by removing or adding extra sand followed by levelling and compaction of the layer. Any pre-compacted sand or screeded sand left overnight shall be loosened before further laying of paving blocks take place.

Sand shall be slightly screeded in a loose condition to the predetermined depth only slightly ahead of the laying of paving unit. Any depressions in the screeded sand exceeding 5 mm shall be loosened, raked and re-screeded before laying of paving blocks.

44.5.6 Laying of interlocking Paver Blocks

Paver blocks shall be laid in herringbone laying pattern throughout the pavement. Once the laying pattern has been established, it shall continue without interruption over the entire pavement surface. Cutting of blocks, the use of infill concrete or discontinuities in laying pattern is not permitted at other than approved locations. 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 gully chambers is assured. Normally, laying should commence from the edge strip and proceed towards the inner side. As far as possible, laying should proceed in one direction only, along the entire width of the area paved.

Paver blocks shall be placed on the prepared sand bed after roughly screeding it to the nominated laying pattern, care being taken to maintain the specified bond through out the job. The first row shall be located next to an edge restraint. Specially manufactured edge paving blocks are permitted or edge blocks may be cut using a power saw, a mechanical or hydraulic guillotine, bolster or other approved cutting machine.

Paver blocks shall be placed to achieve gaps nominally 2 to 3 mm wide between adjacent paving joints. No joint shall be less 1.5 mm not more than 4 mm. Frequent use of string lines shall be used to check alignment. In this regard the "laying face" shall be checked at least every two meters as the face proceeds. Should the face become out of alignment, it must be corrected prior to initial compaction and before further laying job is proceeded with.

In each row, all full blocks shall be laid first. Closure blocks shall be cut and fitted subsequently.

Such closer blocks shall consist of not less than 25% of full blocks.

To infill spaces between 25 mm and 50 mm wide concrete having screened sand, coarse aggregate

mix shall be used. Within such mix the nominal aggregate size shall not exceed one third the smallest dimension of the infill space. For smaller spaces dry packed mortar shall be used. Except where it is necessary to correct any minor variations occurring in the laying bond, the paver blocks shall not be hammered into position. Where adjustment of paver blocks necessary care shall be taken to avoid premature compaction of the sand bedding.

44.5.7 Compaction

After the paver blocks are laid, they shall be compacted to achieve consolidation of the sand bedding and brought to design levels and profiles by not less than Two (2) passes of a suitable vibratory plate compactor.

The compactor shall be a high-frequency, low amplitude mechanical flat plate vibrator having plate area sufficient to cover a minimum of twelve paving blocks. Prior to compaction all debris shall be removed from the surface.

Compaction shall proceed as closely as possible following laying and prior to any traffic.

Compaction shall not, however, be attempted within one metre of the laying face. Compaction shall continue until lipping has been eliminated between adjoining blocks. Joints shall then be filled and recompacted as described under jointing.

All work further than one metre from the laying face shall be left fully compacted at the completion of each day's laying.

Any block that is structurally damaged prior to laying or during compaction shall be immediately removed and replaced.

Sufficient plate compactors shall be maintained at the paving site for both bedding compaction and joint filling.

44.5.8 Joint filling and final compaction

As soon as possible after compaction and in any case prior to the termination of work on that day and prior to the acceptance of vehicular traffic, sand for joint filling shall be spread over the pavement.

Sand used for Joint filling shall conform to specification requirement under clause 101.3.3. Sand bedding and Jointing: The jointing sand shall be broomed to fill the joints. Excess sand shall then be removed from the pavement surface and the jointing sand shall be compacted with not less than one (1) Pass by the plate vibrator and joints refilled with sand to full depth. This procedure shall be repeated until all joints are completely filled with sand. No traffic shall be permitted to use the pavement until all joints have been completely filled with sand and compacted.

Both the sand and paver block shall be dry when sand is spread and broomed into the joints to prevent premature setting of sand.

The difference in level (lipping) between adjacent blocks shall not exceed 3 mm with not more than 1% in any 3 m x 3 mm area exceeding 2 mm. Pavement which is deformed beyond above limits after final compaction shall be taken out and reconstructed to the satisfaction of the Engineer.

44.5.9 Edge Restraint

Edge restraints need to be sufficiently robust to withstand override by the anticipated traffic, to withstand thermal expansion and to prevent loss of the laying course material from beneath the surface course. The edge restraint should present a vertical face down to the level of the underside of the laying course.

The surface course should not be vibrated until the edge restraint, together with any bedding or concrete haunching, has gained sufficient strength. It is essential that edge restraints are adequately secured. The Edge Restrain Block shall conform to specification clause 25.3.5

44.6 Opening to Traffic:

Until all the joints are completely filled, no traffic shall be permitted over the block pavement. The contractor shall ensure that any incompletely filled joints, exposed by traffic and/or weather are promptly filled.

44.7 Surface Finish and Quality Control of Works

44.7.1 Sampling and Testing Procedures for Paver Blocks

(a) Sample Size

Internal – Average of minimum 5 samples (1 sample= 5 nos.) per 5000 blocks – for paver block manufacturers.

External – Minimum 2 samples per 10000 blocks. Average of minimum 8 blocks per site – for captioned contractors.

(b) Sampling

Sampling for testing of paver blocks shall be done as follows:

Method of Sampling; Before laying paver blocks, each designated section comprising not more than 50000 blocks, shall be divided into ten approximately equal groups. Three blocks shall be drawn from each group.

Marking and Identification; All samples shall be clearly marked at the time of sampling in such a way that the designated section of Part thereof and the consignment represented by the sample are clearly defined. The sample shall be dispatched to the approved test laboratory taking precaution to avoid damage to the paving in transit. Protect the paving from damage and contamination until they have been tested. The samples shall be stored in water at $200^{\circ}\text{C} \pm 5^{\circ}\text{C}$ for 24 hours prior to testing.

(c) Compressive Strength

Testing for compressive strength shall be undertaken in accordance with the procedure given below. The average compressive strength of the 80 mm thick paver block tested shall be 50 N/Sq mm and average compressive strength of the 60 mm thick paver blocks tested shall be 35 N/Sq mm

i) Procedure for Testing of Compressive Strength for Paver Blocks

Reference: BS 6717 Part I (1993) Specification for Paver Blocks

Testing Machine: The testing machines shall be of suitable capacity for the test and capable of applying the load at the rate specified. It shall comply; as regards repeatability and accuracy with the requirements of relevant IS specification.

Procedure – The sample specimens shall be tested in wet condition after being stored at least 24 hours, in water maintained at a temperature of $200^{\circ}\text{C} \pm 5^{\circ}\text{C}$ before the specimens are submerged in water, the necessary area shall be determined.

The plates of the testing machine shall be wiped clean and any loose grit or other material removed from the

contact faces of the specimen. Plywood nominally 4 mm thick, shall be used as packing between the upper and lower faces of the specimen and the machine plates, and these boards shall be larger than the specimen

by a margin of at least 5 mm at all points. Fresh packing shall be used for each specimen tested. The specimen shall be placed in the machine with the wearing surface in a horizontal plane and in such a way that the axes of the specimen are aligned with those of the machines plates. The load shall be applied without shock and increased continuously at the rate of approximately 15 N/sqmm per minute until no greater load can be sustained. The maximum load applied to the specimen shall be recorded.

Calculation of Corrected Strength: The compressive strength of each block specimen shall be calculated by dividing the maximum load by full cross section area and multiplying by an appropriate factors.

Thickness and Chamfer Correction Factors.

For Compressive Strength Work Size Thickness

Work Size Thickness in mm

Correction Factors

Plain Block Chamfered Block

60

1.00 1.06

80

1.12 1.18

100

1.18 1.24

Compressive Strength Calculation: The average corrected compressive strength for the designed block section shall be calculated.

(d) Water Absorption

Testing for water absorption shall be in accordance with IS 2185:1979: Part I (Specifications for concrete masonry blocks) as below:

Method for the Determination of Water Absorption

The test specimens shall be completely immersed in water at room temperature for 24 hours.

The specimens shall then be weighed, while suspended by a metal wire and completely submerged in water.

They shall be removed from the water and allowed to drain for one minute

[180]

Visible surfaces water being removed with a damp cloth and immediately weighed

Subsequent to saturation, all specimens shall be dried in a ventilated oven at 100 to 115°C for not less than 24 hours and until two successive weightings at intervals of 2 hours show an increment of loss not greater, than 0.2 percent of the last previously determined mass of the specimen.

Calculate the absorption as follows:

A-B

Absorption, kg/m³ = ----- X 1000

B-C

A-B

Absorption percent = ----- X 1000

B

Where

A = wet mass of unit in kg

B = dry mass of unit in kg. And

C = suspended immersed mass of unit in kg.

44.8.0 Mode of Measurements & Payment

44.8.1 Interlocking concrete paving block pavement shall be measured in square meter based on net plan areas for specified thickness and colour combination as per engineer-in-charge.

44.8.2 Sub grade and base courses shall be measured according to respective applicable clause of Technical specification.

44.8.3 The contract unit rate for different thicknesses and colour combinations of interlocking paving block pavement shall be payment in full for carrying out the required operations including full compensation for all labour, materials, equipment, mixing of concrete, casting of blocks, curing, transporting, storing, laying, compacting, and quality control testing and incidentals to complete the work as per specification.

44.8.4 The rate should be for a unit of **Square Metre**.

Item No.45 :-

Removing and resetting Existing paver block, including all watering leveling, cleaning, labour & Equipments chagres etc. complete as per details in tender specification & as directed by engineer in charge.

45.1. LAYING OF INTERLOCKING PAVER BLOCKS :-

Paver blocks shall be laid in herringbone laying pattern throughout the pavement. Once the laying pattern has been established, it shall continue without interruption over the entire pavement surface. Cutting of blocks, the use of infill concrete or discontinuities in laying pattern is not be permitted in other than approved locations.

Paver blocks shall be placed on the uncompacted screeded sand bed to the nominated laying pattern, care being taken to maintain the specified bond through out the job. The first row shall be located next to an edge restraint. Specially manufactured edge paving blocks are permitted or edge blocks may be cut using a power saw, a mechanical or hydraulic guillotine, bolster or other approved cutting machine. Paver blocks shall be placed to achieve gaps nominally 2 to 3 mm wide between adjacent paving joints. No joint shall be less 1.5 mm not more than 4 mm. Frequent use of string lines shall be used to check alignment. In this regard the "laying face" shall be checked at least every two meters as the face

proceeds. Should the face become out of alignment, it must be corrected prior to initial compaction and before further laying job is proceeded with.

In each row, all full blocks shall be laid first. Closure blocks shall be cut and fitted subsequently. Such closer blocks shall consist of not less than 25% of a full blocks.

To infill spaces between 25 mm and 50 mm wide concrete having screened sand, coarse aggregate mix shall be used. Within such mix the nominal aggregate size shall not exceed one third the smallest dimension of the infill space. For smaller spaces dry packed mortar shall be used.

Except where it is necessary to correct any minor variations occurring in the laying bond, the paver blocks shall not be hammered into position. Where adjustment of paver blocks necessary care shall be taken to avoid premature compaction of the sand bedding.

