

RAJKOT MUNICIPAL CORPORATION

e - Tender No.RMC/ENGG/EZ/24-25/37



Bid Documents For

PROVIDING, LOWERING, LAYING, JOINTING AND
TESTING WORK FOR UNDERGROUND SEWERAGE
NETWORK AT TP SCHEME NO.14, 17, 18 IN WARD NO.4



#Mera Shahr, Meri Pehchan 2023

Milestone dates for e-tendering are as under

1. Downloading of e-documents	15-03-25 To 05-04-25 upto 17.00 Hrs.
2. Pre-bid meeting in the O/o CE	21-03-25 at 16.00 Hrs.
3. Last date for online submission of e-Tender	05-04-25 upto 18.00 Hrs.
4. Submission of EMD, Tender fee and other documents for verification by Regd.Post.A.D. / Speed Post	Before 11-04-25 and 18.00 Hours
5. Opening of Technical Bid	15-04-25 at 11.00 Hours onwards
6.Verification of submitted documents (EMD, e - Tender fee, etc.)	15-04-25 at 11.00 Hours onwards
7.Opening of Price Bid (For Technically qualified bidders only)	17-04-25 at 11.00 Hours onwards
8.Bid Validity	120 Days

2024-25

ADDL. CITY ENGINEER
RAJKOT MUNICIPAL CORPORATION
SHRI ZAVERCHAND MEGHANI BHAWAN
EAST ZONE OFFICE, BHAVANAGAR ROAD,
RAJKOT - 360003 (GUJARAT)

RAJKOT MUNICIPAL CORPORATION

BID DOCUMENT FOR

**PROVIDING, LOWERING, LAYING, JOINTING AND TESTING WORK
FOR UNDERGROUND SEWERAGE NETWORK AT TP SCHEME NO.14,
17, 18 IN WARD NO.4**

PART-I

Section-1 Invitation to Bid, Instructions to Bidders
and Formats.

Section-2 General Conditions of Contract

PART-II

Section-3 Technical Specifications

PART-III

Bill of Quantities (With Price)

PART-IV

Drawings

ABBREVIATIONS

Statement showing the details of abbreviations

Full Form	Abbreviation
ADDL. CITY ENGINEER	ACE
Operation and Maintenance	O&M
Net Present Value	NPV
Engineering Procurement and Construction	EPC
Paschim Gujarat Vij Co. Ltd.	PGVCL
Critical Path Method	CPM
Reinforced Cement Concrete	RCC
High Ground Level Reservoir	HGLR
Kilometer	KM
Mild Steel	MS
Bureau of Indian Standard	BIS
American Water Works Association	AWWA
American Petroleum Industries	API
Million Liter per Day	MLD
High Yield Strength Deformed bar	HYSD
Corrosion Resistance Steel	CRS
Ordinary Portland Cement	OPC
American Standard for Testing of Material	ASTM
Flux Compensated Magnetic Amplifier	FCMA
Cost Insurance and Freight	CIF
Free On Board	FOB
EX – Works	EXW

PART - I
SECTION - 1

INVITATION FOR BIDS

RAJKOT MUNICIPAL CORPORATION
e-TENDER NOTICE

The e-Tenders are invited with two bid system by e-Tendering from the experienced contractors registered in GWSSB / State Government / Central Government / Semi Government in appropriate class for below mentioned work:

Sr No	Name of work	a) Estimated cost in Rs. b) EMD c) E-TENDER fee d) Time limit for completion of work
1	PROVIDING, LOWERING, LAYING, JOINTING AND TESTING WORK FOR UNDERGROUND SEWERAGE NETWORK AT TP SCHEME NO.14, 17, 18 IN WARD NO.4 e-TENDER No.RMC/ENGG/EZ/24-25/37	a.1) Rs.50,00,000/- (with GST) a.2) Rs.42,37,100/- (without GST) b) Rs.42,500/- c) Rs.1,875/- d) 5 months

Milestone dates for e-tendering are as under	
1. Downloading of e-documents	15-03-25 To 05-04-25 upto 17.00 Hrs.
2. Pre-bid meeting in the O/o CE	21-03-25 at 16.00 Hrs.
3. Last date for online submission of e-Tender	05-04-25 upto 18.00 Hrs.
4. Submission of EMD, Tender fee and other documents for verification by Regd.Post.A.D. / Speed Post	Before 11-04-25 and 18.00 Hours
5. Opening of Technical Bid	15-04-25 at 11.00 Hours onwards
6.Verification of submitted documents (EMD, e - Tender fee, etc.)	15-04-25 at 11.00 Hours onwards
7.Opening of Price Bid (For Technically qualified bidders only)	17-04-25 at 11.00 Hours onwards
8.Bid Validity	120 Days

1. The e-tender fee will be accepted only in form of Demand Draft in favor of "Rajkot Municipal Corporation" Rajkot, payable at Rajkot from any Nationalized Bank or Scheduled Bank (except Co-operative Bank) in India and must be delivered to above address.
2. All bidders must submit Bid security (EMD) as above either directly deposited in ICICI Bank Account No.015305010638 (Rajkot Municipal Corporation) IFSC Code ICIC0000153 or submit at the below mentioned address in form of Demand Draft in favour of "Rajkot Municipal Corporation", Rajkot, from any Nationalized Bank or Scheduled Bank (except Co-operative Bank) in India.
~~Bank Guarantee will also be accepted.~~

3. Submission of required documents shall have to be done at the below mentioned address:

Office of the CITY ENGINEER

Rajkot Municipal Corporation

SHRI ZAVERCHAND MEGHANI BHAWAN,

Construction Branch, BHAVANAGAR ROAD,

Rajkot – 360003

4. The pre-qualification requirement is as under:

i) Financial Criteria:

1. The Bidder must have achieved a minimum annual turnover in any one year over the last seven financial years of the annual value of contracts value.
2. The Bidder should give undertaking that he has access to or has available, liquid assets and/or credit facility equal to 25% of the value of the contract / contracts applied.
3. Available Bid Capacity (ABC) must be more than the estimated tender cost.

Available bid capacity (ABC) = $(A \times N \times 2) - B$,
where,

A = Maximum of updated total amount of work executed in any one year of the last seven financial years taking into account the completed as well as works in progress

B = Amount of the existing commitments and ongoing works to be completed during time interval of N years from the bid due date

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

4. Bidder must have minimum Class "E-1" & Above registration.

ii) Experience Criteria:

The bidder should possess following minimum experience:

1. Bidder should have completed OR substantially completed at least one work of **40%** of tender amount either in Government or Semi-Government or Government Autonomous Body as a main contractor in period of last seven years.

Note:

- i) Substantially completed works means those works which are completed at least 90% of original contract price on the date of submission of this tender and execution is satisfactory.
 - ii) The work may have been executed by the applicant as prime contractor or as a member of a joint venture. In case a project has been executed as a joint venture, joint venture proportion will be taken into consideration.
2. Bidder should have enough machinery and experienced personnel to supervise the work.

Note on pre-qualification requirement:

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

Sr. No.	Year	Enhance Factor
1	Current Year (2024-25)	1.00
2	Current Year – 1 (2023-24)	1.10
3	Current Year – 2 (2022-23)	1.21
4	Current Year – 3 (2021-22)	1.33
5	Current Year – 4 (2020-21)	1.46
6	Current Year – 5 (2019-20)	1.61
7	Current Year – 6 (2018-19)	1.77
8	Current Year – 7 (2017-18)	1.95

2. For Financial and Experience criteria, the estimated cost of **Rs.50,00,000/-** will be considered.
5. Bidder has to quote their rates without GST and including other taxes. The invoice should be submitted by contractor showing the breakup of GST in the bill. GST will be paid extra at the prevailing rate at the time of execution.
6. The contractor shall have to purchase the material required for this tender work, only from the supplier having registered GST Number. RMC will not be responsible to pay any amount towards GST if the material is purchased from the unregistered supplier / not having GST Number.
7. After opening of Technical Bid, the procedure for the pre-qualification shall be adopted and the Price Bid of only successful qualified bidder shall be opened for final evaluation of the contract. The decision of Municipal Commissioner regarding the pre-qualification shall be final and binding to all the bidders.
8. The Tender of those bidder(s) those who fails to produce the required documents physically within the stipulated date and time, will be treated as non responsive and their Price Bid will not be opened.
9. The bidder should not have been Black Listed, suspended, terminated, backed out, debarred & delisted by any Municipal Body / Urban Local Body / Development Authority in any State Government Body or undertaking / any department or undertaking of Government of India, since inception of the firm / Company. Such a case will be rejected out rightly. A Declaration in this regard on Rs.300/- Stamp Paper duly Notarized shall have to be submitted as per Annexure along with the tender documents. Submission of the bid document without such Notarized declaration will be rejected out rightly.
10. The bidder should provide accurate information on any litigation history or arbitration resulting from contracts completed or under execution by him over the last ten years. This should also include such cases, which are in process / progress. A consistent history of awards against the bidder may result in failure of the bid. In case the bidder has not provided such information and has come to the notice of the authority, the tender will be rejected at what so ever stage and in such case all the losses that will arise

out of this issue will be recovered from the Bidder / bidder and he will not have any defense for the same.

11. Joint Venture is not permitted for this tender.
12. Conditional Tenders will be out rightly rejected.
13. If no agency remains present and are no points for Prebid meeting, "NIL" minutes to be considered and the same will not be uploaded.
14. Rajkot Municipal Corporation, Rajkot, reserves the right to accept / reject any or all e-tender(s) without assigning any reasons thereof.

CITY ENGINEER
Rajkot Municipal Corporation

CHECKLIST FOR SUBMISSION OF DOCUMENTS
(ONLINE AND OFFLINE)

The bidder must submit the relevant documents as per below:

Sr No	Document Name	ONLINE SUBMISSION	OFFLINE SUBMISSION
1	Tender Fee and EMD	Scan Image	Original DD
2	Tender Documents with Corrigendum, if any	Scan Image	--
3	Work Experience Certificates	Scan Image	--
4	Turnover Certificate from CA	Scan Image	--
5	Working Capital from CA	Scan Image	--
6	Agency Registration Certificate	Scan Image	--
7	GST Registration	Scan Image	--
8	PAN Card	Scan Image	--
9	PF Registration	Scan Image	--
10	ESIC Registration	Scan Image	--
11	Professional Tax (PEC and PRC)	Scan Image	--
12	Non-Blacklist Declaration	Scan Image	Original
13	Litigation History	Scan Image	Original
14	Site Visit Declaration	Scan Image	Original
15	Other documents, if any	Scan Image	--

Note: The bidder must submit all relevant documents as per qualification criteria and tender conditions. No correspondence to the agency will be done for shortfall documents.

Original documents to be brought by bidder/authorized person for verification on the date and time as communicated by engineer-in-charge. Successful bidder to submit hard copy of tender documents including addenda/Corrigendum, if any and other supportive documents as required in this tender, duly stamped & signed on all pages.

ADDL. CITY ENGINEER
Rajkot Municipal Corporation

Name and signature of Bidder

Check List for submission of Documents Tab	
Tender Fee submitted as per Tender	Yes / No
Tender Earnest Money Deposit submitted as per Tender	Yes / No
Registration documents submitted as per tender requirement	Yes / No
Financial Details:	
Turnover details submitted as per requirement	Yes / No
Working Capital as per requirement of tender is submitted	Yes / No
Experience Details:	
Details of Technical Staff and details of machineries submitted	Yes / No
Address proof submitted	Yes / No
Identity proof submitted	Yes / No
Fresh Declaration on Non-Judicial Stamp Paper regarding not black listed or Terminated or Debarred, is submitted	Yes / No
Professional Tax Receipt of current year	Yes / No

Note:

Over and above, the agency shall also have to submit all other necessary documents as may be required for pre-qualification, failing which, the agency will be treated as Non-responsive and will be DISQUALIFIED and also the online price bid of such agency will not be opened.