45.2. INITIAL COMPACTION :-

After laying the paver blocks, they shall be compacted to achieve consolidation of the sand bedding and brought to design levels and profiles by not less than Two (2) passes of a suitable plate compactor.

The compactor shall be a high-frequency, low amplitude mechanical flat plate vibrator having plate area sufficient to cover a minimum of twelve paving blocks. Prior to compaction all debris shall be removed from the surface.

Compaction shall proceed as closely as possible following laying and prior to any traffic. Compaction shall not, however, be attempted within one metre of the laying face. Compaction shall continue until lipping has been eliminated between adjoining blocks. Joints shall then be filled and recompactd as described in Cl. 3.5.

All work further than one metre from the laying face shall be left fully compacted at the completion of each day's laying.

Any blocks that are structurally damaged prior to or during compaction shall be immediately removed and replaced.

Sufficient plate compactors shall be maintained at the paving site for both bedding compaction and joint filling.

45.3. JOINT FILLING AND FINAL COMPACTION :-

As soon as possible after compaction and in any case prior to the termination of work on that day and prior to the acceptance of vehicular traffic, sand for joint filling shall be spread over the pavement. Joint sand shall pass a 2.36 mm (No.8) sieve and shall be free of soluble salts or contaminants likely to cause efflorescence. The same shall comply with the following grading limits.

In Sieve Size	% Passed
9.52 mm	100
4.75 mm	95-100
2.36	80-100
1.18	60-100
600 Microns	25-60
300 Microns	10-30
150 Microns	5-15
75 Microns	0-10

The Contractor shall supply a sample of the jointing sand to be used in the contract prior to delivering any such materials to site for incorporation into the works. Certificates of test results issued by a recognized testing laboratory confirming that the samples conform to the requirements of this specifications shall accompany the sample.

The jointing sand shall be broomed to fill the joints. Excess sand shall then be removed from the pavement surface and the jointing sand shall be compacted with not less than one (1) Pass by the plate vibrator and joints refilled with sand to full depth.

This procedure shall be repeated until all joints are completed filled with sand. No traffic shall be permitted to use the pavement until all joints have been completely filled with sand and compacted.

Both the sand and paver block shall be dry when sand is spread and broomed into the joints to prevent premature setting of sand.

The difference in level (lipping) between adjacent blocks shall not exceed 3 mm with not more than 1% in any 3 m x 3 m area exceeding 2 mm. Pavement which is deformed beyond above limits after final compaction shall be taken out and reconstructed to the satisfaction of the Engineer.

45.4. The rate should be for a unit of **Square Metre**.

Item No.46 :-

Removing & resetting existing readymade c.c. kerb stone of required size & thickness in line .level and in truly vertical position including filling joints in C.M. 1:1 (1 part of cement : 1 part of stone dust) smooth pointing in C.M. 1:1 (1 part of cement : 1 part of coarse sand) including watering etc. complete and as directed by engineer in charge.

46.1 LAYING OF C.C. BLOCK AS KERB :

C.C. block shall be placed in line, level and in truly vertical position with 12 mm gap including filling joints in C.M. 1:1 (1 Part of cement : 1 part of stone dust) and smooth pointing in C.M. 1:1 (1 cement of cement : 1 part of stone dust) including watering.

At the Residential units, it shall be kept 8" (200 mm) open above water table and at the commercial complex, it shall be kept 3" (75 mm) open above water table and as directed by Engineer-in-charge.

46.2 SAMPLING AND TESTING PROCEDURE FOR C.C. BLOCK:

Sample size:

- Internal : Average of minimum 3 samples per 3000 blocks - for paver block manufacturers.
- External : Minimum 3 blocks per 3000 blocks.

Sampling for testing :

Sampling for testing of C.C. kerb shall be done in accordance with Appendix-A in .6.

Compressive strength : testing for 28 days compressive strength shall be undertaken.

Abrasion Resistant: It is assessed under laboratory conditions by abrading the surface of the kerb with a flow of a hard abrasive material applying a know force. The resulting loss of material from the kerb surface is measured by determining the abraded width.

Bending strength : The characteristics bending strength shall be less than the value corresponding to the class. None of the individual results shall be less than the corresponding minimum bending strength.

The rate shall be for a unit of one R.M.

For ensuring quality control and workmanship, above test shall be taken at 01 (One) test per each 1000 (One thousand) Nos. of C.C. block.

The C.C. block shall be got tested at (R&B) field laboratory of GERI (R&B) or S.V.N.I.T., or Govt. approved laboratory.

46.3 Laying on pavement surface:

The units may be laid directly onto a suitable pavement surface which should extend to a width to fully support the units and any required haunching. The units are bonded to the surface using a suitable synthetic resin compound or with a modified strengthened mortar.

46.4 Jointing:

Concrete kerbs are generally laid with unfilled, close joints with a minimum joint width of 12 mm they must not a butt-jointed. Mortar joints should be filled by 1:1 (1 Cement : 1 stone dust) and enlised with the mortar which should be freshly mixed, insisting or 1:1 (1 Cement : stone dust) where mortar joints are used, they should be completely filled and fully compacted. Joints width should be 12 mm.

Where units are laid over or adjacent to a jointed concrete pavement, suitable joints should extend through the line of the units at the joints and continue through the kerb race. When mortar joints are used, movement joints should be provided. These movement joints should be formed of 12 mm thick easily compressible material, extend through the kerb race. Mortar should be used as soon as possible and any material that has begun to set or has been mixed for more than two hours discarded.

Contractors need to plain the work to ensure risk is kept to an acceptable level. This may involve the following actions.

- Rethink the phasing of the kerb installation to maximise the number of kerbs being laid at one time.
- Lay direct from the pack rather than double handling by stringing out ahead of final laying.
- Use machinery capable of handling both packs and individual kerbs.
- Use machinery solutions for the handling of non standard kerb details such as feature kerbs, transition kerbs, drop kerbs, quadrants (cheeses) and radius kerbs.
- Ensure that workers are trained in the safe use of mechanical lifting equipment.
- Provide training in safe lifting techniques for works involved with kerb laying.
- Consider use of alternative lightweight kerb components for certain circumstances.

Kerb laying by hand involves a serious risk of injury to those who are doing the work and therefore employers need to take action to control this risk. When taking the risk, the best solutions will be those which address all three main hazards, the weight of the kerb, the repetitive nature of the operation and poor posture during work. The help find the best solution, the manual handling hierarchy of control measures is suggested. You should try to adopt the solution nearest the top of hierarchy first, as these will give the best level of risk control. In rare cases, where it is not possible to use any mechanical solutions, short stretches of kerb may be laid manually. Where this is necessary workers should be trained in good handling techniques. The use of lighter weight kerbs or devices that allow two people to share the lift will reduce the risk of injury.

46.5 GENERAL GUIDANCE:

It is important that work procedures are drawn up before commencement to identify any hazards. Failure to do this can result in lack of co-ordination of materials and multiple handling of product. Correct personal protective clothing should be provided.

46.6 Planning the work:

Work should be planned and coordinated to avoid unnecessary handling.

For operations where fork lift vehicles are used, kerbs should be stacked onto timber plaes. Ensure that pallets are robust as the failure of a pallet could allow kerbs to fall.

Stripping and wrapping of packs should only be removing just prior to use of the kerbs.

Care should be taken when cutting bands and/or removing wrapping to avoid kerbs falling.

Accurate placement of the concrete bed will minimise shovelling operations.

Accurate preparation of the concrete bed and any excavated trench will reduce the amount of adjustment to kerbs once laid.

Where power tools are used for cutting these should be concrete cutters with diamond blades and water flow lubrication for cooling and dust suppression.

46.7 The rate should be for a unit of **Running Metre**.

Item No. - 47

Providing & Fixing U-PVC pipe (SWR) confirming to IS no. 13592 (Type "B") of Prince/Supreme/Jain/Astral/Tulsi/Finolex make for soil and waste discharge system at all floor levels incl. All fixtures like bends, tees, shoe etc. jointed with resin of approved brand & manufacture etc. comp. (M.R.)

(a) 75 mm dia

(b) 110 mm dia

47.0 MATERIALS :

The specified dia. P.V.C. spigot and socket soil or waste pipe shall conform M-68-A.

47.1 WORKMANSHIP :

47.1.0 The P.V.C. spigot and Socket soil or waster pipe shall be joined as per following procedure.

47.1.1 Cut the P.V.C. pipe with a fine to the saw to the required length pipe should be cut square.

47.1.2 Chamfer the edge of the pipe to be inserted at an angle of about 15 to about 1/3 rd. the wall thickness, using a coarse file.

47.1.3 Make sure the spigot and socket are the roughly clean and dry.

47.1.4 Insert the pipe into the socket without the seal ring and mark along the pipe, when it is fully inserted.

47.1.5 Fix the rubber ring into the groove without twisting it.

47.1.6 Apply jointing lubricant to the chamfered end of the pipe, upto the make made on spigot or to the socket end of the fitting.

47.1.7 Push the pipe firmly into the socket till the gap between the mark on the spigot and socket is about 10mm to allow for thermal expansion.

47.1.8 The pipe clips should be spaced at intervals of no more then ten times the outside diameter of pipes for horizontal runs & for vertical lines are spaced at intervals of one meter to a maximum of two meters according to pipe diameter.

47.1.9 All entry to main stacks should be protected with minimum 50mm water seal trap. Wherever is there mixing of soil & waste lines.

47.1.10 Smoke just should be avoided and test plug/ socket plug should be used for testing the lines.

47.1.11 All soil pipes shall be carried up above the roof and shall have a wire balloon guard or a cowl.

47.1.12 The ventilation pipe or shaft shall be carried out to a height of at least one metre above the outer covering of the roof of the building or in the case of windows in a gable wall or a dormer two meters above the top of the windows. In case of flat roof to which access for use is provided, it shall be carried out upto a height of atleast one meter above the parapet or two meters measured vertically from the top of any windows or opening which may exist upto a horizontal distance of five meters from the vent pipe into such building and in no case shall be carried out to a height less than three meters.

47.1.13 Where ventilating pipes are carried in pipe shafts, the shafts, shall be of a minimum size of one meter. If the shafts are also used to give light and air to rooms, the ventilating pipes must be carried out to a horizontal distance at roof level not less than five meter from the site of the shaft.

47.1.14 The connection between the main pipe and branch pipes shall be made by using branches and bends with access doors for cleaning.

47.1.15 The waste from lavatories, kitchens basins, sinks, baths and other floor traps shall be separately connected to respective stacks of upper floors. The waste stack of lavatories shall be connected directly to main hole while the waste stack of other shall be separately discharged over gully trap.

47.2 MODE OF MEASUREMENTS & PAYMENT :

47.2.1 The length of pipe shall be measured including all fittings along its length in running meters correct to a centimetre. No allowance shall be made for the portion of pipe length entered in the sockets of the adjacent pipe or fittings.

47.2.2 The rate includes all labour and materials, tool and plant etc. required for satisfactory completion of this item.