Signature of contractor with seal

I N S T R U C T I O N S T O B I D D E R S

INSTRUCTIONS TO BIDDER

IT 1. GENERAL

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

IT 2. INVITATION TO E-TENDER

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

IT 3. LANGUAGE OF e-TENDER

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

IT 4. QUALIFICATIONS OF BIDDERS

- A. The Bidders shall abide by the laws of the Union of India and of Gujarat State and legal jurisdiction of the place where the works are located.
- B. The Bidder shall furnish a written statement of financial and technical parameters with details and documents along with his e-Tender which contains namely as below:
 - i. The Bidder's experience in the fields relevant to this contract
 - ii. The Bidder's financial capacity/resources and standing over at least 7 (Seven) years
 - iii. The Bidder's present commitments (Jobs on hand
 - iv. The Bidder's capability and qualifications of himself and his regular staff etc
 - v. Plants and Machinery available with the Bidder for the work e-Tendered
- C. Joint venture : **(N.A.)**
 - i. For the work mentioned above Joint Venture shall be allowed with maximum number of partner two, however all the fees, guarantee amount etc will be in the name of lead partner.
 - ii. In Joint Venture, the lead partner as well as any other partner should have experience of similar nature of work, minimum 15 % of the estimated cost.

In case of Joint venture the tender evaluation will be as under:

Financial :-

The finance of each partner will be considered proportionate to their share in the Joint venture agreement.

Technical :-

The experienced of each partner will be added in the tender evaluation.

Bids submitted by a joint venture of two firms as partners shall comply with the following requirements.

- i. Tender fee, Earnest Money Deposit, Security Deposit and other financial details will be in the name of the lead partner.
- ii. All the partners shall have to enter into the Joint venture agreement and original agreement duly notarized shall have to be submitted along with tender documents.
- iii. The bid, and in case of a successful bid, the Form of Contract Agreement, shall be signed so as to be legally binding on all partners.
- iv. One of the partners shall be authorized to be in charge, and his authorization shall be evidenced by submitting a power of attorney by legally authorized signatories of all the partners.
- v. The partner in charge shall be authorizes to incur liabilities, receive payments and receive instructions for and on behalf of any or all partners of the joint venture and the entire execution of the Contract.
- vi. All partners of the joint venture shall be jointly and severally liable for the execution of the Contract in accordance with the Contract terms and relevant statement to this effect shall be included in the authorization mentioned under (iv) above as well as in the Bid Form and the Form of Contract Agreement (in case of successful bid); and
- vii. Permissible Joint venture partners shall be restricted to two numbers.

The owner or the Engineer-in-charge is not obliged to disclose his findings or his Assessment.

The Bidder shall furnish original documents on the date mentioned in tender notice. The bid for those bidder will be treated as non-responsive who failing to produce original documents on specified date.

IT 5. e-TENDER DOCUMENTS

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

IT 6. EXAMINATION BY BIDDERS

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

(d) correlate his observations, investigations, and determinations with the requirements of the e-TENDER Documents, site & subsoil investigation.

- B. The e-Tender is invited on **..%. rate** and contractor shall have to quote his price on % bases **above or below in the schedule -B./ Price Schedule**. The works shall have to be completed in all respect as stated in the e-Tender document to the satisfaction of the Corporation.
- C. The following comprises in Contract Documents at a price of **Rs.1,875-00**.

e-TENDER Document:

Part-I

1. Notice inviting Bidders.
2. Instructions to the Bidder.
3. Check List
4. Formats
5. General conditions of contract

Part-II

Technical specifications

Part-III

- a. Bid Form (With Price)
- b. Preamble to Price schedule
- c. Price Schedule (Schedule-B)

General Specifications

1. General note & site description.
2. Definition.
3. Scope of Contract.
4. e-Tender price.
5. Completion Schedule.
6. Site investigation.
7. Contractor's responsibility.
8. Safety.
9. Quality Assurance.
10. Classification of Strata.

- D. Copy of the E-TENDER Document should be completed, checked in a responsible manner, digitally signed, and submitted. Security Bond shall be submitted in person by the stipulate date, which shall form the e-Tender.

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

IT 7. EARNEST MONEY DEPOSIT:

- A. Each Bidder must submit a receipt of deposit as Tender guarantee towards **Earnest money** amounting to **Rs.42,500/-** in any form mentioned below:

- a) By a Demand Draft on the Rajkot Branch of any Nationalized Bank or Scheduled Bank except co-operative bank.
- b) It can be directly deposited in the account of Rajkot Municipal Corporation.
- c) ~~A Bank Guarantee from Rajkot Branch of any Nationalized Bank or Scheduled Bank except co-operative bank. It shall be valid for a period of not less than Three hundred and Sixty (360) days from the date of submission.~~

EMD shall comply with the requirements for Bond as stipulated in the General conditions of contract. The Tender guarantee bond will be held by the owner as a guarantee that the Bidder, if awarded the contract, will enter into the contract agreement in good faith and furnish the required bonds. Any e-Tender not accompanied by a Tender guarantee in the form of earnest money deposited for the sum stipulated in the e-Tender Document will be summarily rejected.

- B. The Earnest Money Deposit will be refunded to the unsuccessful Bidders after an award has been finalized.
- C. The Earnest Money Deposit (Tender Guarantee) will be forfeited in event the successful Bidder fails to accept the contract and fails to submit the "Performance Guarantee Bonds to the Owner as stipulated in this e-Tender document within ten (10) days after receipt of notice of award of contract.

The successful Bidder shall furnish the required Security Deposit for performance and plus additional security if any for unbalanced bids in accordance with the condition of the contract and attend the office of the Engineer In-charge for execution of the contract documents. If he fails to furnish the Security Deposit for performance or enter into an agreement to execute the contract for the work offered to him, his Earnest Money Deposit will be forfeited and the Bidder will be Black Listed / Debarred from tendering for further works of Rajkot Municipal Corporation for the period of three years.

- D. The Earnest Money Deposit of the successful Bidder shall be returned after the performance guarantee bond, as required, is furnished by the contractor.
- E. No interest shall be paid by the owner on any e-Tender guarantee.

IT 8. INCOME TAX CLEARANCE CERTIFICATE: (DELETED)

Latest Income Tax clearance Certificates must accompany with the e-Tender without which the e-Tender is liable to be summarily rejected. The Income Tax Clearance Certificate obtained from the Income Tax Officer shall clearly indicate the Income Tax Pan No/Circle/Ward, District and the reference number of the assessment along with the assessment year.

IT 9. PREPARATION OF e-TENDER DOCUMENTS

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

- A. e-TENDER shall be submitted on the e-TENDER form bound here in English. All statements shall be properly filled in. Numbers shall be stated both in words and in figures where so indicated.
- B. All entries or prices and arithmetic shall be checked before submission of the e-TENDER. If there is discrepancy between the rates quoted in figures and in words, the rates expressed in words shall be considered as binding.
- C. Each e-Tender shall be accompanied by the prescribed e-Tender security bond and other required documents and drawings. All witnesses and sureties shall be persons of status and probity and their full names, occupations and addresses shall be stated below their signature.
- D. Variation to the contract Documents requested by the Bidder may be affixed and duly signed and stamped. Such variations may be approved or refused by the Corporation is not obliged to give reason for his decisions.

IT 10. SUBMISSION OF e-TENDER DOCUMENTS

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

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

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

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

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

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

IT 11 TENDER VALIDITY PERIOD

The validity period of the e-Tender submitted for this work shall be of One Hundred and Twenty (120) calendar days from the date opening of Technical bid of eTender and that the Bidder shall not be allowed to withdraw or modify the e-Tender offer on his own during the validity period. The Bidder will not be allowed to withdrawn the e-Tender or make any modifications or additions in the terms and conditions on his own e-Tender. If this is done then the owner shall, without prejudice to any other right or remedy, be at liberty to reject the e-Tender and forfeit the earnest money deposit in full.

IT 12 GENERAL PERFORMANCE DATA

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

IT 13 SIGNING OF e-TENDER DOCUMENTS

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

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

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

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

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

IT 14 WITHDRAWAL OF TENDERS

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

IT 15 INTERPRETATIONS OF e-TENDER DOCUMENTS

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

IT 16 ERRORS AND DISCREPANCIES IN e-TENDERS

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

IT 17 MODIFICATION OF DOCUMENTS

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

ADDENDA

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

A. RMC may issue Addenda to advise Bidders of changed requirements. Such addenda may modify previously issued Addenda.

B. No addendum may be issued after the time stated in the notice inviting e-Tenders.

IT 18 TAX AND DUTIES ON MATERIALS

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

IT 19 EVALUATION OF e-TENDERS

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

IT 20 TIME REQUIRED FOR COMPLETION

The completion period mentioned in this schedule is to be reckoned from the date of notice to proceed. Total completion period is **6 Months** from the date of issue of notice to proceed and contractor should adhere to this completion time. Monsoon period from 1st July to 30th September will be considered as non-working period and hence excluded in time limit.

IT 21 POLICY FOR TENDER UNDER CONSIDERATION

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

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

IT 22 PRICES AND PAYMENTS

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

IT 23 PAYMENT TERMS

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

IT 24 AWARD

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

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

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

IT 25 SIGNING OF CONTRACT

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

IT 26 DISQUALIFICATION

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

- (a) The envelope does not show on the outside the reference of bid and thus gets opened before the due date of opening (as per Article IT 10 i.e. submission of tender document)
- (b) The Tender fee and Tender Earnest Money Deposit is not deposited in full and in the manner as specified as per Article IT.7 i.e. Earnest Money Deposit.
- (c) The e-Tender is in a language other than English or does not contain its English Translation in case of other language adopted for e-Tender preparation.
- (d) The e-Tender documents are not signed by an authorized person (as per Article IT. 13 i.e. signing of e-Tender documents).
- (e) The general performance data for qualification is not submitted fully (as per Article IT 12 i.e. General performance Data).
- (f) Bidder does not agree to payment terms defined as per Article IT. 23 i.e. payment terms.

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

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

- (e) Any conditional tender.
- (f) All corrections or posted slips are not initiated by Bidder.
- (g) Any erasure is made in the e-tender.

IT 27 PERFORMANCE GUARANTEE (SECURITY DEPOSIT)

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

Additional performance guarantee is payable if,

1. the contract price offered by the selected bidder is lower than 10% but upto 20% of the estimated project cost than the additional performance security shall be calculated @ 20% of the difference in the estimated project cost minus 10% of the estimated project cost and Contract price offered by the selected bidder.
2. the contract price offered by the selected bidder is lower than 20% of the Estimated project cost than the additional performance security shall be calculated @ 30% of the difference in the Estimated project cost minus 10% of the Estimated project cost and Contract price offered by the selected bidder.

This additional performance security shall be treated as part of the performance security.

Performance security shall be valid beyond 60 days of the defect liability period and the additional performance security shall be valid beyond 28 days of project completion date.

Final SD will be calculated at the time of final bill i.e. actual completion amount.

Performance as mentioned above may be in the forms mentioned below:

- a) By a Demand Draft on the Rajkot Branch of any Nationalized Bank or Scheduled Bank except co-operative bank.
- b) A fixed deposit receipt of any Schedule Bank or Nationalized Bank (except Co-operative Bank) duly endorsed in favour of the **Rajkot Municipal Corporation, Rajkot.**
- c) A Bank Guarantee from Rajkot Branch of any Nationalized Bank or Scheduled Bank except co-operative bank.