47.2.3 The rate shall be for a unit of **Running Metre.**

Item No. - 48

(B) Providing and laying integral cement based water proofing treatment including preparation of surface as required for treatment of roofs, balconies, terraces etc. consisting of following operations.

(a) Applying and grouting a slurry coat of neat cement using 2.75 kg/sqm of cement admixed with proprietary water proofing compound conforming to IS:2645 over the R.C.C. slab including cleaning the surface before treatment.

(b) Laying cement concrete using broken bricks/brick bats 25 mm to 100 mm size with 50% of cement mortar 1:5 (1 Cement : 5 Coarse sand) admixed with proprietary water proofing compound conforming to IS:2645, brick bats is finally covered by jointless cement plaster 20mm th. in C.M. 1:4 added with special water proofing compound conforming to IS:2645 & top smooth finished with trowel with false chequered marking of 300 mm.size. The treatment is carried along the vertical surface of the parapet & other adjoining wall up to height of about 300 mm in a shape of quarter round vata Incl. curing etc. Comp. With average thickness of 120 mm and minimum thickness at khurra as 65 mm.

(c) The whole terrace so finished shall be flooded with water for a minimum period of two weeks for curing and for final test. All above operations to be down in order and as directed and specified by the engineer-in-charge. With average thickness of 120 mm and minimum thickness at khurra as 65 mm. (Cement consumption 0.511 Bags / S.M.)

48.1 Details specification same as per the Item and as per instructions by Engineer-in-charge.

48.2 The rate shall be for a unit of **Square Metre**.

Item No- 49

Providing and laying broken china mosaic flooring for terrace using 12mm to 20mm broken pieces of glazed tiles to be laid over cement mortar 1:3 to plain or slope and to be tempered to bring mortar cream out upto surface using white cement including rounding off junctions and extending them upto 15 cm along the wall clearing with water and oxalic acid etc. as directed.

49.1 Broken 12mm thick white glazed China mosaic flooring for plain and curved surfaces on terraces, floors, balconies, roofs, wall cladding, dado etc comprising of 12mm to 20mm size broken pieces of ceramic/ glazed tiles, laid over cement mortar 1:3 bedding on plain or sloped surfaces. The flooring shall be tamped to bring the cement mortar cream upto the surface, including rounding of junctions and extending them to dado along the parapet/ wall. The rate shall include bands, if different color is used, any pattern or design as per drawing and direction, finishing with white cement with joints as small as possible and the tiles placed in radial manner, curing, cleaning with water and oxalic acid, etc complete at all levels, as directed and to satisfaction to the engineer in charge. Rate shall include all tools, tackles, machines, necessary scaffolding, adding of waterproofing material as recommended in the bedding mortar by the Engineer in charge. Exposed edges shall be made in line and level. Rates are including of Brickbat work for maintaining the slope. The item includes all bedding material for obtaining desired slopes and chemical water proofing of Sika, STP or equivalent. The edge to be properly made inline and level and necessary full tile of 100mm width be used to make such edge.

49.2 Details specification same as per the Item and as per instructions by Engineer-in-charge.

49.3 The rate shall be for a unit of **Square Metre**.

Item No.50:-

Providing & Applying specifically developed to from flexible water proof seals in cracked reinforced concrete with infiltration of water (sealing pipe work which passes through concrete)-mode of measurement up to 6mm thick in liner mm.

Procces: Removing all dust & clean upper surface of pipe & inner surface in concrete hole apply sweet chemical on all periphery & both sides making same that the boundary formed is at last 5cm, cut off the tip of the nozzle according to the size of bead required, and pierce the membrane under the nozzle. insert the cartridge in an extrusion gun and apply the product directly into concrete or element to be sealed

50.1 Details specification same as per the Item.

50.2 The work shall be carried out as per instructions of Engineer-in-charge.

50.3 The rate shall be per **Number**.

Item No.51 :-

Providing corrugated G.I. Sheets of class-3 roofing fixed with galvanized iron J or L Hooks, Bolts and nuts 8mm diameter with bitumen and G.I. limpet washer or G.I. limpet washer. filled with white lead complete excluding the cost of purlins, Rafters and Trusses. (1) 0.63 mm thick sheet. (Tata / Jindal or equivalent)

Materials :

Corrugated G.I. sheets shall conform to M-23.

51.0. Workmanship

51.1. Spacing of purlins : One purline shall be provided at the ridge and one at the eaves. The spacing of other purlins for 0.8 mm. thick G.I. sheets shall not exceed 1.80 meters. The purline shall coincide with the centre line of the end lap. The ridge purlins shall be placed in such a way that the ridges can be fixed properly. The portion overhanging the wall support shall not be more than one fourth of the 'spacing of purlins.

51.2. The top surfaces of the purlins shall be painted before the sheets are fixed over them. Embedded portions of purlins shall be finished with two coats of coal-tar.

51.3. Laying of sheets :

51.3.1. The sheets shall be laid in purlins to a true plane with the line of corrugations truly parallel or normal to the sides of area to be covered. The sheets shall not generally be built into gables and parapets. They shall be bent up along their side edges close to the wall, and the junction shall be protected by suitable flashing or by projecting drip course.

51.3.2 The laps at end shall be provided 150 mm. minimum for roof slopes 1 in 2 (1 vertical : two horizontal) and steeper but 200 mm. shall be provided for flatter slopes than those above. The side lap shall be provided two ridges of corrugations at each side.

51.3.3. The sheets shall be cut to the dimensions or the shape of the roof either along their lengths or their width or in slant across the line of corrugations at hips and valleys. The sheets shall be cut carefully with a straight edge and chisel to give straight finish. The sheets shall be laid such that the laps are turned away from the usual direction of local heavy rain.

51.3.4. Fixing of sheets :

51.3.4.1. Sheets shall be fixed to the purlins or other roof members such as hips or valley rafter etc. with 1J' or 1L' galvanized hook bolts, and galvanized nuts 8 mm. dia. with bitumen limpet washers and G.I. washers. Limpet washers with white lead shall be used. Length of hook bolt shall be varied to suit the site requirement. Bolts shall be sufficiently long so that after fixing the project above the top of their nuts by not less than 12 mm the grip of 1J' or 1L' hook bolts on the sides of purlins shall not be less than 25 mm. There shall be minimum of three hooks bolts placed at the ridge of corrugations in each sheet in every purlin and their spacing shall not exceed 300 mm. Coach screw shall not be used for fixing the sheets to purlin, where the slopes of roof are not less than 2.1/2 degree (1 vertical and 2.1/2 horizontal). Sheets shall be jointed together at the side laps by galvanized iron bolts and nuts 25 mm. x 6 mm. size each bolt with a bitumen and G.I. limpet washer filled with white lead. Where the overlaps at the sides extend to two corrugations, these bolts shall be placed zigzag over lapping corrugations, so that the ends of the overlapping sheets are drawn tightly towards each other. The spacing of same bolts shall not exceed 600 mm. along each of the staggered rows.

51.3.5. Holes for all bolts shall be drilled and not punched in the ridges of the corrugations from the underside, while the sheets are on the ground. The holes in the sheets shall be at least 50 mm. from the edge. ' Sheets drilled wrongly shall be rejected. The holes in the washers shall be of the exact diameter of the hook bolts or the beam bolts. The nuts shall be tightened from above to give a leak-proof roof

51.3.6 Mode of measurements and payment

The measurements of the C.G.L sheet roof shall be taken for finished work in superficial area in general plane (not girthed on the roof). The laps between the C.G.I. Sheets both at their ends and along the side edges shall not be measured. The overlaps of C.G.I, sheets over the valley piece and their under lap under the ridge, hip and flashing piece shall be included in the measurements.

51.4 The rate shall be for a unit of one **Square Metre**.

Item No.52 :-

Providing & Fixing Polycarbonate sheet roofing with surface of the sheet is coated with an anti-UV Co-extrusion layer having good weather resistance, it can maintain its optical properties and mechanical performance for a long time. Fastening is usually done by screws. , The fastening screws should be inserted about 500 mm apart and 300mm apart Along the supporting internal purlin and edge pulin.All fixing holes with diameter at least 2 mm larger than screw must be predrilled into each screw location. The screws should be 6mm diameter with length according to sheet thickness and corrosion resistant, with at least heavy duty hot dripped galvanized or stainless steel. Excluding the cost of purlins rafter and trusses.

(a) 1.5 mm thick Solid Sheet

(b) 2 mm thick Solid Sheet

52.1 The work shall be carried out as per instructions of Engineer-in-charge.

52.2 The rate shall be per **Square Metre**.

Item No. - 53

Providing and fixing stainless steel (Grade 304) railing made of Hollow tubes, channels, plates etc., including welding, grinding, buffing, polishing and making curvature (wherever required) and fitting the same with necessary stainless steel nuts and bolts complete, i/c fixing the railing with necessary accessories & stainless steel dash fasteners , stainless steel bolts etc., of required size, on the top of the floor or the side of waist slab with suitable arrangement as per approval of Engineer-incharge, (for payment purpose only weight of stainless steel members shall be considered excluding fixing accessories such as nuts, bolts, fasteners etc.).

53.1. Materials & Workmanship

The relevant specifications be followed except that the work shall be for Stainless Steel of Hollow Tubes, Channel, plates, SS Nuts, Rivets, Bolts Etc.

53.2. Workmanship

The steel sections/hollow tubes as specified or required, shall be cut, square and to correct lengths. The cut ends exposed to view shall be finished smooth. No two pieces shall be welded or otherwise jointed to make up the required length of member. All straightening and shaping to form shall be done by application of pressure and not by hammering. Any bending or cutting shall be carried out in such a manner as not to impair the strength of the metal. Edges should not be sharp and not exposed in all the manners. All operations shall be done in cold state unless otherwise directed/permitted.

Details specification same as per item description and as directed by Engineer-in-charge.

The rate shall be for a unit of KG (Kilogram).

Item No.54:-

Repairing ,erecting and placing in position Structural Stainless steel pipe section for making the structural support railings, Stainless steel flats, seats , framing, etc. including cutting , making holes, argon arc welding and bolting wherever necessary including accessories fixing hardware. All welded joints to be grinded and cleaned and finished as satin finish including buffing. Completed as directed. All SS material to undergo spectro analysis confirming to 304 L grade. (Only actual finished measurements

will be paid for ;physically measurable after the completion of the work). All pipes to be nonmagnetic. Stainless steel to have minimum of 8% Nickel. (Jindal/Chowksi/ Ratnamani/Asian make). Any junction with M.S. plate and stiffners, etc to be done with argon arc welding. Satin finish sample to be approved by the consultant. All grinding and polishing to be done with uni-directional finishes where polishing must be carried out in the direction of pattern of the rest of the satin finish surfaces. Pipe to pipe joining to be done with a spigot. Contractor shall submit report of testing of welded sections for 304L grade stainless steel.