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

2.5% to be recovered in installments through deduction @ the rate of 10% from the running account bills. It is further clarified that Performance Guarantee (SD) for extra work will also be recovered @ 10% from the bill of extra work i.e. works beyond tender amount.

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

IT 28 STAMP DUTY

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

IT 29 BRAND NAMES

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

IT 30 NON TRANSFERABLE

e-TENDER documents are not transferable.

IT 31 COST OF e-Tendering

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

IT 32 EFFECT OF e-Tender

The e-Tender for the work shall remain for a period of One hundred and Twenty (120) calendar days from the date of opening of Technical Bid for this work and that the Bidder shall not be allowed to withdraw or modify the offer in his own during the period. If any Bidder withdraws or makes any modification or additions in the terms and conditions of his own e-Tender, then the Corporation shall, without prejudice to any other right or remedy, be at liberty to reject the e-Tender and forfeit the earnest money in full.

IT 33 CHANGE IN QUANTITY

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

IT 34 NEW EQUIPMENT AND MATERIAL

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

IT 35 RIGHTS RESERVED

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

IT 36 ADDITIONAL RIGHTS RESERVED

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

IT 37 MOBILIZATION ADVANCE

No mobilization advance or advance on machinery will be given.

IT 38 CONDITIONAL e-Tenders

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

IT 39 CESS & REGISTRATION:

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

IT 40 ESI REGISTRATION:

The contractors who are liable to be registered under ESI Act must possess ESI registration number at the time of filling of tender. The agency should follow all the rules and regulations of ESI Act as per prevailing norms.

IT 41 PROFESSIONAL TAX

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

IT 42 PF CODE:

The contractors who are liable to be registered under EPF Act, 1950 must possess EFP code at the time of filling of tender. The agency should follow all the rules and regulations of the Act as prevailing currently.

IT 43 LABOUR LICENSE:

The contractors who are liable to be registered under Contract Labour Act, 1970 must possess online Labour License at the time of filling of tender. The agency should follow all the rules and regulations of the Act as prevailing currently.

IT 44 FILLING OF e-TENDER

The bidder shall have to fill all the details required in on-line bidding form of e-Tender. Incomplete OR inappropriate OR wrong information filled may cause the e-Tender to be rejected.

Add. Asst. Engineer
R. M. C.

Dy. Executive Engineer
R. M. C.

ADDL. CITY ENGINEER
Rajkot Muni. Corporation

Signature of Bidder:

F O R M A T S

Financial & Other Statements

Information / Details to be submitted by the Bidders in the Performa mentioned under Statement no 1 to 9. All the documents submitted herewith as supporting documents shall be duly attested and certified true copy.

STATEMENT NO-1

DECLARATION

I / We _____ hereby declared that I am / We partner(s) are not black listed or Terminated or Debarred or suspended, backed out, delisted or connected with firm black listed or terminated or debarred or suspended or backed out or delisted in any States, CPWD/ MES/ Railways or any Government, Semi- Government or Private body since the inception of the firm / company. Also, no Police complaint is lodged against the firm / company or Staff deployed by me / us.

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

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

I further undertake that if above declaration proves to be wrong/ incorrect or misleading, our tender/ contract stands to be cancelled/ terminated.

Date:
Place:

Signature of Authorized Person

With
Notarised

STATEMENT NO-2

APPLICABILITY OF PROVIDENT FUND AND MISCELLANEOUS PROVISIONS ACT 1952

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

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

Declaration Of Depositing Provident Fund contribution

This to certify that we have deducted the employees' P.F. and deposited the same along with employer's contribution towards provident fund on labour charges / wages paid by us to the labourers engaged for the work of ____
_____ with Provident
Fund Authority under our Provident Fund Code No. _____

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

Date:

Seal and Signature of the Bidder

STATEMENT NO. –3

CURRICULAM VITAE

Sr.No.	Details of person	
1.	Name	
2.	Age	
3.	Qualifications	
4.	Experience in Project Related field	
5.	Other experiences	
6.	Employment Record.	

Sr.No.	Period From - To	Organization under which work	Status /position in the

Note:

- (1) Separate sheet for each person to be furnished as above.
- (2) The contractor's Project Team should consist of persons in the following disciplines.
 - a) Senior Engineer with experience of Building work
 - b) Senior material Engineer.
 - c) Senior Quantity Surveyor.
 - d) Project management expert.
 - e) Site in charge

STATEMENT – 4

INFORMATION REGARDING FINANCIAL CAPACITY OF THE CONTRACTORS

Sr.	Details	Amount (Rs. in lakhs)	Remarks
1.	Solvency		A Banker's Certificate of current financial year may please be attached.
2.	Annual Turnover for the last five years.		Certified true copy to be attached
3.	Price of biggest similar job carried out		Certified true copy to be attached

STATEMENT NO. – 4/A

BIDDER'S FINANCIAL CAPACITY

Sr. No.	Financial Year	Annual Turnover in Engineering Project Rs.	Net worth Rs.	Net Cash Rs.	Working Capital Rs.
1	2022-2023				
2	2021-2022				
3	2020-2021				
4	2019-2020				
5	2018-2019				
6	2017-2018				
7	2016-2017				

Note:-

- 1) *Figures to be taken from audited balance sheets. Duly certified attested true copy*
- 2) *Copies of the balance sheet to be attached..*
- 3) *The bidder shall have to provide that for a period of at least 5 months the bidder has ability to sustain negative cash balance and how he proposes to meet with the same.*
- 4) *Cash Plan / Cash flow Statement.*

STATEMENT NO. – 4 / B

AVAILABLE BID CAPACITY

	2016- 17	2017- 18	2018- 19	2019- 20	2020- 21	2021- 22	2022- 23
Value of works executed in							

The available bid capacity will be worked out as follows.

Available bid capacity = (A x N x 2) – B,

where

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

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

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

STATEMENT NO. – 5

LIST OF SINGLE PROJECT WORK OF NOT LESS THAN 70% OF THE ESTIMATED COST COMPLETED DURING THE LAST FIVE YEARS.

Sr. No .	<i>Year of Construct- ion work</i>	<i>Name of Project</i>	Name of owner & contact person of the project, address, phone	Tot al cost of the wor k	Tot al valu e of wor k don e	Date of starti ng work	Date of Actual completi on of work
1	2	3	4	5	6	7	8
1							
2							
3							
4							
5							
6							
7							
8							
9							
10							

Note: Certificate from the owners in support of above works may be enclosed with this statement.

STATEMENT NO. 5/ A

Detailed information of similar type of work costing not less than tender amount completed with good quality and workmanship in the past seven years.

Name of Contractor: _____

Sr. No.	Name of work	Name of client	Estimated cost of work (Rs. Lakhs)	Tendered amount (Rs. Lakhs)	Date of award of contract	Target date of completion	Actual date of completion	Reason for delay	Amount of work done during last five years preceding this tender (Rs. Lakhs).							Amount of work done after March 2021 (Rs. Lakhs)	Remarks
									2016	2017	2018	2019	2020	2021	2022		
									-	-	-	-	-	-	-		
									17	18	19	20	21	22	23		

Note: Certificate from the owners in support of above works may be enclosed with this statement.

STATEMENT NO – 5/B

[illegible]

Note: Certificate from the owners in support of above works may be enclosed with this statement.

STATEMENT NO. – 5/C

DETAILS OF ONGOING PROJECT

Sr. No	Name of project	Value of remaining work Rs. in lakhs.	Start date	Likely date of completi on	Name, address, telephone, fax no. of project authority and contact person.

STATEMENT NO.-6

**DETAILS OF PLANT & MACHINERY TO BE DEPLOYED ON
THIS WORK**

Name of the contractor/company_____

Sr. No	Name of plants/machinery	Nos. available (with make & year)	Nos. proposed to be deployed for this project	Present location	Present value of plant/ machineries
1	2	3	4	5	6

Note:

Plant / machineries which are proposed to be procured shall have to be procured at the earliest after award of the work and before the start of the work.

STATEMENT NO. 7

METHOD STATEMENT AND WORK PLAN

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

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

Application Form(1)

General Information

All individual firms and each partner of a consortium applying for qualification are requested to complete the information in this form. Nationality information to be provided for all owners or applicants who are partnerships or individually-owned firms.

Where the Applicant proposes to use named subcontractors for critical components of the works, or for work contents in excess of 10 percent of the value of the whole works the following information should also be supplied for the specialist subcontractor(s).

1.	Name of Firm	
2.	Head office address	
3.	Telephone	Contact
4.	Fax	Telex
5.	Place of incorporation/registration	Year of incorporation/ registration

	Nationality of owners	
	Name	Nationality
1.		
2.		
3.		
4.		
5.		

Name of Bidders officers / Persons to be contacted			
Name.	Address	Phone Nos.	Fax.

Application Form (1A)

Structure and Organization

<p>The applicant is an individual a proprietary firm a firm in partnership a Limited Company or Corporation a group of firms/consortium (if Yes, give completion information in respect of each partner)</p>	
<p>Attach the Organization Chart showing the structure of the organization including the names of the Directors and position of officers</p>	
<p>Number of years of experience : as a Prime Contractor (contractor shouldering major responsibility in own country other countries (specify country)</p>	
<p>in a consortium in own country other countries (Specify country)</p>	
<p>as a sub-contractor (specify main contractor) in own country other countries (Specify country)</p>	
<p>4. Name and address of any associates the applicant has in India (in case the applicant happens to be from foreign country) who are knowledgeable in the procedures of customs, immigration, taxes and other information necessary to do the work.</p>	
<p>For how many years has your organization been in business of similar work under its present name? What were your fields when your organization was established? Whether any new fields were added in your organization? And if so, when?</p>	

5. Were you ever required to suspend construction for a period of more than six months continuously after you started? If so, give the name of project and give reasons thereof.	
6. Have you ever left the work awarded to you incomplete? If so, give name of project and reasons for not completing work.	
In which fields of civil engineering construction do you claim specialization and interest?	
Give details of your experience in mechanized cement concrete lining and in modern concrete technology for manufacture and quality control.	
Give details of your experience in using heavy earth moving equipment and quality control in compaction of soils.	
Give details of your experience in Underground Drainage work in rocky area.	
Give details of civil work for drainage pumping station	
Give details for construction of sewerage treatment plant	
Give details for pumping machinery in drainage pumping station	

APPENDIX – A

Details of Firm

Name of the Bidding firm :

Address :

Telephone No. :

Income Tax Year :

2017-2018 :

2018-2019 :

2019-2020 :

2020-2021 :

2021-2022 :

2022-2023 :

2023-2024 :

Details of Firm Partners

Sr No.	Name of the firm Proprietor/Partner	Address with Phone No.		Full details of Income Tax Ward.
		Office	Residence	

No.of Extra sheets used _____ Pages _____ to _____

APPENDIX – B

Financial Statement

To be given separately for the firm each partner / director - please use copies.

Name of the firm / Partner / Director	
NET CAPITAL	
- Authorized	
- Issued and Paid-up	
- FINANCIAL POSITION	
- cash	
-Current Assets	
- Current Liabilities	
- Ratio (Assets to Liabilities)	
- Working Capital	
- Net worth	

	2017-18	2018-19	2019-20	2020-21	2021-22	2022-23	2023-24
Min.avg. annual turnover in construction							
Min.avg. annual net cash							
Min.avg. annual net worth							
Net profit before tax							
Income							

Please attach copy of Income tax return, audited balance sheet and profit and loss account for the last three years.

No. of Extra sheets used _____ pages _____ to _____

APPENDIX – C

Details of Firm Partners / Directors

Sr No	Name of person and address	Prop/ Partner/ Director	Phone Numbers			Full details of Income Tax Ward
			Office	Resi.	Mobile	

Details of Bankers of the Bidder

Sr No	Name of Bank	Account type and number	Manager / Contact person	Address	Phone Number

No.of Extra Sheets used _____ Pages _____ to _____

APPENDIX – D

Details of works completed by Bidder in last Seven years.
(2017-2018 to 2023-2024 years wise)

In order of relevance to the work for which this pre-qualification is sought for:

Sr No	Name and type of work	Address	<u>Bidder</u> 's role (Developer / Builder/ Contractor)	Year of completion	Time taken for completion (in months)	Project details	Project cost (in lacs)

(Bidder can enclose photographs of the above works, with project and bidder's name on the back side).

No. of extra sheets used _____ Pages _____ to _____

APPENDIX – E

**SUPPLYING, LAYING AND COMMISSIONING EXPERIENCE OF DUCTILE IRON/M.S.
PIPELINE IN KMS IN LENGTH (MINIMUM) IN SINGLE CONTRACT IN LAST SEVEN
YEARS**

Sr.No	Name of Scheme	Total Length in Kms	Name of Client with address, contact number and fax no.	Length in Km for Diameter $\geq 300\text{mm}$	Length in Km for Diameter $< 300\text{mm}$	Delay in Months from Scheduled Completion Time	Whether Project Under Litigation (Yes / No.) & reasons thereof

Signature of Contractor

Name of the Contractor

Date

Stamp of Company

(Bidder can enclose photographs of the above works, with project and Bidder 's name on the back side).

APPENDIX – F

EXPERIENCE IN EXECUTION OF SIMILAR PROJECTS AS A MAIN CONTRACTOR – MINIMUM REQUIREMENT ONE PROJECT

(With Similar Nature in Last 7 Years) Cost of the project should not be less than Rs. -----Crores.

Sr. No.	Name of Project / Client	Project Capacity	Cost of the project in Rs. Lakhs.	Brief Details of Project components	Year of work done	Delay in months from the Scheduled date of completion

Signature and Stamp of Contractor

Name of the Contractor

Date

(Bidder can enclose photographs of the above works, with project and Bidder 's name on the back side).

APPENDIX – G

DETAILS OF PLANT & EQUIPMENT OWNED BY THE CONTRACTOR

Description	Qty.	Capacity or Output	Make and Model	Year of Manufacture	Details of the RTO registration	Owned / Hired/ Leased	Present Location
1. List of principal Plant / Equipment of the Contractor							
a) Trucks/Dumpers							
b) Excavators							
c) Concrete Transit Mixers							
d) Dewatering Pumps							
e) Shuttering							
f) Electrical tooling kit							
g) Other (Bidder to list)							

Signature :
 Name :
 Designation :
 Company :
Date :

Note: The contractor shall have to submit proof of ownership of each equipment as otherwise it will be considered that equipments are to be hired.

APPENDIX – H**DETAILS OF KEY-PERSONNEL WITH BIDDER**

Sr No	Name	Qualification	Type of experience	Experience in years	Whether will be involved in the work.

No. of extra sheets used _____ Pages _____ to _____

APPENDIX – H-1**List of Attachments**

Sr No	Attachment	No. of pages	Included Yes/No

No. of Extra Sheets used _____ Pages _____ to _____

APPENDIX – H-2

Name of Work : PROVIDING, LOWERING, LAYING, JOINTING AND
TESTING WORK FOR UNDERGROUND SEWERAGE
NETWORK AT TP SCHEME NO.14, 17, 18 IN WARD
NO.4.

Further information
(Any Further Information To Prove Bidder's Capability For The
Work)

No. of Extra Sheets used _____ Pages _____ to _____

APPENDIX – I

MEMORANDUM OF UNDERSTANDING (MOU)

This MOU made and entered into on **th day of** , 202_ for the , **PROVIDING, LOWERING, LAYING, JOINTING AND TESTING WORK FOR UNDERGROUND SEWERAGE NETWORK AT TP SCHEME NO.14, 17, 18 IN WARD NO.4.**

BETWEEN

M/s. Principal Contractor having registered office, referred to as " PC " which expression shall unless repugnant to the context or contrary to the meaning thereof includes its successors, legal heirs, representatives and permitted assignee of First part.

AND

M/s. Pipe Manufacturer , having registered factory at" HEREINAFTER referred to as " PM" which expression shall unless repugnant to the context or contrary to the meaning thereof includes its successors, legal heirs, representatives and permitted assignees of Second part

WHEREAS RAJKOT MUNICIPAL CORPORATION (herein after referred to as CLIENT) has invited tender for the work of (e- tender -) **PROVIDING, LOWERING, LAYING, JOINTING AND TESTING WORK FOR UNDERGROUND SEWERAGE NETWORK AT TP SCHEME NO.14, 17, 18 IN WARD NO.4.** under control of The Municipal Commissioner, Rajkot Municipal Corporation . Here in after referred to as work.

WHEREAS

The purpose of this MOU is to ensure successful Manufacture, Testing & Supply of pipes of the said project and to respond to the well defined requirements stipulated in the tender specification duly amendment if any during pre-bid conference and the requirements of the tender.

WHEREAS " PC " shall be the principal contractor / Bidder who have relevant experience Providing, laying, jointing, testing & commissioning of DI pipeline of various diameter for in required length for state / central or any semi govt. organization for their water supply scheme successfully and desires to undertake the said work after award of Contract for the said work.

AND WHEREAS "PM" is having own manufacturing unit for manufacturing of Ductile Iron pipes as per the standards laid down in the tender document of this project and agrees to Manufacture, testing, marking and supply required total quantity as per tender in 50% of time limits shown in the tender with a provision to provide all testing facilities at factory site to the authorized engineer and his team of Rajkot Municipal Corporation for this project.

NOW THEREFORE in consideration of all the above, it is hereby agreed upon by and between the parties as follows:

- 1 "PM" agrees to manufacture, testing and supply pipes as per the relevant IS code of practice and specifications laid down in the tender document to "PC ", if the same are desired and requested by the client.
- 2 "PM" in this association will provide all Technical Assistance for Design & Manufacturing of pipes as per the standards and specifications within a period prescribed in the tender. "PC" shall in all normal circumstances carry out the said work at site at the price quoted by them.
- 3 Both the companies "PC" and "PM" are jointly and severally responsible for performance in totality for their respective scope of work included in the above said work up to liability period.
- 4 The parties hereto further agree that each of them treat the TECHNICAL AND FINANCIAL DATA and information supplied by one to the other as strictly confidential and confine to any tender only and shall not part with the same to be third party.
- 5 When "PC" gets the work order for the above said work from the CLIENT, "PM " shall automatically get its part of order from "PC".
- 6 In the event, liquidated damages are imposed by the CLIENT, for the non fulfillment of any requirement or conditions pertaining to **completion of this work** by "PC" shall be prime responsible & "PM" shall be responsible for Manufacturing, testing, supply of required pipes under scope of work.
- 7 All questions/disputes related to this contract or consequence to this MOU which cannot be settled, mutually shall within 30 days from the date that either PARTY informs the other in writing that such disputes or disagreement, all necessary Assistance for performance under this contract shall continue during the arbitration proceedings. The venue of Arbitration shall be Rajkot and municipal commissioner shall be the sole arbitrator for this work.
- 8 Each PARTY shall inform, in a timely manner, to the other PARTY the specifications and other details available with one PARTY and required by the other Party to enable the other PARTY to properly perform their own scope of work.
- 9 "PC" shall bear all cost and expenses incurred in connection or otherwise related to all parts and aspects of the project work.
- 10 Manufacture & Supply understanding letter of "PM" dated_th , 20 shall be considered as part of Agreement.

- 11 Payment to sub contractor / pipe manufacturer for this work shall be made by "PC" However if further amount on sub contract etc. will be levied by the Govt., any further taxes of central or state govt., PC shall be responsible for it.

IN WITNESS WHEREOF the parties have caused there duly authorized representative to sign below:

Signed for & on behalf of

For PC For PM

Proprietor. Director.

APPENDIX –J

DELETED

Form of Bid Security (Bank Guarantee) (DELETED)[N.A.]

WHEREAS, _____ *[Name of Bidder]* (hereinafter called "the Bidder") has submitted his bid dated _____ *[Date]* for the construction of _____ *[Name of Contract]* (hereinafter called "the Bid").

KNOW ALL MEN by these presents that We _____ *[Name of Bank]* of _____ *[Name of Country]* having our registered office at _____ (hereinafter called "the Bank") are bound as principal obligator unto _____ *[Name of Employer]* (hereinafter called "the Employer") and unconditionally and irrevocably guarantee the payment to the sum of _____ for which payment well and truly to be made to the said Employer the Bank binds himself, his successors and assigns by these presents.

SEALED with the Common Seal of the said Bank this _____ day of _____ 20____.

THE CONDITIONS of this obligation are:

- (1) If the Bidder withdraws his Bid during the period of bid validity specified in the Form of Bid:
- or
- (2) If the Bidder refuses to accept the correction of errors in his Bid;
- or
- (3) if the Bidder, having been notified of the acceptance of his Bid by the Employer during the period of Bid validity;
 - (a) fails or refuses to execute the Form of Contract Agreement in accordance with the 'Instructions to Bidders, if required; or
 - (b) fails or refuses to furnish the Performance Security, in accordance with the Instructions to Bidders;

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

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

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

DATE _____

SIGNATURE OF THE BANK

WITNESS _____

SEAL

(Signature, Name, and Address)

FORM OF CONTRACT AGREEMENT

AGREEMENT

THIS AGREEMENT made the _____ day
of _____ 20____
between _____

of _____
_____ (hereinafter called "the Employer") of the one part
and _____ of _____ (hereinafter
called "the Contractor" of the other part.

WHEREAS the Employer is desirous that certain Works should be executed
by the Contractor, viz.,

_____ and has accepted a e-Tender by the Contractor for the execution and
completion of such Works and the remedying of any defects therein at a
cost of Rs. _____
and _____.

NOW THIS AGREEMENT WITNESSETH as follows:

In this Agreement, words and expressions shall have the same meanings as are respectively assigned to them in the Conditions of Contract hereinafter referred to.

The following documents shall be deemed to form and be read and construed as part of this Agreement, viz:

- a) The Contract Agreement.
- b) The Letter of Acceptance.
- c) The Employer's Requirements.
- d) The Bid.
- e) The Conditions of Contract - Volume -I
- f) The Technical Specifications - Volume-II
- g) The Bid Drawings;
- h) The Price Bid. Volume-III
- i) The Contractor's Proposal
- j) Minutes of Pre bid meeting
- k) Addenda, Corrigendum etc.

In consideration of the payments to be made by the Employer to the Contractor as hereinafter mentioned, the Contractor hereby covenants with the Employer to execute and complete the Works and remedy any

defects therein in conformity in all respects with the provisions of the Contract.

The Employer hereby covenants to pay the Contractor in consideration of the execution and completion of the Work and the remedying of defects therein the Contract Price or such other sum as may become payable under the provisions of the Contract at the times and in the manner prescribed by the Contract.

IN WITNESS whereof the parties hereto have caused this Agreement to be executed the day and year first before written.

The _____ Common _____ Seal
of _____

____ was hereunto affixed in the presence of:

_____ or _____

Signed, sealed, and delivered by the said _____
_____ in the presence of: _____

Binding Signature of Employer _____

Binding Signature of Contractor _____

FORM OF PERFORMANCE SECURITY (BANK GUARANTEE)

(DELETED - N.A.)