54.1 Details specification same as per the Item and as per instructions by Engineer-in-charge.

54.2 Measurements:

All fabricated pipes, cables, sheets, etc. shall be calculated on the basis standard net weight /length according to I.S.I. code. Net weight of clean, brackets, packing pieces, rivets, bolts distance pieces, separators, gussets holding down bolts, fish plates, etc shall be added to the respective items. No deduction shall be made for holes, bolts or rivets and waste involved in cutting or nothing ends of sections or intermediate points for making connections. Weights for the bolts and nuts shall be measured but the weight of the weld shall not be considered. Rates shall be inclusive of erection equipments, tools, tackles, machinery, argon welding, buffing and satin polishing etc **equipments**, scaffolding and labour. Rates shall be also inclusive of argon welding of SS members with M.S. members and finishing the surface properly to have a even and clean look.

The rate shall be for a unit of KG (Kilogram).

ITEM NO.55 :-

Providing and Fixing Hollow steel Sections Framed Work including Cutting, Hoisting, Welding & Fixing in position Purlin, Main Chord etc. as per Engineer- in-charge. TATA / JINDAL / ASIAN Make

In general the work shall be carried out as per the standard specifications of P.W.D. / C.P.W.D./ GWSSB relevant drawings and as per the instructions of Engineer in Charge. Work shall be carried out as per item description.

- **Structural Holsslow steel Sections**

1. Hot finished welded (HFW) type, or
2. Hot finished seamless (HFS) type, or
3. Electric resistance or induction butt welded (ERW), having carbon content less than 0.03 percent, yield stress of 21.5 kg/mm² (YST 210) type Conforming to the requirement of IS 1161. The

Hollow steel Sections when analysed in accordance with the

method specified in IS 228 shall show not more than 0.06 percent sulphur, and not more than 0.06 per cent phosphorous.

Hollow steel Sections shall be designated by their into in dimensions of hollow steel section. These shall be light, medium or heavy as specified depending upon the wall thickness. The standard size and weights of Hollow steel section shall be as per relevant IS Ccode. Hollow sections shall be as per IS 4923.

Hollow steel Sections shall be clean finished and reasonably free from scale. They shall be free from cracks, surface flaws, laminations and other defects. The ends shall be cut clean and square with axis of tube, unless otherwise specified.

- **Minimum Thickness of Metals**

Thickness of **Hollow steel Sections** used for construction exposed to weather shall be not less than 4 mm and for construction not exposed to weather it shall be not less than 3.2 mm where structures are not readily accessible for maintenance, the minimum thickness shall be 5 mm.

- **Fabrication**

The component parts of the structure shall be assembled in such a manner that they are neither twisted nor otherwise damaged and be so prepared that the specified cambers, if any, are, maintained. The **Hollow steel Sections** work shall be painted with one coat of approved steel primer after fabrication. All fabrication and welding is to be done in an approved workshop. The joint details shall be generally as per S.P-38 of B.I.S publication.

Straightening: All material before being assembled shall be straightened, if necessary, unless required to be of curvilinear form and shall be free from twist. This work also include curvature structure. It should be precisely fabricated In terms of rendering, curvature & length as per instruction of Engineer-in-charge and as per Drawing. Curvature should be fabricated using bending Equipment.

Bolting : Washers shall be specially shaped where necessary, or other means, used to give the nuts and the heads of bolts a satisfactory bearing.

In all cases, where the full area of the bolts is to be developed, the threaded portion of the bolt shall not be within the thickness of the parts bolted together and washers of appropriate thickness shall be provided to allow the nuts to be completely tightened.

Welding : Where welding is adopted, it shall be as per IS 816.

Caps and Bases for Columns : The ends of all the tubes, for columns transmitting loads through the ends, should be true and square to the axis of the tubes and should be provided with a cap or base accurately fitted to the end of the tube and screwed, welded or shrunk on. The cap or base plate should be true and square to the axis of the column.

Sealing of Tubes : When the end of a **Hollow steel Sections** is not automatically sealed by virtue of its connection be welding to another member the end shall be properly and completely sealed. Before sealing, the inside of the **Hollow steel Sections** should be dry and free from loose scale.

Flatened Ends : In **Hollow steel Sections** construction the ends of **Hollow steel Sections** may be flattened or otherwise formed to provide for welded. Riveted or bolted connections provide that the methods adopted for such flattening do not injure the material. The change of sections shall be gradual.

- **Hoisting and Erection**

Hollow stell seccion trusses shall be hoisted and erected in position carefully, without damage to themselves, other structure, equipment and injury to workman.

The method of hoisting and erection proposed to be adopted shall be got approved from the Engineer-in-charge. The contractor shall however be fully responsible, for the work being carried out in a safe and proper manner without unduly stressing the various members. Proper equipment such as derricks, lifting tackles, winches, ropes etc. shall be used.

Relevant specification of DTS NO.42E shall be follow wherever find necessary. Work shall be strictky done as per drawing and as per instruction by Engineer-in-charge.

- **Measurements**

The work as fixed in place shall be measured in running metres correct to a centimeter on their weights calculated on the basis of standard tables correct to the nearest kilogram unless otherwise specified.

Weight of cleats, brackets, packing pieces bolts nuts, washers distance pieces separators diapharam gussests (taking overall square dimensions) fish plates, etc. shall be added to the weight of respective items unless otherwise specified. No deduction shall be made for skew cuts.

- **Rate**

The rate shall include the cost of labour and materials involved in all the operations described above including application of one coat of approved steel primer, i.e. red oxide zinc chrome primer conforming to IS 2074.

Rate also include NDT Test for Welding.

The rate shall be for a unit of one **KG (Kilogram)**.

Item No.56 :-

Steel work welded in built up sections, framed work including cutting, hoisting, fixing in position and applying a priming coat of red lead paint (A) in beams & joists channels angles, tees, flats with connection plates or angle cleats as in main & cross beams, hip & trussed purlins connected to common rafters & the like. (B) For work like chain link fencing, above compound wall etc. (C) in trusses & trussed purlins upto 25m.Span & 15m. Overall height

LAYING OUT :

The steel structures, as shown in the drawings or as per directions of the Engineer-in-charge, shall be laid out on a level platform to full scale and to full size in parts. A steel type shall be used for measurements to ensure maximum accuracy.

Wooden templates 12 mm to 19 mm thick or steel templates shall be made to correspond to each connecting gusset plate and rivet holes shall be accurately marked on them and drilled. The templates shall be laid on the steel members and holes for rivetting and bolting marked on them. The ends of the steel members shall also be marked for cutting. The base of steel columns and the position of anchor bolts shall be carefully set out.

FABRICATION :

The steel sections as specified shall be straightened and cut square and accurately to correct lengths. The cut ends exposed to view shall be finished smooth. No. two pieces shall be welded or otherwise jointed to make up required length of a member except as indicated in the drawing or otherwise specifically permitted by the Engineer - in - charge. All straightening and shoring to form shall be done by application of pressure and not by hammering. Any bending or cutting shall be carried out in cold condition (unless otherwise directed) in such a manner as not to impair the strength of the metal.

All stiffeners shall be formed by pressure, and where practicable, the metal shall not be cut and welded in making these. In major works or where so specified, shop drawings giving complete details and information for the fabrication of the component parts of the structure, including the locating, type, size, length and details of rivets, bolts or welds shall be prepared in advance of the actual fabrication and approved by the Engineer-in-charge. The drawing shall indicate the shop and field rivets, bolts and welds. The steel members shall be distinctly marked or stencilled with paint with the identification marks as given in the shop drawings.

The bars shall be thickened at the ends so as to provide for screwed threads and gradually tapered off to meet their normal section.

Great accuracy shall be observed in the fabrication of various members. Do that these can be assembled without being unduly packed strained or forced into position and when built-up shall be true and free from twists, buckles or open joints.

Before making holes in individual members, for fabrication the steel work intended to be riveted or bolted to girth shall be assembled or clamped properly and tightly so as to ensure close abutting or lapping of the surface of the different members. All stiffeners shall be tightly both at top and bottom without being drawn or caulked. The abutting joints shall be cut off dressed true and straight and fitted close together,

We splice plates and fillers under stiffeners shall be cut to fit within 3 mm of flange angles. We plates or girders which have no cover plates shall have their ends flush with the top of angles forming the flanges unless otherwise required. The we plates, when spliced shall have clearance of not more than 6 mm.

The erection clearance for cleated ends of members connecting steel to steel preferably be not greater than 1.5 mm. The erection clearance at the ends of beams without web cleats shall not be more than 3 mm. at each end but where for practical reasons, greater clearance is necessary, suitably designed seating shall be provided.

Pins and rollers shall be accurately turned to gauge. These shall be straight and smooth and free from flaws. The roller bearing shall be provided with adequate arrangement for holding the girders or truss resting on it, from lateral displacement.

Expansion bed plates shall be planed true and smooth. The planing of bed plates shall be done in the direction of the movement of the girder or truss resting on it.

Column splices and butt joints of struts and impression members depending on contract for trees transmission shall be accurately machined and closebutted over the whole section. In column caps and bases, the ends of shafts together with the attached gussets, angles, channels etc. after riveting together shall be accurately machined so that the parts connected but against each other over the entire surface of contact. Connecting angles or channels shall be fabricated and placed in position with great accuracy so that they are not unduly reduced in thickness by machining.

The ends of all bearing stiffeners shall be machined or ground to fit tightly both at the top and bottom.

All holes shall generally be drilled to the required size and at the required position. Sub-punching shall be permitted, provided it is done 3 mm. less in diameter and reamed thereafter to the required size.

Holes for rivets and black bolts shall be large by 0.4 to 6 mm. as shown in appendix-I under column "Coarse" than the nominal diameter of the rivets or black bolts depending upon the dia of rivets. Holes for turned and fitted bolts shall be drilled or reamed large by 0.2 to 3 mm. depending upon the dia of bolts as shown in Appendix under column "Medium".

When the number of plates or sections to be riveted together exceeds three or when their total thickness is 90 mm or more, holes shall be drilled or reamed in position, after the members are assembled and the parts firmly hold together by clamps. Before riveting or bolting up or welding finally. The members shall be taken apart and all burrs removed.

Holes shall have their axis perpendicular to the surface bore through. The drilling or reaming shall be free from burrs and the holes shall be clean and accurate.

The work or fabrication shall be completed in the workshop as far as it is practicable to do so. Site jointing shall be done with rivets or turned and fitted bolts, or black bolts or welding as shown in drawings or as directed by the Engineer-in-charge. Generally, the following principles shall govern the use of rivets, turned and fitted bolts and black bolts :-

[i] Rivets or turned and fitted bolts shall be used where the connection is such that slip under load has to be avoided.

[ii] Black bolts may be used very sparingly where a force is carried through a connection without impact, vibration or reversal of stresses (unless such reversal is due to wind forces.)

In the case of welding, holes shall only be made for the bolts used for temporary fastening as shown in drawings.

WELDING :

Welding shall be generally be done by electric process. The electric arc method being economical, is usually adopted. Where public electricity is not available, a suitable generator shall be arranged. Gas welding shall be resorted to using oxyacetylene flame with specific period approval of the Engineer-in-charge.

Gas welding shall not be permitted for structural steel work. Gas welding requires heating of the members to be welded along with the welding rod and is likely to create temperature stresses in the welded members. Precautions shall therefore be taken to avoid distortion of the members due to these temperature stresses.

The work shall be done as shown in the shop drawings which should clearly indicate various details of the joints to be welded, type of welds, shop and site welds, as well as the types of electrodes to be used. Symbols for welding on plans and shop drawings shall be according to IS : 813-1061. As far as possible, every effort shall be made to limit the welding that must be done after the structure is erected so as to avoid the improper welding that is likely to be done due to heights and difficult positions of scaffolding etc. apart from the aspect of economy.

PREPARATION OF SURFACE :

Surfaces which are to be welded together, shall be free from loose mild-scale, rust, paint, grease or other foreign matter. A Coating of boiled linseed oil shall be permitted.

PRECAUTIONS :

All operations connected with welding and cutting equipment shall conform to the safety requirement given in IS : 818-1968 for "Safety and Health requirements in Electric and Gas welding and Cutting Operations".

The following points shall be borne in mind during the process of welding :-

[a] Welds shall be made in the flat position. Whereever practicable.

[b] Arc length, voltage and amperage shall be suited to the thickness of materials, type of groove and other circumstance of the work.

[c] The sequence of welding shall be such that where possible, the members which after the greatest resistance to compression are welded first.

All defective welds which shall be considered, harmful to the structural strength shall be cut out and rewelded.

Finished welds and adjacent parts shall be protected with clean boiled linseed oil and after all slag has been removed. Welds and adjacent parts shall be painted after the same are approved by the Engineer-in-charge.

All the members shall be thoroughly cleaned of rust, scales dust etc. and given a priming coat of lead painting before fixing then in position.

RATE :

The rate shall be for a unit of **one Quintal**.

Item No.57:-

Fabricating, supplying, cutting, bending, fixing and assembling frames etc using aluminium sections of JINDAL / HINDALCO / NARMADA / BANCO make of thickness and fixed to MS framing, concrete members etc with S.S.screws in counter sunk/ S.S. rivets, S.S washers, SS anchor bolts, cleats, hangers etc and other necessary accessories and hardware complete as specified by Engineer in Charge. (Only finished measurements will be paid for, M.S. framing shall not be part of this item.) The rate shall include 20 micron anodising of approved shade. The sheet type will be finalised by the consultant. The rates shall be inclusive of rubber gaskets and all other hardware. Cutting and making of framing etc shall be done by experts. The rates shall be inclusive of all mechanized tools, cutters, bending machine work, grinders etc.

57.1. MATERIALS :

Aluminium shall conform to M-31. Rubber gasket shall be as per the details or as per instructions given by the Engineer-in-charge.

57.2. WORKMANSHIP :

Preparing the surface for the fixing of aluminium frame. Providing and fixing aluminium door frame as per the details of instruction given by the site in charge with proper alignment and precautions. Providing and fixing sheet glass with acid frosting as per instructions given by the Engineer in charge with necessary precautions. Aluminium doors, frame, glass etc. shall be cleaned after the completion of the work as per the instruction of Engineer in charge.

57.3. MODE OF MEASUREMENT AND PAYMENT :

57.3.1. Rates include all materials, labour, tools including providing and fixing aluminium sheet, nails etc. complete. The measurement shall be taken for the finished product.

57.3.2. The rate shall be paid **per KG (Kilogram)**.

Item No.58:-

Providing & fixing Aluminium Composite panel of alum decor, Indobond & Flexibond make to all Surfaces 4mm thick in required colours of exterior consisting of two layers of aluminium skins of 0.25mm thick sandwiching a thermo plastic core in continuous lamination process with PVDF coating of exterior grades ensuring long life colour and fungal resistance. Base frame work with aluminium sections shall be

fixed over the all surfaces, ACP shall be fixed to the frame work as cladding it includes cost of labour, Materials , accessories, adhesive, scaffolding, wastages, transport, taxes, fixing into a neat finish in aesthetic point of view, without any undulations in facias all complete as per drawing and instruction of engineer in-charge.

58.1 The rate includes cost of labour, materials, accessories, adhesive, scaffolding, wastages, transport, taxes.

58.2 Rate shall be paid per **Square Metre**.

Item No. 59:-

Providing, erecting and fixing in position structural steel sections of Yst 310 grade of TATA, Kamdhenu, Jindal or Asian confirming to IS:4923 purlins, roof trusses, columns, side runners, ties bracing, framing etc. including all types of base plate, gusset plate, cap plate, bearing plate, stiffner, cleats etc. complete and structural steel confirming to IS:226 including necessary pipes, rolled joists, channels, angles, tees, MS flats, angle cleats, gusset plates, bright bars, chequered plates, cross plates as per required thickness including cutting, welding, riveting as per the structural details and good engineering practice grinding and cleaning the members as specified by Engineer in Charge. (Only finished measurements will be paid for billing purpose). No extra payment shall be made for grouting that has to be done under the base plates to get full bearing on supporting sub strata. The paint shall be oil paint in three coats to get an even look over a coat of red lead paint as per the instructions of the Engineer-in-charge. The rate shall also be inclusive of screws, bolts, nuts, washers, hinges, pivots, locks, handles, anchor fasteners etc. complete.

A.03 STRUCTURAL STEEL WORK

Indian Standards

IS 2062 : 1999 – Steel for General Structural Purposes (specifications) ; including amendments in June 2001.

IS 9595 : 1996 – Metal Arc welding of carbon and carbon Manganese Steels

IS 808 : 1989 (reaffirmed 1999) – Dimensions for Hot Rolled Steel beam, channel, angle sections

IS 800 : 1984 (reaffirmed 1998) – Code for practice for general construction in steel

Providing, erecting and fixing in position structural hollow steel sections of Yst 310 grade of TATA or equivalent confirming to IS:4923 purlins, roof trusses, columns, side runners, ties bracing, including all types of base plate, gusset plate, cap plate, bearing plate, stiffness, cleats etc. complete and structural steel confirming to IS:226 including necessary rolled joists, channels, angles, tees, flats, angle cleats, gusset plates, including cutting, welding as per the structural details and good engineering practice grinding and cleaning the members as per detailed drawing and design. The rate shall include for applying three coats of approved make synthetic enamel paint over a coat of zinc chromate anticorrosive paint, as per instructions by the consultant/site engineer and shown as per drawing. (Only finished measurements will be paid for). No extra payment shall be made for grouting that has to be done under the base plates to get full bearing on he supporting sub strata

All steel work shall conform to IS : 800-1984 (reaffirmed 1998) or latest edition and shall be free from defects impairing strength, durability or appearance and shall be of the best quality for the purpose specified, and possessing structural properties to withstand safely stresses to which these shall be normally subjected. The contractor shall bear the costs of the tests.

All structural steel members brought by the contractor shall be handled with care, stacked on edge and supported evenly.

The structural steel and rivet bars shall conform to latest edition of IS: 226. Before any fabrication work is commenced all plaster shall be flattened and all bars and sections be straightened or otherwise trued and made free from twist or other distortion. Method adopted for the purpose shall be such as not to inure the material. Cutting shall be the responsibility of the contractor.

The contractor will have to submit shop drawings to the Architect/ Consultant. All shop drawing shall be prepared in advance of the drawing actual fabrication. These shall show full size sections and all joints and connections, thickness of materials used and details of welds, bolts, rivets etc. Shop drawings shall clearly distinguish between, shop and field rivets, bolts and welds. Drawing shall be made in conformity with the IS : code for shop drawings and with due regard to speed and economy in fabrication and erection. A making diagram allotting distinct identification marks to each separate piece of steel shall be prepared. The diagram shall be sufficient to ensure convenient assembly and erection at site. All shop drawings shall show temporary bracing and connections required fabrication and erection.

Riveting :

All holes in platers or section over 12 mm thick must be drilled and not punched and accurately gauged. All hole (except in purlins, runners, packing plates, lacing bars) shall be drilled to required size. All matching holes for rivets or black bolts shall be such that a gauge 0.8 mm less in diameter than the hole can pass freely through members assembled for riveting and bolting. All holes for turned and fitted bolts shall be drilled and reamed, if necessary, to tolerance of only plus 0.13 mm when the number of thickness to be riveted exceeds three or the total thickness is 90 mm. or more the holes shall be drilled or reamed in position after assembly, except when the steel bushed jigs are used. Parts shall be firmly held together during such block drilling and taken apart for removal of burrs, after drilling.

All parts assembled for riveting shall be in close contact and all bearing stiffeners shall bear tightly at both top and bottom without being drawn or caulked. All parts of riveted members shall be temporarily pinned or bolted while riveting. Drifting of holes shall not be permitted except to draw the part together and no drift used shall be larger in any part than the normal diameter of rivet or bolt. Drifting done during assembling shall not distort metal or enlarge hole. Rivets when cold shall be size shown on drawing and shall preferably fill the hole and from the head of standard dimension unless otherwise stated. All riveting wherever practicable shall be done by the hydraulic or pneumatic process. All loose, burnt or badly formed rivets with eccentric or deficient heads shall be cut and replaced by sound rivets. Counter sunk heads shall be provided wherever required. Caulking and recupping shall not be permitted.

Bolting :

All turned and fitted bolts shall be parallel throughout the barrel within the tolerance of only minus 0.13 mm and faces of heads and nuts bearing on steel work shall be machined. All such bolts shall be provided with washers of standard size so that the nut when turned shall not bear on the unthreaded body of the bolt. Heads and nuts shall be hexagonal with worth screws and shall be well formed. Where the full bearing area of the rivet is to be developed, the threaded portion of the bolt shall not be within the thickness of the parts bolted together. Threaded portion of each bolt shall project beyond the nut at least by one thread. Tapered washers shall be provided for all heads and butts bearing on beveled surfaces.

Welding :

Welding wherever indicated shall conform to latest edition of IS : 814-1963 unless otherwise specified. Welding shall be carried out by experienced welders only, who if necessary, shall produce testimonials about their work or if required by Architect/Consultant shall have to undergo qualifying tests as prescribed in latest edition of IS : 1181. Welding work shall be carried out as per latest edition of IS : 818.

Welding shall be done in flat position wherever possible and adequate steps shall be taken to maintain the correct arc length, rate of travel, current and polarity for the type of electrode and nature of work.

Steel shall not be painted or oiled and any areas where welding is to be performed shall be well cleaned to remove any paint, scale or rust immediately before welding for a distance of at least 2 cm (3/4") on either side.

The work shall be securely held in position by means of tack welds, service bolts, clamps or jigs before commencing the welding so as to prevent any relative movement due to distortion, wind or other causes. When welding is liable to cause distortion, the work shall be securely held in approved frames or jigs.

Parts to be filler welded shall be brought in as close contact as practicable and in no event shall be separated more than 4.75 mm (3/16"). If the separation is 1.6 mm (1/16") , or greater, the size of the fillet welds shall be increased by the amount of the separation.

The separation between facing surfaces of lap joints shall not exceed 1.6 mm (1/16"). The fit of joints at contact surfaces which are not completely sealed by welds, shall be close enough to exclude water after painting.