To: _____ (name of Employer)

_____ (address of Employer)

WHEREAS _____ (name and address of Contractor) (hereinafter called "the Contractor") has undertaken, in pursuance of Contract No. _____ dated _____ to execute _____ (name of Contract and brief description of Works) (hereinafter called "the Contract");

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

AND WHEREAS we have agreed to give the Contractor such as Bank Guarantee;

NOW THEREFORE we hereby affirm that we are the Guarantor and responsible to you as principal obligator, on behalf of the Contractor, unconditionally and irrevocably guarantee the payment of _____ an _____ amount _____ to _____ total _____ of _____

_____ (amount of Guarantee) _____ (amount in words), such sum being payable in the types and proportions- of currencies in which the Contract Price is payable, and we undertake to pay you, upon your first written demand and without cavil or argument, any sum or sums within the limits of _____ (amount of Guarantee) as aforesaid without your needing to prove or to show grounds or reasons for your demand for the sum specified therein.

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

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

this guarantee shall be valid until the date of issue of the performance certificate.

SIGNATURE AND SEAL OF THE GUARANTOR

Name of Bank _____

Address _____

Date _____

FORM OF ADVANCE PAYMENT SECURITY (BANK GUARANTEE)**(DELETED - N.A.)**To: _____ (name of
Employer)_____ (address of
Employer)

_____ (name of Contract)

Gentlemen:

In accordance with the provisions of the Conditions of Contract,
("Advance Payment") of the above-mentioned
Contract, _____

_____ [name and address of Contractor]
(hereinafter called "the Contractor") shall deposit with

_____ (name of the Employer) a bank guarantee to guarantee his proper and
faithful performance under the Clause of the Contract in an amount of
_____ (amount of Guarantee)

_____ (amount of words).

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

_____ (amount in words), such amount to
be reduced periodically by the amounts recovered by you from the
proceeds of the Contract.

We further agree that no change or addition to or other modification of
the terms of the Contract or of Works to be performed there under or of
any of the Contract documents which may be made between
_____ (name of Employer) and the
Contractor, shall in any way release us from any liability under this

guarantee, and we hereby waive notice of any change, addition, or modification.

This guarantee shall remain valid and in full effect from the date of the advance payment under the Contract until _____ (name of Employer) receives full repayment of the same amount from the Contractor.

Yours truly,

SIGNATURE AND SEAL:

Name of Bank or Financial Institution:

Address:

Date:

**Signature of Contractor Executive Engineer
Rajkot Municipal Corporation**

GENERAL CONDITIONS OF CONTRACT

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GC-01 DEFINITIONS AND INTERPRETATIONS :

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

relative to the particular work or part thereof, so far as they are not contrary to the E-TENDER specifications and in absence of any other Country applied in Indian as a matter of standard engineering practice and approved in writing by the Engineer-In-Charge with or without modification.

- 1.14 The "Drawings" shall include maps, plans, tracings, or prints thereof with any modification approved in writing by the Engineer-In-Charge and as such other drawings as may, from time to time, be furnished or approved in writing by the Engineer-In-Charge in connection with the work.
- 1.15 The "Work" shall mean the works to be executed in accordance with the contract or the part thereof as the case may be and shall include extra, additional, altered or substituted works as required for the purpose of the contract. It shall mean the totality of the work by expression or implication envisaged in the contract and shall include all materials, equipment and labour required for or relative or incidental to or in connection with the commencement, performance and completion of any work and / or incorporation in the work.
- 1.16 The "Permanent Work" shall mean works which will be incorporated in and form part of the work to be handed over to the owner by the Contractor on completion of the contract.
- 1.17 The "Temporary Work" shall mean all temporary works of every kind required in or about the execution, completion and maintenance of the work.
- 1.18 "Site" shall mean the land and other places, on, under, in or through which the permanent works are to be carried out and any other lands or places provided by the Corporation for the purpose of the contract together with any other places designated in the contract as forming part of the site.
- 1.19 The "Construction Equipment" shall mean all appliances / equipment of whatever nature required in or for execution, completion or maintenance of works or temporary works (as herein before defined) but does not include materials or other things intended to form or forming part of the permanent work.
- 1.20 **"Notice in writing or written Notice"** shall mean a notice written, typed or in printed form delivered personally **OR** sent by Registered Post to the last known private or business address or Registered Office of the Contractor **OR** through e-mail **OR** mobile message shall be deemed to have been received in the ordinary course of post it would have been delivered.
- 1.21 The "Alteration / variation order" shall mean an order given in writing by the Engineer-In-Charge to effect additions or deletions from or alterations in the work.
- 1.22 "Final Test Certificate" shall mean the final test certificate issued by the owner within the provisions of the contract.
- 1.23 The "Completion Certificate" shall mean the certificate to be issued by the Engineer-In-Charge when the work has been completed and tested to his satisfaction.

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

GC-02 LOCATION OF SITE AND ACCESSIBILITY :

The intending bidders should inspect the site & make thyself familiar with site conditions and available communication facilities.

Non-availability of access roads shall in no case be the cause to condone delay in the execution of the work and no claim or extra compensation will be paid.

GC-03 SCOPE OF WORK :

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

Power Supply :

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

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

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

GC-04

RULING LANGUAGE :

The language according to which the contract shall be construed and interpreted shall be English. All entries in the contract document and all correspondence between the contractor and the Corporation or the Engineer-In-Charge shall be in English/Gujarati. All dimensions for the materials shall be given in metric units only.

GC-05

INTERPRETATION OF CONTRACT DOCUMENT :

1. The provision of the General Conditions of Contract and Special Conditions of Contract shall prevail over those of any other documents of the contract unless specifically provided otherwise, should have there be any discrepancy, inconsistency, error or omission in the several documents forming the contract, the matter may be referred to the Engineer-In-Charge for his instructions and decision. The Engineer-In-Charge's decision in such case shall be final and binding to the Contractor.
2. Works shown upon the drawings but not described in the specifications or described in the specifications without showing on the drawings shall be taken as described in the specifications and shown on the drawings.
3. The headings and the marginal notes to the clause of these General Conditions of Contract or to the specifications or to any other part of e-Tender documents are solely for the purpose of giving a concise indication and not a summary of contents thereof. They shall never be deemed to be part thereof or be used in the interpretation or construction of the contract.
4. Unless otherwise states specifically, in this contract documents the singular shall include the plural and vice-versa wherever the context so requires. Works imparting persons shall include relevant Corporations / Body of individual / firm of partnership.
5. Notwithstanding the sub-division of the documents into separate section and volumes every part of each shall be supplementary to and complementary of every other part and shall be read with and into the context so far as it may be practicable to do so.
6. Where any portion of the General Conditions of Contract is repugnant to or at variance with any provisions of the Special Conditions of Contract, then, unless a different intention appears, the provisions of the special conditions of contract shall be deemed to over ride the provisions of General Conditions of Contract to the extent of each repugnancy of variance.
7. The materials, design, and workmanship shall satisfy the relevant IS, and codes referred to. If additional requirements are shown in the specifications, the same shall be satisfied over and above IS and other codes.

8. If the specifications mention that the Contractor shall perform certain work or provide certain facilities, it shall mean that the Contractor shall do so at his own cost.

9. **Contractor to Collect His Own Information -**

The details given in the e-Tender are arranged making necessary investigations for framing an estimate. However, when the work is being executed, changes in soil conditions are likely to be met with in view of the formation of soil, strata in Rajkot District. It is, therefore, desirable that the Contractor makes his own investigations or additional investigations as may be required for correctly assessing the cost of different items of work and submit his e-Tender accordingly. Any change in description or quantity of an item shall not vitiate the contract or release the Contractor from executing the work comprised in the contract according to the drawings and specifications at the e-Tendered rates.

He is deemed to have know the scope, nature and magnitude of the work and the requirements of materials and labour involved and as to whatever work he has to complete in accordance with the contract. The Contractor is expected to visit the site and surroundings to satisfy himself as to the nature of all existing structures, if any, and also as to the nature and the conditions of railways, roads, bridges and culverts, means of transport and communications whether by land, air or water and as to possible interruptions thereto and the access and gross from the site, to have examined and satisfied himself as to the sites for obtaining sand, stones, bricks and other materials, the site for disposal of surplus materials, the available accommodation and make such enquiries as may be necessary for executing and completing the work, to have local enquiries as to the sub-soil, subsoil water and variation thereof, storms, prevailing winds, climatic conditions and all other similar matters, effecting work. He is expected to be familiar with his liability for payment of Government taxes, customs and excise duty and other charges etc. in contract with the execution of this contract.

GC-06

CONTRACTOR TO UNDERSTAND HIMSELF FULLY :

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

GC-07

ERRORS IN SUBMISSIONS :

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

GC-08

SUFFICIENCY OF e-TENDER :

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

GC-09

DISCREPANCIES :

The drawings and specifications are to be considered as mutually explanatory of each other, detailed drawings being followed in preference to small-scale drawings and figured dimensions in preference to scale and special conditions in preference to General Conditions. The special directions or dimensions given in the specifications shall supercede all else. Should any discrepancies however, appear or should any misunderstanding arise as to the meaning and intent of the said specifications or drawings, or as to the dimensions or the quality of the materials or the due and proper execution of the works, or as to the measurement or quality and valuation of the work executed under this contract or as extra there upon, the same shall be explained by the Engineer-In-Charge and his explanation shall be subject to the final decision of the Municipal Corporation in case reference be made to it, be binding upon the Contractor and the Contractor shall execute the work according to such explanation and without addition or to deduction from the contract price and shall also do all such works and things necessary for the proper completion of the works as implied by the drawings and specifications, even though such works and things are not specially shown and described in the said specifications. In cases where no particular specifications are given for any article to be used under the contract, the relevant specifications of the Indian Standard Institution shall apply.

GC-10

PERFORMANCE GUARANTEE (SECURITY DEPOSIT) :

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

Additional performance guarantee is payable if,

1. the contract price offered by the selected bidder is lower than 10% but upto 20% of the estimated project cost than the additional performance security shall be calculated @ 20% of the difference in the estimated project cost minus 10% of the estimated project cost and Contract price offered by the selected bidder.
2. the contract price offered by the selected bidder is lower than 20% of the Estimated project cost than the additional performance security shall be calculated @ 30% of the difference in the Estimated project cost minus 10% of the Estimated project cost and Contract price offered by the selected bidder.

This additional performance security shall be treated as part of the performance security.

Performance security shall be valid beyond 60 days of the defect liability period and the additional performance security shall be valid beyond 28 days of project completion date.

Final SD will be calculated at the time of final bill i.e. actual completion amount.

Performance as mentioned above may be in the forms mentioned below:

- a) By a Demand Draft on the Rajkot Branch of any Nationalized Bank or Scheduled Bank except co-operative bank.

- b) A fixed deposit receipt of any Schedule Bank or Nationalized Bank (except Co-operative Bank) duly endorsed in favour of the **Rajkot Municipal Corporation, Rajkot.**
- c) A Bank Guarantee from Rajkot Branch of any Nationalized Bank or Scheduled Bank except co-operative bank.

The performance guarantee shall be delivered to the Corporation within ten (10) days of the notice of award and at least three (3) days before the contract agreement is signed unless otherwise specified by the Engineer-in-charge. Alternatively, the contractor may at his option deposit an amount of **2.5%** of the value of the contract price within ten days and the balance **2.5%** to be recovered in installments through deduction @ the rate of 10% from the running account bills. It is further clarified that Performance Guarantee (SD) for extra work will also be recovered @ 10% from the bill of extra work i.e. works beyond tender amount.