Abutting parts to be butt welded shall be carefully aligned. Misalignment greater than 3 mm (1/8") shall be corrected and in making the correction, the parts shall not be drawn a sharper slope than two degrees (11mm in 30 cm or 7/16" in 12").

The sequence of welding shall be such that when possible the members which offer the greatest resistance to compression are welded first.

Welded joints showing slag inclusion or lack of proper penetration shall be cut and rewelded overlap of the toe of the weld and undercutting of the parent metal should be avoided and where present to a serious extent shall be rectified.

All slag shall be removed from each run before another run is superimposed. When cold the final run shall be protected with clean boiled linseed oil and shall not be painted until approved by the Architect/Consultant or his representative.

Grinding of finished weld is permitted provided the weld is not reduced below the prescribed section. All exposed welds shall be ground smooth. Welds which have not been ground shall be scrubbed with a 10% solution of Hydrochloric acid which shall be washed off with before paint is applied an alkali resisting paint is used.

Other IS codes :

IS 812 : 1957 (revised 1998)

IS 817 (Part 1 & 2) – Training of Welders – code of practice

Fabrication and Erection:

In order to facilities handling, transportation and execution contractor may fabricate structural members in suitable sections. The details of site connection and their location shall be approved by the Architect/Consultant.

Frame or lattice section intended for use as parts of composite construction which are likely deflect considerably during handling shall be suitably stiffened by means of steel angles.

Roof and other structure shall be supported at close intervals during the welding/bolting or site connections.

The frame of steel skeleton building shall be carried up true and plumb and temporary bracings shall be introduced wherever necessary to take care of all loads to which structures may be subjected including erection equipment and operation of the same, such bracing shall be kept in position as long as required for safety or as deemed necessary by the Architect/Consultant.

As erection progresses, the work shall be securely bolted to take care of all dead load, wind load and erection stresses. No riveting or welding shall be done until the structure has been properly aligned. Rivets driven in field shall be heated and driven with the same care as those driven in the shop.

In the setting or erection of steel work the individual pieces shall be considered plumb or level when error does not exceed 1 to 500. For exterior columns the error shall not exceed 1 to 1000.

Slight bends in the members of fabricated structure shall not be straightened unless strictly necessary on account of danger of overstraining connection and rivets, weld or bolts. Connection plates, if slightly bent or twisted shall be straightened cold. If bent so sharply as to require heating the whole piece thus heated shall be subsequently annealed. No straightening whatsoever shall be carried out without the previous sanctions of the Architect / Consultant / Engineer in charge.

Expansion Gaps:

Particular care must be taken to ensure free expansion and contraction, whatever provide for, drawing or special specification.

Painting:

Painting of steel structure shall be carried out as per detailed specification under painting.

Painting Joints:

The surface of all joints must be thoroughly scrapped cleaned and given the first coat of red lead paint before joining up which should be done while the paint is still wet. The procedure shall not apply to welded joints. All rivets, bolts, washers, etc shall be thoroughly cleaned and dipped in boiled linseed oil. All machined surfaces shall be well coated with a mixture of white lead and tallow.

Measurements:

All fabricated trusses, frames, gantry girders, crane rails, fishplates, and clamps, square or round bars etc. Stanchions built girders and purlins shall be calculated on the basis standard net weight according to I.S.I. code. Net weight of clean, brackets, packing pieces, rivets, bolts distance pieces, separators, gussets holding down bolts, fish plates etc shall be added to the respective items. No deduction shall be made for holes, bolts or rivets and waste involved in cutting or nothing ends of sections or intermediate points for making connections. Weights for the bolts and nuts shall be measured but the weight of the weld shall not be considered. The rates shall be inclusive of all plants and heavy machinery required for its erection like cranes, temporary structures, concrete blocks, pulleys, hydraulic jacks etc.

The rate shall be for a unit of **one KG (Kilogram)**.

Item No.60:-

Providing and fixing 8mm thick glass of approved make including toughening, edge diamond polishing, making necessary holes in glass, supporting system of good quality SS accessories of Ozone make ("D" clamp fittings) and joints to be filled where necessary by clear structural silicon sealant as specified by Engineer in Charge.

60.1 Materials :

Materials shall conform to M-38 and relevant specifications.

60.2 SCOPE OF WORK :

Work under this section shall be inclusive of design, fabrication and installation of toughened glass for sliding doors, ticket counters, signage etc as specified and as per the designs of the consultant including supply and installation of patch fittings of approved make as mentioned in the design drawings of the Consultant.

60.3 WORKMANSHIP :

60.3.1 Examine conditions and proceed with work when framing systems are ready for glazing.

a. Verify that openings for glazing, Sliding door/Window/ opening/ ticket counter work etc are correctly sized and within tolerances.

b. Verify that glazing channel surfaces or recesses are clear, free of burrs, obstructions, Irregularities and glass is free of edge damage or imperfections.

60.3.2 Preparation :

a. Clean contact surfaces with solvent and wipe dry.

b. Seal porous glazing channels or recesses with substrate compatible primer or sealer.

c. Prime surfaces scheduled to receive sealant, if required by sealant manufacturer.

d. Verify that materials used for cleaning edges of sealed insulating units are compatible with sealants and components and will not damage or cause deterioration of integrity of sealed insulating unit.

- * Glass shall have safety marking as approved by the CONSULTANT at eye level.
- * Installation completed shall be sound, watertight, free from defects and to acceptable standard of CONSULTANT.

C. Tempered Glass

Do not cut, seam, nip or abrade tempered glass.

The contractor shall ensure that the glass is firmly fixed in desired positions and the framing, SS studs, channels are also firmly fixed to the base surface. The edges shall be protected using a protective tapping for all exposed edges of the glass during the execution of works. Holes shall be correctly made prior to toughening the clear glass. The contractor shall ensure that the holes for accommodating SS patch fittings, SS studs, screws, Aluminum framing members etc shall be marked precisely on the glass and alignments are matched before making the holes in glass.

All free intersecting edges of glass to glass, glass to wood, glass to aluminum framing, glass to stone etc shall be sealed properly using a good quality approved make structural silicone sealant. The rates of the contractor shall be inclusive of the sealants.

60.3.3 Protection :

A. Protect finished work.

B. After installation, mark glass pane with X by using removable plastic tape or paste.

60.3.4 Cleaning :

The PVC tape, protective covering shall be retained till the glass work is completed and until the CONSULTANT gives instruction for its removal.

60.3.5 General :

60.3.5.1. Remove labels after work is completed.

60.3.5.2. Wash and polish both faces not more than seven days prior to Owner's acceptance of work.

60.3.5.3. Comply with glass manufacturer's recommendations for final cleaning.

60.4 Method of Measurements:

The work shall be measured in **square metre (S.M)** and the rates shall be inclusive of the framework, S.S. studs, S.S. patch fittings of approved make unless otherwise mentioned.

The rates shall be inclusive of making holes, edge polishing using diamond, cutting, cleaning of glass, protection tapes, gaskets, sealants, PVC edge tapes, frosting, acid finishing, etching etc.

Item No. - 61

Providing and fixing in position as per designs 10mm thick toughened glass of required diameter with diamond polished edges of Asahi, Modiguard make. The glass shall be firmly fixed to the base surface using structural silicon of Dow Corning or Wacker make. The contractor shall ensure that the base surface is thoroughly cleaned prior to fixing of glass and the assembly shall be made completely water tight. The contractor shall check for water tightness and provide a certificate for the same. The work shall be executed to the complete satisfaction of the Engineer in charge and the work area shall be made totally clean on completion of the work.

61.1 All specifications will remain same as per **Item No.- 60** except the thickness of the glass.

61.2 Method of Measurements:

The work shall be measured in **Square Metre (S.M)** and the rates shall be inclusive of the framework, S.S. studs, S.S. patch fittings of approved make unless otherwise mentioned.

The rates shall be inclusive of making holes, edge polishing using diamond, cutting, cleaning of glass, protection tapes, gaskets, sealants, PVC edge tapes, frosting, acid finishing, etching etc.

Item No.- 62.

Providing and installing in position HDPE synthetic Fiber carry rollers of 100mm dia as instructed by Engineer in Charge. The rollers shall have seals which are with labyrinth seal components, non-rubbing polymer seal and attached with dust and water deflectors. The rollers shall be such that they shall have good rolling during impact and shall not damage the body of the bus nor shall get damaged during impact and shall act as a protecting mechanism for the bus and the surface of the bus shelter. The installation of the rollers shall be as per the instructions of the manufacturers. Samples shall be approved prior to installation. Roller shafts shall be made of stainless steel and multi labyrinth seals shall be filled with high grade lubricants.

62.1 Details specification same as per the Item.

62.2 The work shall be carried out as per instructions of Engineer-in-charge.

62.3 The rate shall be **per Number**.

Item No.63 :-

Providing & fixing 35mm.th. Flush Door Solid Double Core type Both Face water proof Ply Vennered & 1.5 mm th.laminate shall be pasted on both side with adhesives as specified by the manufacturers. The laminate shall be as per approved shade & texture, of make incl. Sal wood frames of finished size 12cm x 7cm.incl. S.S. Hinges with nessary screws & Anodized aluminum fixtures & fastenings For all Floor

63.1.0 MATERIALS

Wood for frame and shutter shall confirm to M-29. Fixtures and fastening shall confirm M-43. The ready mixed paint for brushing priming for enamels wood shall confirm to I.S. 106-1962 and the paint shall confirm to M-44 (the enamels paint shall confirm to I.S. 133-1975).

63.2.0 WORKMANSHIP

63.2.1 The item covers the requirement of frames and shutters for doors, windows, clear story windows, ventilators their supply and fixing.

63.2.2 Frames - All members of frames shall be exactly at right angles. The right angle shall be checked from inside surfaces of the respective members.

All members of frames shall be straight without any warp or bow and shall have smooth surfaces well planned on the three sides exposed at right angles to each other. The surfaces touching the wall may not be planned unless it is required in order to straighten up the member or to obtain the overall sizes within the tolerances as specified.

Frame shall have dovetail joints. When windows is included, it shall be provided by having full length one piece post for door or windows and clearstory window extending the frame on top at the head to the required extent. Horns shall not be provided in the head of the frame. When no sills are provided, the vertical posts of the frame in the ground floor shall be embedded in the sill masonry for 10 cm. on upper floors, the vertical posts shall be fixed in the floor or masonry by forming notches 10 mm. deep. Sight adjustment of spacing as necessary shall be done to have the holdfasts in the joints of masonry course. The frame shall be erected in position and held plumb with strong support iron both sides and built in masonry as it is being built. The transom shall be through tenoned in the mortices of the jamb post to the full width of the jamb post and the thickness of the tenon shall be not less than 15 mm.

63.2.3 Tolerance - Unless specially mentioned otherwise tolerance of 1.5 mm. shall be allowed for each wrought face.

63.2.4 The tenons shall be closely fitting into the mortices and suitably pinned with wood dowels not less than 10 mm. diameter. The depth of rebates for housing the shutter shall be as shown in the detail drawing or as directed.