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

GC-11

INSPECTION OF WORK :

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

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

2. The material shall be dispatched from Contractor's store on site of work before obtaining approval in writing of the Engineer-In-Charge. Contractor shall provide at all times during the progress of work and maintenance period of proper means of access with ladders, gangways, etc. and make necessary arrangement as directed for inspection or measurement of work by Engineer-In-Charge.

GC-12

DEFECT LIABILITY :

1. Contractor shall guarantee the work for a period of 12 months. Any damage or defect that may arise or that may remain undiscovered at the time of issue of Completion Certificate connected in any way with the equipment or materials supplied by him or in the workmanship shall be rectified or replaced by Contractor at his own expense as desired by Engineer-In-Charge or in default Engineer-In-Charge may cause the same to be made good by other agency and deduct expenses of which the

certificate of Engineer-In-Charge shall be final from any sums that may then or any time thereafter become due to Contractor or from his security deposit or the proceeds of sale thereof or of a sufficient portion thereof.

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

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

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

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

GC-14 PROGRAMME:

The time allowed for execution of works shall be the essence of the contract. The contract period shall commence from the date of notice of intimation to proceed. The Bidder at the time of submitting his e-Tender shall indicate in the construction schedule his programme of execution of work commencement with the total time specified. The Contractor shall provide the Engineer-In-Charge a detailed programme of time schedule for execution of the works in accordance with the specifications and the

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

GC-15 SUB-LETTING OF WORK :

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

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

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

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

GC-17 TIME FOR COMPLETION :

1. The work covered under this contract shall be commenced from the date the Contractor is served with a notice to proceed with the work and shall be completed before the date as mentioned in the time schedule of work. The time is the essence of the contract and unless the same is extended as mentioned in Clause GC-18 "Extension of Time", the Contractor shall pay liquidated damages for the delay.
2. The general time schedule for construction is given in the e-Tender document. Contractor shall prepare a detailed weekly or monthly construction programme in consultation with the Engineer-In-Charge soon after the agreement and the work shall be strictly executed accordingly. The time for construction includes, the time required for testing, rectifications, if any, retesting and completion of the work in all respects to the entire satisfaction of the Engineer-In-Charge except the items which are not coming in the way to commission the project.
3. Monsoon period from 1st July to 30th September shall be considered as non-working period hence excluded in time limit.

GC-18 EXTENSION OF TIME :

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

GC-19 CONTRACT AGREEMENT :

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

GC-20 LIQUIDATED DAMAGES :

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

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

The amount of liquidated damages shall, however, be subjected to a maximum of 10 percent of the contract value.

GC-21 FORFEITURE OF SECUEITY DEPOSIT :

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

GC-22 ACTION OF FORFEITURE OF SECURITY DEPOSIT :

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

- a) To rescind the contract (of which recession notice in writing to the contractor under the hand of the owner shall be conclusive evidence) in which case the security deposit of the Contractor shall stand forfeited and be absolutely at the disposal of the owner.
- b) To employ labour and to supply materials to carry out the balance work debiting Contractor with the cost of labour employed and the cost of materials supplied for which a certificate of the Engineer-In-Charge shall be final and conclusive against the Contractor and 10% of costs on above to cover all departmental charges and crediting him with the value of work done at the same rates as if it has been carried out by the Contractor under the terms of his contract. The certificate of Engineer-In-Charge as to the value of the work done shall be final and conclusive against the Contractor.

- c) To measure up the work of the contractor and to take such part thereof as shall be unexecuted out of his hand and give it to another Contractor to complete, the same. in this case the excess expenditure incurred than what would have been paid to the original Contractor, if the whole work had been executed by him, shall be borne and paid by the original Contractor and shall be deducted from any money due to him by the owner under the contract or otherwise and for the excess expenditure, the certificate of the Engineer-In-Charge shall be final and conclusive.

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

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

In the event of the owner putting in force the powers as stated in a, b, c, above vested in him under the proceeding clause, he may, if he so desires, take possession of all or any tools and plant, materials and stores in or upon the works or the site thereof belonging to the Contractor, or procured by him and intended to be used for the execution of the work or any part thereof paying or allowing for the same in account at the contract rates to be certified by the Engineer-In-Charge. The Engineer-In-Charge may give notice in writing to the Contractor or his representative requiring him to remove such tools, plant, materials or stores from the premises within the time specified in the notice and in the event of the Contractor failing to comply with any such notice, the Engineer-In-Charge may remove them at the Contractor's expenses or sell them by auction or private sale on account of the Contractor and his risks in all respects without any further notice as to the date, time or place of the sale and the certificate of Engineer-In-Charge as to the expense of any such removal and the amount of the proceeds and the expenses of any such sale shall be final and conclusive against the Contractor.

GC-23

COMPENSATION FOR ALTERATION IN OR RESTRICTION IN WORK :

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

When the Contractor is a partnership firm, the prior approval in writing of the owner shall be obtained before any change is made in the Constitution of the firm. Where the Contractor is an individual or a Hindu Undivided Family or business concern, such approval as aforesaid shall, likewise be obtained before Contractor enters into an agreement with other parties

where under, the reconstituted firm would have the right to carry out the work hereby undertaken by the Contractor. In either case, if prior approval as aforesaid is not obtained, the contract shall be deemed to have been allotted contravention of subletting clause hereof and the same action may be taken and the same consequence shall ensure as provided in the subletting clause.

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

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

GC-25 MEMBERS OF THE OWNER NOT INDIVIDUALLY LIABLE :

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

GC-26 OWNER NOT BOUND BY PERSONAL REPRESENTATIONS :

The Contractor shall not be entitled to any increase on the schedule of rates or any other rights or claims whatsoever by reason of representation, promise or guarantees given or alleged to have been given to him by any person.

GC-27 CONTRACTOR'S OFFICE AT SITE :

The Contractor shall provide and maintain an office at the site for the accommodation of his agent and staff and such office shall remain open at all reasonable hours to receive information, notices or other communications.

GC-28 CONTRACTOR'S SUBORDINATE STAFF AND THEIR CONDUCT :

1. The Contractor on award of the work shall name and depute a qualified Engineer having experience of carrying out work of similar nature, whom equipments, materials, if any, shall be issued and instructions for work given. the Contractor shall also provide to the satisfaction of Engineer-In-Charge sufficient and qualified staff, competent sub-agents, foreman and loading hands including those specially qualified by previous experience to supervise the type of works comprised in the contract in such manner as will ensure work of the best quality and expeditious working. If, in the opinion of the Engineer-In-Charge additional properly qualified supervision staff is considered necessary, it shall be employed by the Contractor, without additional charge on account thereof. The Contractor shall ensure to the satisfaction of the Engineer-In-Charge that sub-contractors, if any, shall provide competent and efficient supervision over the work entrusted to them.
2. If and whenever any of the Contractor's or sub-contractor's agents, sub-agents, assistants, foreman or other employees shall, in the opinion of the Engineer-In-Charge, be guilty of any misconduct or be incompetent or insufficiently qualified or negligent in the performance of their duties or that in the opinion of the owner or Engineer-In-Charge, it is undesirable for administrative or any other reason for person or persons to be employed in the works, the Contractor if so directed by the Engineer-In-Charge, shall at once remove such person or persons from employment thereon. Any person or persons so removed shall not again be re-employed in connection with the works without the written permission of the Engineer-In-Charge. Any person, so removed from the works shall be

immediately replaced at the expense of the Contractor by a qualified and competent substitute. Should the Contractor be required to repatriate any person removed from the works he shall do so after approval of Engineer-In-Charge and shall bear all costs in connection therewith.

3. The Contractor shall be responsible for the proper behavior of all the staff, foreman, workmen and others and shall exercise proper control over them and in particular and without prejudice to the said generality, the Contractor shall be bound to prohibit and prevent any employee from trespassing or acting in any way detrimental or prejudicial to the interest of the community or of the properties or occupiers of land and properties in the neighborhood and in the event of such employees so trespassing, the Contractor shall be responsible therefore and relieve the owner of all consequent claims, actions for damages or injury or any other ground whatsoever. The decision of the Engineer-In-Charge upon any matter arising under this claim shall be final.
4. If and when required by the owner, the Contractor's personnel entering upon the owner's premises shall be properly identified by badges of a type acceptable to the owner which must be worn at all times on owner's premises.

GC-29 TERMINATION OF SUB-CONTRACT BY OWNER :

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

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

GC-30 POWER OF ENTRY :

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

- i) Fail to carry out works in conformity with the contract documents, or
- ii) Fail to carry out the works in accordance with the time schedule, or
- iii) Substantially suspend work or the works for a period of seven 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 persists in any of the above mentioned breaches of the contract for seven days after notice in writing shall have been given to the Contractor by the Engineer-In-Charge requiring such breach to be remedied, or
- 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 stores therein and to revoke the Contractor's license to use the same and to complete the works by his agents, other Contractor or workmen, to relate the same upon any terms to such other person firm or Corporation as the owner in his absolute discretion may think proper to employ, and for the purpose aforesaid to use or authorize the use of any materials, temporary works, constructional plant, and stores as aforesaid with making payments or allowance to the Contractor for the said materials other than such as may be certified in writing by the Engineer-In-Charge to be reasonable and without making any payment or allowance to the Contractor for the use of said temporary works, constructional plant and stock or being liable for loss or damage thereto. If the owner shall be reason of his taking possession of the works or of the work being got completed by other Contractor incurred excess expenditure be deducted from any money which may be due for the work done by the Contractor under the contract and not paid for. Any deficiency shall forthwith be made good and paid to the owner by the Contractor and the owner shall have power to sell in such manner and for such price as he may think fit all or any of the constructional plant, materials etc., consist constructed by or belonging to and to recoup and retain the said deficiency or any part thereof out of the proceeds of the sale.

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

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

GC-32 OTHER AGENCIES AT SITE :

The Contractor shall have to execute the work in such place and condition where other agencies will also be engaged for other works, such as site grading, filling and leveling, electrical and mechanical engineering works etc. No claim shall be entertained for works being executed in the above circumstances.

GC-33 NOTICES :

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

GC-34 RIGHTS OF VARIOUS INTERESTS :

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

GC-35 PRICE ADJUSTMENTS :

No adjustment in price shall be allowed and no price escalation will be allowed.

GC-36 TERMS OF PAYMENT :

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

GC-37 RETENTION MONEY :

Pursuance to clause GC-36 (Terms of Payment) any on at money due to the Contractor for work done, Corporation will hold as Retention money five (5) percent of the value of work. The retention money will not normally be due for payment until the completion of the entire work and till such period the work has been finally accepted by the Corporation and a completion certificate issued by the Corporation in pursuant to Clause-GC 79 (Completion Certificate).

GC-38 PAYMENTS DUE FROM THE CONTRACTOR :

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

GC-39 CONTINGENT FEE :

- i) The Contractor warrants that he has not employed a person to solicit or secure the contract upon any agreement for a commission, percentage, and brokerage contingent fee. Breach of this warranty shall give the Corporation the right to cancel the contract or to take any drastic measure as the Corporation may deem fit. The warranty does not apply to commissions payable by the Contractor to establish commercial or selling agent for the purpose of securing business.
- ii) No officer, employer or agent of the Corporation shall be admitted to any share or part of this contract or to any benefit that may rise there from.