63.2.5 The contact surface of tenon and mortise shall be treated before putting together with an adhesive of approved make.

63.2.6 Minimum number of three holdfasts shall be fixed on each side of door and window frames, one at the centre point and the other two at 30 cms. from the top and the bottom of the frames. In case of window and ventilator frames whose height is less than 1 M. two

- holdfasts, in each side shall be fixed at quarter points of the frames. The size of each holdfasts shall be 300 x 25 x 6 mm. and of mild steel with spit end. The holdfasts shall be fixed with screws to frames.
- 63.2.7 Mild steel hold fasts shall be protected with a coating of coal asphalt tar. The surface of frame abutting the masonry or concrete faces shall be properly treated by applying a coat of approved coating.
- 63.2.8 Shutters - Pannelled shutters shall be constructed in the form of timber frame work of styles and rails with panel inserted of type as specified in the detailed drawings. Panel shall be fixed by providing grooves in the styles and rails. The styles and rails shall be joined to each other by mortise and tenon joints at right angles.
All members of the shutters shall be straight without any warp or bow and shall have smooth, well planned faces at right angles to each other.
The size of styles and rails shall be as per drawings or as directed. Styles and rails of shutters shall be made of one piece only.
- 63.2.9 Timber Panelling - Thickness of the panel shall be as specified in the drawings or as directed. If the panel is made from more than one piece, the piece shall be finished as shown in the detailed drawings and shall be joined with continuous groove with specified size. The end pieces of the panel and the top and the bottom of the panel shall be provided with continuous tongue to frame into groove of the frame shutter. An air space of 1.5 mm. shall be left in the groove of frame of shutter while framing the panel in it.
The faces of the panel as well as various pieces of the panel shall be closely fitted to the sizes of the grooves.
Finishing of the corners or raised panel edge shall be done as shown in drawings or as directed.
The thickness specified shall be finished thickness and no tolerance will be permitted.
- 63.2.10 Glazing - The glass panels shall be embeded in putty and secured to the rebate by wooden bends, or mouldings shape and size as approved with counter sunk screws of suitable size.
The glass panel shall be properly cut to fit the rebate of the frames and sashes fully with a slight minus margin of about 1.5 mm. of all sides. Before glazing the frame shall be primed and prepared for painting so that wood may not draw oil out of putty. The rebate shall be putted to an extent to provide bedding all round the glass.
The glass shall than be bedded in putty and fitted to frames with wooden beads or moulding as directed and screwed with wooden beads or moulding as directed and screwed with counter sunk screws. The screws shall be spaced not more than 100 mm. from each corner and nor more that 200 mm. apart.
The size of the rebate in the frame and size and shape of beads or moulding shall be as per detailed drawing or as directed. The beads or mouldings shall have mitred corners.
- 63.2.11 Fixtures & Fastenings - All fixtures and fastening of approved quality shall be provided with necessary screws. The hinges, bolts and other items of iron mongery with moving part shall be properly oiled by the contractor before handing over the building.
- 63.2.12 Painting - The surface shall be cleaned and rubbed with sand paper to bring it in the one plane. When finished, no scratches from the sand paper should show. After preparing the surface, one coat of white paint shall applied as priming coat.
Little white lead being worked in other mixing to help hardening of putty. The work shall be rubbed down smooth with sand paper and the consequent coats of paint of the specified shade approved by the Engineer-in-charge shall be applied.
The paints shall be applied with brush. It shall be spread as smoothly as possible. Final coat shall be very crossed and laid off, so that brush marks are not visible.
Each coat of paint shall be allowed to dry thoroughly and shall be little rubbed in before the next one is laid.
Finish surface shall not show any hair marks ridges or dry patches of paint and no puddles shall be left in the corners of panels, angles of the mouldings etc.
- 63.3.0 MODE OF MEASUREMENTS & PAYMENTS
- 63.3.1 For measurement, the dimensions shall be measured correct upto 1 cm. The quantity shall be worked out correct to 2 places of decimals for rounding.
- 63.3.2 The item includes all materials, labours and necessary iron oxidised fixtures and fastenings, oil panting in three coats of approved paint. The payment shall be made on Sq.Mts. basis.

63.3.3 The rate shall be for a unit of **one square metre (S.M)**.

Item No.64 :-

Same as Above But Without Frame

Details specification as per **Item No.63**.

The rate shall be for a unit of **one square metre (S.M)**.

Item No.65 :-

Providing and fixing FRP FRAME size 125 x 65 mm and 35 mm thick FRP shutter with wood grain raised paneled design finish shutter having extra reinforcement on sides & edges in Gel coat finish. The core of the shutter & frame is to be filled up with injected polyurethane foam done in situ along with embedded wooden pieces for stiffening & also taking hinges & fixtures.

The whole FRP frame & shutter is to be water proof weather proof, termite proof & resistance to mild acid/alkali. Rates are to be inclusive of S.S.hinges with fastener sleeve & aluminium fixtures & fastenings.

1. The GRP (**Glass Fibre Reinforced Plastic**) shutter shall have hollow rails and stiles monolithically cast with panels.
2. The shutters shall be contact moulded by either hand lay up or Resin Transfer Moulding (RTM) process in two pieces as shown in Fig. 1. The process shall consist of laying gelcoat of 0.35 mm to 0.40 mm thickness laid over with three layers of GRP mat (one layer of 300 CSM mat and two layers of 450 CSM) for each of the web (panel) portion and four layers of GRP mat for the flange (rails and stiles) portion (one layer of 300 CSM mat and three layers of 450 CSM mat). While closing the two pieces, additional layer of 450 CSM mat shall be provided in the web portion. The CSM mat shall be bonded with isophthalic resin in the ratio not less than 1:2 (one part of mat to two parts of isophthalic resin and fillers and additives) by weight. The edges shall be sealed with gelcoat and FRP mat to obtain smooth finish. Sufficient rovings shall be laid in the corners to have smooth curve while laying the CSM mat. If the shutter is moulded using the RTM process, then moulding shall be done either by laying gelcoat followed by laying of the GRP mat. Core material shall be placed in location in the hollow sections. The GRP mat shall be bonded by injecting under pressure isophthalic resin in a ratio not less than 1:2 (one part of mat to two parts of isophthalic resin). Alternatively, if the shutter is moulded without using gelcoat then the process is to lay the FRP mat in the mould with the core material blocks in location in the hollow section. The GRP mat shall then be bonded by injecting under pressure, isophthalic resin in a ratio not less than 1:2 (one part of mat to two parts of isophthalic resin).
3. Blocks of any seasoned hardwood of bulk density not less than 450 kg/m³ at 12 percent moisture content or any other material of sufficient thickness and length shall be provided inside the shutter at suitable place to hold fittings and fixtures such as aldrops, tower bolt, handle sliding door bolt, mortice lock, etc. Blocks for hinges shall be provided at three locations, unless otherwise specified by the purchaser. One at the centre and other two at 200 mm from the top and the bottom of the shutter.
4. Blocks shall be provided at predetermined places in the shutter so as to fix hinges, mortice locks, tower bolts, aldrops, door closures, etc. 6.5 The finished surface shall be buffed and polished 3 IS 14856:2000 with wax.
5. Dimensions, Sizes And Tolerances

Minimum thickness of GRP laminate of hollow rails and stiles shall be 3 mm.

Minimum thickness of GRP laminate used for panel in the shutter shall be 5 mm.

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

Item No.66 :-

Providing & fixing M.S.Grills of required pattern to wooden frames of windows etc. At all floor levels with M.S. flats at required spacing & frame around square or round bars with round headed bolts & round headed bolts and nuts or by screws incl. Priming coat of Red lead paint etc. comp. (A) Plain grill For all Floors

66.1.0 MATERIALS :

The structural steel shall conform to M-22.

66.2.0 WORKMANSHIP :-

The M.S. Grill shall be prepared as per the drawings or as directed for fixing to wooden frames of windows etc.

The grill shall be fabricated to the designs and pattern shown in the drawings and the weight shall be as directed, and the joints shall be revetted or welded as shown in the plan or as directed. The grill so formed shall be fixed into the strip frames of the windows etc. before they are erected in position. The outside strip frame of the grill shall be housed to its full thickness into the recess cut into the frame of the windows etc. The grill shall be fixed to the frame with number of bolts and nuts or screws viz. bolt nut/screw per 30 cm. of the length of outer strip subject to a minimum of 2 Nos. on such side of the frame or as indicated in the drawing or as directed.

The bolts and nuts or screws shall be counter sunk and shall be fixed with the top of their heads flush with the face of the frame strips.

66.3.0 MODE OF MEASUREMENT AND PAYMENT :-

payment shall be made for weight of screws, bolts and nuts etc. only weight of grill shall be paid.

The rate shall be for a unit one **KG (Kilogram)**.

Item No.67 :-

Repairing & servicing of existing door/window including cost of hardware (fevicol, Nail and NF screw etc.) but excluding cost of fixtures as directed by Engineer-in-charge.

(A) Partly panelled and Partly glazed aluminium door

(B) Aluminium shutter

67.1. The work shall be carried out as per instructions of Engineer-in-charge.

67.2. The rate shall be paid per **Number**.

Item No.68 :-

Providing and Replace door, Window S.S. Fixtures fix in wooden / Aluminium door - window with ISI marks as per approved by engineer in charge.

(A) S.S. Door / window hinges 4x1"x1"

(B) S.S. Aldrop 20 Cm long of ASIS 304 Grade

(C) S.S. Aldrop 25 Cm long of ASIS 304 Grade

(D) S.S. Aldrop 30 Cm long of ASIS 304 Grade

(E) S.S. Handle for door/ window 10 Cm size of ASIS 304 Grade

(F) S.S. Handle for Door 15 Cm size of ASIS 304 Grade

(G) S.S. Stopper 20 Cm long of ASIS 304

(H) S.S. Stopper 30 Cm long of ASIS 304

68.1. The work shall be carried out as per instructions of Engineer-in-charge.

69.2. The rate shall be paid per **Number**.

Item No.69 :-

Dismantling, Cutting & Refixing aluminium partition door Providing with necessary Hardware & Rubber gasket etc. complete as per instruction by engineer in charge.

69.1. The work shall be carried out as per instructions of Engineer-in-charge.

69.2. The rate shall be paid per **Square Metre**.

Item No.70 :-

Providing & Fixing door closer Ozon / Dorma / Hyper / Hardwin / Godrej Aluminium body ISI brander equivalent make with necessary hardware materials etc. complete as per instruction by engineer in charge. (Door closers (Heavy type of 765 number)

Hardwire or Everite Prabhat or Equivalent.(M190, Page No.13 R&B SOR)

70.1. The work shall be carried out as per instructions of Engineer-in-charge.

70.2. The rate shall be paid per **Each**.

Item No.71 :-

:- Providing & Fixing floor spring make Hyper / Hardwin / Godrej / Ozon / Dorma equivalent ISI make with necessary hardware materials complete as per instruction by engineer in charge. Floor spring heavy duty (M-704, Page No. 27 R&B SOR)

71.1. The work shall be carried out as per instructions of Engineer-in-charge.

71.2. The rate shall be paid **per Each**.

Item No.72 :-

Providing and fixing G.I. chain link of 50mm x 50mm size x 10 guage thick with nuts, bolts, washer or G.I. pins, excluding M.S. angles etc.complete asper relevent IS specification & directed by engineer in charge. (TATA or Jindal Make)

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

G.I. wire for chain line mesh shall be of perfectly 10 gauge thickness size of chain link wire mesh shall be clear 50 mm x 50 mm at inside gap all wire shall be perfectly bounded/tead with each other by making chain shape.

Item include all materials, labours, equipment etc. complete.

Payment shall be made on **square metre** basis for actual fixed chain link mesh.

Item No.73 :-

Providing and fixing and fitting TATA or Jindal make G.I. barbed wire fencing with necessary barbed wire (12 x 14 guage, weight not less than 0.14 kg. / mt.) pins, hooks, excluding M.S. angles etc. complete as per relevent IS specification.& directed by engineer in charge

73.1.0. MATERIAL:-

Material shall be conform to M-84.

The galvanized barbed wire shall be manufactured from mild steel wire conforming to IS 280. The galvanized coating shall conform to the requirements for any one of the type of coating as given in IS 4826 as per agreement with the purchaser. The coating requirements of electro galvanized wire shall conform to the requirements for any one of the type as given in IS 12753 as per agreement with the purchaser.

73.2.0. Workmanship:-

The barbed wire shall be stretched and fixed in 5 horizontal rows and two diagonals. The bottom row shall be 140

mm. above ground and the rest at 125 mm. centre to centre. The diagonal shall be stretched between adjacent post

from top wire of one post to the bottom wire of 2nd post. The wires shall be fixed to posts by means of staples. The

M.S. Angle posts shall be painted with 3 coats of old paint of approved tint and shade.

73.3.0. Mode of measurements and payment

73.3.1. The work shall be measured for the finished work from centre to centre of the posts.

73.3.2. The rate shall include the cost of labor and materials involved in the operations described above.

73.3.3. The rate shall be for a unit of **KG (Kilogram)**.

Item No.74 :-

Providing and fixing rebar of following diameter using chemical grout of Swanchores/Hilti/Fischer or equivalent make including cost of all equipments, tools, material, labour, etc. Standard procedure as mentioned in manufacturer's specifications shall be strictly followed, which shall be submitted and got approved from the authority prior to start of work. The rate shall also include cost of drilling of hole of required diameter and depth as mentioned in manufacturer's specification, cleaning the hole with required air blower and other necessary tools and tackles, positioning, providing and grouting chemical, allied fixtures and fasteners, etc. but excluding the cost of reinforcing bar etc. complete. Item includes necessary scaffolding, staging, labour, tools and equipments, etc. complete as directed by the engineer-in-charge. (A) 8mm, (B)10mm, (C) 12mm, (D) 16mm, (E) 20MM, (F)25mm

Detailed specification same as per item description and as directed by Engineer-in-charge.

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

Item No.75 :-

Removing old damaged MDF sheet with insulation glasswool from the wall and Providing and fixing New MDF Sheet-10mm.thick including glasswool insulation-50mm. thick with all necessary fixtures, fittings & Labour, complete as per drawing / instruction of Engineer-in-charge.

75.1 Details specification same as per the Item.

75.2 The work shall be carried out as per instructions of Engineer-in-charge.

75.3 The rate shall be **per Square Metre**.

Item No.76 :-

Removing old damaged Cement sheet from the existing flooring and Providing and fixing New Cement sheet-20mm. thick with all necessary fixtures, fittings &Labour, complete as per drawing/instruction of Engineer-in-charge.

76.1 Details specification same as per the Item.

76.2 The work shall be carried out as per instructions of Engineer-in-charge.

76.3 The rate shall be **per Square Metre**.

Item No.77 :-

Providing & Applying Surface Water Proofing treatment on existing Water proofing.

(1) Cleaning Surface Slab up to Mother slab & free from any Loose Material. Paint, Dust, Grease or Remove all existing bituminous Coating Completely. It is recommended to use intense wise brushing on high speed Water jet for through Cleaning.

(2) The Substrate must be checked for its Soundness using Small hammer. All Cracks at corner joint, Channels and Parapet Should be Properly treated.

(3) Cracks/construction joints treatment: Opening the cracks/construction joints,if any, in V/U shape using electrically operated cutting machine. Cleaning the surface thoroughly from dust and loose partical using wire brush and air blower. Filling the cracks if any with polymer modified cement mortar hybrid PU Sealant depending on the width of crack/joint.

(4) Epoxy primer:The Epoxy primer must be applied on clean and dry surface by mixing base and hardner in equal proportions with the help of stirrer and adding equal amount of water and appling on the surface at 80-100 grams per sqmt and allowed it to dry untill tack free.

(5) Hybrrid polyurea part-A(base) and part-B(hardner) are packed in two separate containers having the correct predetermined mixing ratio by weight.Stir individual container separately,Part-A and PArt-B very well, to get

77.1 Detailed specification same as per item description, and as directed by Engineer-in-charge.

77.2 The rate shall be for a unit of **per Square Metre**.

Item No.78 :-

Aluminum section Window opening and refixing with all necessary fix & fitting etc made in wisely.

78.1 Detailed specification same as per item description, and as directed by Engineer-in-charge.

78.2 The rate shall be for a unit of **per Square Metre**.

Item No.79 :-

RCC Core Cutting is about making precise, circular cuts for creating holes of required diameters for Rehabilitation in civil works. The core drilling rod is fitted with diamond pieces at the drilling end. The core cutting machine can be used for both horizontal and vertical hole making purposes.

(i) 75mm -110mm

(ii) 150mm

79.1 Detailed specification same as per item description, and as directed by Engineer-in-charge.

79.2 The rate shall be for a unit of one **Nos**.

Signature of the contractor with seal:

Date :

**Executive Engineer
Traffic-BRTS Project Cell
Surat Municipal Corporation**

16.0 AFFIDAVIT *

1. I, the undersigned, do hereby certify that all the statements made in the required attachments are true and correct.
2. The undersigned also hereby certifies that neither our firm M/s. _____ nor any of its constituent partners have abandoned any work on National Highways and Bridges in India nor any contract awarded to us for such works have been rescinded, during last five years prior to the date of this application.
3. The undersigned hereby authorize(s) and request(s) any bank, person, firm or corporation to furnish pertinent information deemed necessary and requested by the Department to verify this statement or regarding my (our) competence and general reputation.
4. The undersigned understands and agrees that further qualifying information may be requested, and agrees to furnish any such information at the request of the Project implementing unit.
5. I/We the undersigned on behalf of our firm M/s. _____ hereby give an undertaking that I/We am/are Jointly responsible to meet all the liabilities over and above the business of the firm and make good the above financial loss sustained by the Surat Municipal Corporation as a result of my/our abandoning the work entrusted to me / us / this firm.

Signed by an Authorized Officer of the Firm

Title of Officer

Name of Firm

Date

* To be given on Rs.300/- Non-judicial stamp paper duly signed by authorized notary.



17.0 UNDERTAKING

Photographs of the Tenderer/ Partners/ Managing Director of the firm :

Name :

Signature :

Name :

Signature :

Name :

Signature :

(Separate Sheet Shall be attached for Photographs, if required).

1. I/We agree, hereby, that the decision of the Surat Municipal Corporation in qualifying &/or Selection of the applicant's / Contractor, phasing of the work and in any other project related matter, shall be final and binding to me/us.
2. All the information and data, furnished herewith, are correct to my/our best of Knowledge.
3. I/We agree that I/We have no Objection, if inquiries are made about my/our works, their related areas and any other inquiry regarding all the details, projects and works listed by me/us in the qualifying documents at any Stage.

Signature of the applicant with seal of the firm

Note: The Undertaking format as indicated above to be furnished on non judicial stamp Paper of **Rs.300.**

18.0 ANTI-BLACKLISTING CERTIFICATE

(on Non Judicial Stamp Paper of Rs.300/-)

(To be provided by Bidder)

I M/s. _____ (Name of the Bidder along with name and address of registered office) hereby certify and confirm that we or any of our promoter/s/ director/s are not barred by Government of Gujarat (GoG)/ any other entity of GoG or blacklisted by any state government or central government/ department/ agency/local self Government/Surat Municipal Corporation in India from participating in Project/s, either individually or as member of a Consortium as on _____ (Bid Submission Date).

We further confirm that we are aware that our Bid for the captioned Project would be liable for rejection in case any material misrepresentation is made or discovered with regard to the requirements of this Tender at any stage of the Bidding Process or thereafter during the agreement period. Dated this ____ day of _____ 2026

To be signed by:

Authorised Signatory with name & designation

Name of the Bidder

19.0 List of Banks

Where the contractor is required to submit bank guarantee against payment towards any deposit e.g. EMD, SD, etc., such bank guarantees shall be produced only from any one of the following Nationalized/Schedule banks as listed below :

- 1) Axis Bank
- 2) A U Small Finance Bank
- 3) Bandhan bank
- 4) City Union Bank
- 5) CSB Bank
- 6) DBS Bank India Limited
- 7) DCB Bank
- 8) Dhanlaxmi Bank
- 9) Equitas Small Finance Bank
- 10) Federal Bank
- 11) HDFC Bank
- 12) HSBC Bank
- 13) ICICI Bank
- 14) IDBI Bank
- 15) IDFC First Bank
- 16) IndusInd Bank
- 17) Jammu and Kashmir Bank
- 18) Jana Small Finance Bank
- 19) Karnataka Bank
- 20) Karur Vysya Bank
- 21) Kotak Mahindra Bank
- 22) RBL Bank
- 23) South Indian Bank
- 24) Standard Chartered Bank
- 25) Tamilnadu Mercantile Bank
- 26) Ujjavan Small Finance Bank
- 27) YES Bank
- 28) Ahmedabad Mercantile Co-Operative Bank Limited
- 29) Nutan Nagrik Sahakari Bank Limited
- 30) Rajkot Nagarik Sahakari Bank Limited
- 31) Saraswat Co-operative Bank
- 32) SBPP Co-Operative Bank Ltd.
- 33) SVC Co-Operative Bank LTD.
- 34) The Cosmos Co-Op Bank Ltd
- 35) The Gujarat State Co-Operative Bank
- 36) The Surat District Co-operative Bank
- 37) The Surat Peoples Co-Operative Bank
- 38) The Baroda Central Co-Operative Bank
- 39) The Panchmahal District Co-operative Banks
- 40) Kalupur Commercial Co-Operative Bank Limited
- 41) The Rajkot Commercial Co-Operative Bank
- 42) The Banaskantha Mercantile Co-Operative Bank Limited
- 43) Gujarat Gramin Bank
- 44) All Nationalized Banks

Such bank guarantee should be encashable at Surat

Note: If in any case the F.D.R., bank guarantee, etc. submitted by bidder of a bank and if the bank is declared defaulter then the bidder needs to update F.D.R., bank guarantee, etc. submitted as per instruction of Surat Municipal Corporation.