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

If the Contractor fails to perform the work under the contract with due diligence or shall refuse or neglect to comply with instructions given to him in writing by the Engineer-In-Charge in accordance with the contract, or shall contravene the provisions of the contract, the Corporation 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 10 (Ten) days of receipt, it shall be lawful for the Corporation, without prejudice to any other rights the Corporation may have under the contract, to terminate the contract for all or part of the works, and make any other arrangements it shall deem necessary to complete the work outstanding under the contract at the time of termination. In this event, the performance Bond shall immediately become due and payable to the Corporation. The value of the work done on the date of termination and not paid for shall be kept as deposit for adjustment of excess expenditure incurred in getting the remaining work completed and the Corporation shall have free use of any works which the Contractor may have at the site at the time of termination of the contract.

If Contractor fails to carry out the work in timely manner as mentioned in clause 20 (Liquidated damages), Rajkot Municipal Corporation may give notice in writing to the Contractor to expedite the work, so that the work can be completed as per time schedule. If Contractor fails to expedite the work within 10 days of receipt of notice, Rajkot Municipal Corporation may terminate the contract and debar the Contractor for three years and the remaining work will be executed through other agency at the risk and cost of the Contractor.

GC-41**DEFAULT OF CONTRACTOR :**

- i) The Corporation may upon written notice of default to the Contractor terminate the contract circumstances detailed as under:
 - a) If in the opinion of the Corporation, the Contractor fails to make completion of works within the time specified in the completion schedule or within the period for which extension has been granted by the Corporation to the Contractor.
 - b) If in the opinion of the Corporation, the Contractor fails to comply with any of the other provisions of this contract.
- ii) In the event, the Corporation terminates the contract in whole or in part as provided in Article GC-50 (Termination of the Contract) the Corporation reserves the right to purchase upon such terms and in such manner as it may be deem appropriate, plant similar to one which is not supplied by the Contractor and the Contractor will be liable to the Corporation for any additional costs for such similar plant and / or for liquidated damages for delay until such time as may be required for the final completion of works.
- iii) If this contract is terminated as provided in this paragraph GC-40 AND/OR GC-30 (Power of Entry) (1) the Corporation in addition to any other rights provided in this clause, may require the Contractor to transfer title and deliver to the Corporation.
 - a) Any completed works

- b) Such partially completed information and contract rights as the Contractor has specifically produced or acquired for the performance of the contract so terminated.
- iv) In the event, the Corporation does not terminate the contract as provided in the paragraph GC-50 (Termination of Contract) the Contractor shall continue performance of the contract, in which case, he shall be liable to the Corporation for liquidated damages for delay until the works are completed and accepted.

GC-42 BANKRUPTCY :

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

GC-43 OWNERSHIP :

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

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

GC-44 DECLARATION AGAINST WAIVER :

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

GC-45 LAWS GOVERNING THE CONTRACT :

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

GC-46 OVER PAYMENT AND UNDER PAYMENT :

Whenever any claim for the payment of a sum to the Corporation arises out of or under this contract against the Contractor, the same may be deducted by the Corporation from any sum then due or which at any time thereafter may become due to the Contractor under this contract and failing that under any other contract with the Corporation (which may be available with the Corporation), or from his retention money or he shall

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

GC-47 SETTLEMENT OF DISPUTES :

Except as otherwise specifically provided in the contract, all disputes concerning questions of fact arising under the contract shall be decided by the Engineer-In-Charge subject to a written appeal by the Contractor to the Engineer-In-Charge and those decisions shall be final and binding on the parties hereto. Any disputes or differences including those considered as such by only one of the parties arising out of or in connection with this contract shall be to the extent possible settled amicably between the parties. If amicable settlement cannot be reached then all disputed issues shall be settled as provided in Article GC-48 (Disputes or differences to be referred to) and Article No.GC-49 (Arbitration).

GC-48 DISPUTES OF DIFFERENCES TO BE REFERRED TO :

If at any time, any question, disputes or differences of any kind whatsoever shall arise between the Engineer-In-Charge and the contractor upon or in relation to or in connection with this contract either party may forthwith give to the other, notice in writing of the existence of such question, dispute or difference as to any decision, opinion, instruction, direction, certificate or evaluation of the Engineer-In-Charge. The question, dispute or differences shall be settled by the Municipal Commissioner, Rajkot Municipal Corporation, who shall state his decision in writing and give notice of same to the Engineer-In-Charge and to the Contractor. Such decision shall be final and binding upon both parties. The contract and work on contract if not already breached or abandoned shall proceed normally unless and until the same shall be revised (or uphold) by any arbitration proceedings as hereinafter provided. Such decisions shall be final and binding on the Engineer-In-Charge and the Contractor unless the Contractor shall require the matter to be referred to an Arbitration panel as hereinafter provided.

GC-49 ARBITRATION :

In case of any dispute arising during the course of execution, the matter should be referred to Municipal Commissioner who will be sole Arbitrator whose decisions will be final and binding to the Contractor.

The word "Arbitration" or "Arbitration Clause" wherever mentioned in this tender document, is to be treated to be referred to GC-49. In this context, an Order bearing No.RMC/Legal/1858 dated 18-02-2017 of Legal Department of Rajkot Municipal Corporation is uploaded separately along with this tender, which Order, will hereafter referred and taken into consideration for Arbitration related purpose.

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

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

GC-51**SPECIAL RISKS :**

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

The Contractor shall not be liable for payment of compensation for delay or for failure to perform the contract for reasons of Force Majeure such as acts of public enemy, acts of Government, fires, floods, cyclones, epidemics, quarantine restrictions, lockouts, strikes, freight embargoes and provided that the Contractor shall within 10 (ten) days from the

beginning of such delay notify the Engineer-In-Charge in writing, of the cause of delay, the Corporation shall verify the facts and grant such extension as the facts justify.

GC-52 CHANGE IN CONSTITUTION :

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

GC-53 SUB-CONTRACTUAL RELATIONS :

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

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

GC-54 PATENTS AND ROYALTIES :

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

machinery, materials, process methods to be supplied in hereunder. Contractor agrees to and does hereby grant to owner together with the right to extend the same to any of the subsidiaries of the owner an irrevocable royalty fee license to use in any Country, any invention made by the Contractor or his employees in or as a result of the performance of work under contract.

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

GC-55

LIEN :

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

GC-56

EXECUTION OF WORK :

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

GC-57

WORK IN MONSOON :

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

GC-58

WORK ON SUNDAYS AND HOLIDAYS :

No work except curing shall be carried out on Sunday and holidays. However, if the exigencies of the work need continuation of work on Sundays and Holidays, written permission of the Engineer-In-Charge shall be obtained in advance.

GC-59 GENERAL CONDITIONS FOR CONSTRUCTION WORK :

Working hours shall be eight every day. The over time work in two shifts could be carried out with the written permission of the Engineer-In-Charge but no compensation shall be paid for the same. The rate quoted shall include this. The Contractor shall plan his work in such a way that his labourers do not remain idle. The owner will not be responsible for idle labour of the Contractor. The Contractor shall submit to the owner progress report every week. The details and proforma of the report will be as per mutual agreement.

GC-60 DRAWINGS TO BE SUPPLIED BY THE OWNER : (N.A.)

The drawings attached with the e-Tender documents shall be for general guidance of the Contractor to enable him to visualize the type of work contemplated and scope of work involved. Detail working drawings according to which the work is to be done shall be prepared by the Contractor for executing the work.

GC-61 DRAWINGS TO BE SUPPLIED BY THE CONTRACTOR:

Where drawings, data are to be furnished by the Contractor they shall be as enumerated in special conditions of contract and shall be furnished within the specified time. Where approval of drawings has been specified it shall be Contractor's responsibility to have these drawings got approved before any work is taken up with regard to the same. Any changes becoming necessary in those drawings during the execution of the work shall have to be carried out by the Contractor at no extra cost. All final drawings shall bear the certification stamp as indicated below duly signed by both the Contractor and Engineer-In-Charge.

Certified true for.....Project
Agreement No.....

Signed

**Contractor
Charge**

Engineer-In-

Drawings will be approved within three (3 weeks of the receipt of the same by the Engineer-In-Charge.

GC-62 SETTING OUT WORK :

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

approval shall not relieve the Contractor of his responsibilities about the correctness of setting out. The Contractor shall provide all materials, labour and other facilities necessary for checking at his own cost. Pillars bearing geodetic marks on site shall be protected by the Contractor. On completion of the work, the Contractor shall submit the geodetic documents according to which the work has been carried out.

GC-63

RESPONSIBILITIES OF CONTRACTOR FOR CORRECTNESS OF THE WORK :

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

1. Materials to be supplied by the Contractor:

Contractor shall procure and provide all the material required for the execution and maintenance of work including M S rods; all tools, tackles, construction plant and equipment except, the materials to be supplied by the owner detailed in the contract documents. Owner, shall make recommendations for procurement of materials to the respective authorities if desired by the Contractor but assumes no responsibility of any nature. Owner shall insist for procurement of materials with ISI marks supplied by reputed firms of the DGS & D list.

2. If however, the Engineer-In-Charge feels that the work is likely to be delayed due to Contractor's inability to procure materials, the Engineer-In-Charge shall have the right to procure materials, from the market and the Contractor will accept these materials at the rates decided by Engineer-In-Charge.

GC-64

MATERIALS TO BE SUPPLIED BY THE OWNER :

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

GC-65

CONDITIONS OF ISSUE OF MATERIALS BY THE OWNER: (N.A.)

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

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

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

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

The Contractor should take the delivery of the materials issued by the owner after satisfying himself that they are in good condition. Once the materials are issued, it will be the responsibility of the Contractor to keep them in good condition and in safe custody. If the materials get damaged or if they are stolen, it shall be the responsibility of the Contractor to replace them at his cost according to the instructions of the Engineer-In-Charge.

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

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

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

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

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

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

GC-66

MATERIALS PROCURED WITH ASSISTANCE OF THE OWNER :

Notwithstanding anything contained to the contrary in any of the clauses of this contract, where any materials for the execution of the contract are procured with the assistance of the owner either by issue from owner's

stock or purchase made under orders or permits or licenses issued materials as trustees for owner, and use such materials not disposed them off without the permission of owner and unserviceable materials that may be left with him after completion of the contract or at its termination for any reason whatsoever on his being paid or credited such price as Engineer-In-Charge shall determine having due regard to the conditions of the materials. The price allowed to Contractor shall not exceed the amount charged to him excluding the storage of breach of the aforesaid condition, the Contractor shall in terms of license or permits and/or for criminal breach of trust be liable to compensate owner at double the rate or any higher rates. In the event of these materials at that time having higher rate or not being available in the market then any other rate to be determined by the Engineer-In-Charge at his decision shall be final and conclusive.

GC-67 MATERIALS OBTAINED FROM DISMANTLING :

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

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

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

GC-69 DISCREPANCIES BETWEEN INSTRUCTIONS:

If there is any discrepancy between various stipulations of the contract documents or instructions to the Contractor or his authorized representative or if any doubt arises as to the meaning of such stipulation or instructions, the Contractor shall immediately refer in writing to the Engineer-In-Charge and shall hand over the same to the owner.

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

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

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

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

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

GC-71 ACTION WHEN NO SPECIFICATIONS ARE ISSUED :

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

GC-72 ABNORMAL RATES :

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

GC-73 ASSISTANCE TO ENGINEER-IN-CHARGE:

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

GC-74 TESTS FOR QUALITY OF WORK :

1. All workmanship shall be of the best kind described in the contract documents and in accordance with the instructions of Engineer-In-Charge and shall be subjected from time to time to such tests at Contractor's cost as the Engineer-In-Charge may direct at the place of manufacture of fabrication or on the site or at any such place. Contractor shall provide assistance, instruments, labour and materials as are normally required for examining, measuring and testing of any work of workmanship as may be selected and required by Engineer-In-Charge.

2. All tests necessary in connection with the execution of work as decided by Engineer-In-Charge shall be carried out at an approved laboratory at Contractor's cost.
3. Contractor shall furnish the Engineer-In-Charge for approval when requested or if required by the specification, adequate samples of all materials and finished goods to be used in work sufficiently in advance to permit tests and examination thereof. All materials furnished and finished goods applied in work shall be exactly as per the approved samples.

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

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

GC-76**SUSPENSION WORK :**

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

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

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

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

The Engineer-In-Charge shall have the right to take possession of or to use any completed or partly completed work or part of work. Such possession or use shall not be deemed to be an acceptance of any work

completed in accordance with the contract. If such prior possession or use by Engineer-In-Charge delays the process of work, equitable adjustment in the time of completion will be made and the contract shall be deemed to be modified accordingly.

GC-79**COMPLETION CERTIFICATE :**

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

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

GC-80**SCHEDULE OF RATES :**

1. The rates quoted by the Contractor shall remain firm till the completion of the work and shall not be subject to escalation. Schedule of rates shall be deemed to include and cover all costs, expenses and liabilities of every description and risks of every kind to be taken in executing, completing and handing over the work to owner by Contractor. The contractor shall be deemed to have known the nature, scope, magnitude and the extent of work and materials required though contract documents may not fully and precisely furnish them. He shall make such provision in the Schedule of Rates as he may consider necessary to cover the cost of such items of work and materials as may be reasonable and necessary to complete the work. The opinion of Engineer-In-Charge as to the item of work which are necessary and reasonable for completion of the work shall be final and binding on Contractor although the same may be not shown on drawings or described specifically in contract documents.
2. The Schedule of Rates shall be deemed to include and cover the cost of all constructional plant, temporary work, materials, labour and all other matters in connection with each item in Schedule of Rates and the

execution of work or any portion thereof finished complete in every respect and maintained as shown or described in the contract document or as may be ordered in writing during the continuance of the contract.

3. The Schedule of Rates shall be deemed to include and cover the cost of all royalties and fees for the articles and processes, protected by letters patent or otherwise incorporated in or used in connection with work, also all royalties, rents and other payments in connection with obtaining material of whatsoever kind for work and shall include an indemnity to owner which Contractor hereby gives against all action, proceedings, claims, damages, costs and expenses arising from the incorporation in or use on the works of any such articles, processes or materials. Other Municipal or local Board charges if levied on material, equipment or machineries to be brought to site for use on work shall be borne by the Contractor.
4. No exemption or reduction of custom duties, excise duties, sales tax or any other taxes or charges of the Central or State Government or of any Local Body whatsoever will be granted or obtained and all such expenses shall be deemed to have been included in and covered by Schedule of Rates. Contractor shall also obtain and pay for all permits or other privileges necessary to complete the work.
5. The Schedule of Rates shall be deemed to include and cover risk on account of delay and interference with Contractor's conduct of work which may occur from any cause including orders of owner in the exercise of his powers and on account of extension of time granted due to various reasons.
6. For work under unit rate basis, no alteration will be allowed in the Schedule of Rates by reasons of work or any part of them being modified, altered, extended, diminished or omitted.

GC-81

PROCEDURE FOR MEASUREMENT OF WORK IN PROGRESS:

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

GC-82

RUNNING ACCOUNT PAYMENTS TO BE REGARDED AS ADVANCES :

1. All running account payments shall be regarded as payments by way of advance against the final payment only and not as payment for work

actually done and completed and shall not preclude the requiring of bad, unsound and imperfect or unskilled work to be removed and taken away and reconstructed or rejected or to be considered as an admission of the due performance of contract or any part thereof.

2. Five (5) percent of the gross R A Bill amount shall be retained from each bill as retention amount and the same will be paid with the final bill.

GC-83

NOTICE FOR CLAIM FOR ADDITIONAL PAYMENT :

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

GC-84

PAYMENT OF CONTRACTOR'S BILL :

1. The price to be paid by the owner to Contractor for the work to be done and for the performance of all the obligations undertaken by the Contractor under contract shall be based on the contract price and payment to be made accordingly for the work actually executed and approved by the Engineer-In-Charge.
2. No payment shall be made for work costing less than Rs.2,00,000/- till the work is completed and a certificate of completion for Construction is given. But in case of work estimated to cost more than Rs.2,00,000/-, 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 shall be made after necessary deductions as stipulated elsewhere in the contract documents for materials, security deposit etc. The payment shall be released to the Contractor within two (2) month of submission of the bill duly pre-occupied on proper revenue stamp. Payment due to Contractor shall be made by the owner by ECS/RTGS mode in Indian currency. Successful bidder must furnish his Bank details for RTGS/ECS with Account Branch of RMC.

GC-85

FINAL BILL :

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

GC-86

RECEIPT FOR PAYMENT :

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

GC-87

COMPLETION CERTIFICATE :

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

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

2. Within one month of completion of work in all respects Contractor shall be furnished with a certificate by the Engineer-In-Charge of such completion but no certificate shall be given nor shall work be deemed to have been executed until all (i) scaffolding, surplus materials and rubbish is cleaned off site completely, (ii) until work shall have been measured by the Engineer-In-Charge whose measurement shall be binding and conclusive and, (iii) until all the temporary works, labour and staff colonies etc. constructed are removed and the work site cleaned to the satisfaction of the Engineer-In-Charge. If Contractor shall fail to comply with the requirements as aforesaid or before date fixed for the completion of work, the Engineer-In-Charge may at the expense of Contractor remove such scaffolding, surplus materials and rubbish and dispose off the same as he thinks fit.
3. The following documents will form the completion documents: -
 - a) Technical documents according to which the work has been carried out.
 - b) Three sets of construction drawings showing therein the modifications and corrections made during the course of execution signed by the Engineer-In-Charge.
 - c) Completion Certificate for "Embedded" or "Covered" up work.
 - d) Certificate of final levels as set out for various works.
 - e) Certificate of test performed for various work.
 - f) Material appropriation statement for the materials issued by owner for work and list of surplus materials returned to owner's store duly supported by necessary documents. (N.A.)
4. Upon expiry of the period of defect liability and subject to Engineer-In-Charge being satisfied that work has been duly maintained by Contractor during the defect liability period of fixed originally or as extended subsequently and that Contractor has in all respects made up any subsidence and performed all his obligations under contract, the Engineer-In-Charge (without prejudice to the rights of owner in any way) give final certificate to that effect. The Contractor shall not be considered to have fulfilled the whole of his obligation until final certificate shall have been given by the Engineer-In-Charge.

5. **Final Certificate only evidence of completion:**

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

GC-88

TAXES, DUTIES, ETC. :

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

If the Contractor is not liable to Sales Tax assessment, a certificate to that effect from the Competent Authority shall be produced without which final payment to the Contractor shall not be made No.P, 'C' and 'D' Form shall be supplied by the owner, and the Contractor shall be required to pay full tax as applicable.

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

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

GC-89

INSURANCE :

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

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

Contractor agrees to fill in with the Employees State Insurance Corporation, the declaration form and all forms which may be required in respect of Contractor's or sub-Contractor's employees whose aggregate remuneration is Rs.400/- p.m. or less and who are employed in work provided for or those covered by ESI from time to time under the agreement. The Contractor shall deduct and secure the agreement of the sub-Contractor to deduct the employees contribution as per the first schedule of the Employees State Insurance Act from wages. Contractor shall remit and secure the agreement of sub-contractor to remit to the State Bank of Indian Employees State Insurance Accounts, the employee's contribution as required by the Act. Contractor agrees to maintain all cards and records as required under the Act in respect of employees and payments and Contractor shall secure the agreements of the sub contractors to maintain in such records, any expenses incurred for the contributions, making contributions or maintaining records shall be to Contractors or sub-contractors own account. owner shall retain such sum as may be necessary from the contract value until Contractor shall furnish satisfactory proof that all contribution as required by the Employees State Insurance Act, 1948 have been paid.

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

GC-90 DAMAGE TO PROPERTY :

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

GC-91 CONTRACTOR TO INDEMNIFY OWNER :

1. The Contractor shall indemnify and keep indemnified the owner and every member, officer and employee of owner from and against all actions, claims, demands and liabilities whatsoever under the in respect of the breach of any of the above clauses and / or against any claim, action or demand by any workman / employee of the Contractor or any sub-contractor under any laws, rules or regulations having force of laws, including but not limited to claims against the owner under the workman compensation Act, 1923, the Employee's Provident Funds Act, 1952 and / or the contract labour (Abolition and Regulations) Act, 1970.

2. PAYMENTS OF CLAIMS AND DAMAGES : If owner has to pay any money in respect of such claims or demands aforesaid, the amount so paid and the cost incurred by the owner shall be charged to and paid by Contractor without any dispute 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, owner be obliged to pay compensation to workmen employed by Contractor the amount of compensation so paid, and without prejudice to the rights of owner under Section-(12) Sub-section-(2) of the said Act, owner shall be at liberty to recover such amount from any surplus due to on to become due to the Contractor or from the security deposit. Owner will not be bound to contest any claim made under Section-(12) Sub-section-(2) of the said act except on written request of Contractor and giving full security for all costs consequent upon the contesting of such claim.

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

GC-92 IMPLEMENTATION OF APPRENTICE ACT 1954 :

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

GC-93 HEALTH AND SANITARY ARRANGEMENTS FOR WORKERS:

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

GC-94 SAFETY CODE :

General :

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

1.0 First Aid and Industrial Injuries :

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

1.2 Contractor shall make outside arrangements for ambulance service and for the treatment of industrial injuries. Name of those providing these services shall be furnished to Engineer-In-Charge prior to start of construction, and their telephone numbers shall be prominently posted in Contractor's field office.

1.3 All injuries shall be reported promptly to Engineer-In-Charge and a copy of Contractor's report covering each personal injury requiring the attention of a physician shall be furnished to owner.

2.0 General Rules :

2.1 Carrying and striking, matches, lighters inside the project area and smoking within the job site is strictly prohibited. Violators of smoking rules

shall be discharged immediately. Within the operation area, no hot work shall be permitted, without valid gas, safety, fire permits. The Contractor shall also be held liable and responsible for all lapses of his sub-Contractors / employees in this regard.

3.0 Contractor's Barricades :

3.1 Contractor shall erect and maintain barricades without any extra cost, required in connection with his operation to guard or protect during the entire phase of the operation of this contract for -

- i) Excavation
- ii) Hoisting areas
- iii) Areas adjudged hazardous by Contractor's OR Owner's inspectors.
- iv) Owner's existing property liable to be damaged by Contractor's operations, in the opinion of Engineer-In-Charge / Site Engineer.

3.2 Contractor's employees and those of his sub-contractors shall become acquainted with owner's barricading practices and shall respect the provisions thereof.

3.3 Barricades and hazardous areas adjacent to but not located in normal routes of travel shall be marked by red lantern at night.

4.0 Scaffolding :

4.1 Suitable scaffolding shall be provided for workman for all works that cannot safely be done from ladders. When a ladder is used, an extra mazdoor shall be engaged for holding the ladder and if the ladder is used for carrying materials as well suitable footholds and handholds shall be provided on the ladder and the same shall be given an inclination not steeper than 1 in 4 (1 horizontal and 4 vertical).

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

4.3 Working platforms, gangways, and stairways should be so constructed that they should not sag unduly or inadequately and if the height of the platform or the gangway of the stairway is more than 3.6 (12') above ground level or floor level, they should be closely boarded, should have adequate width and should be suitably fastened as described in 4.2 above.

4.4 Every opening in the floor of a building or in a working platform be provided with suitable means to prevent the fall of persons or materials by providing suitable fencing or railing whose minimum height shall be 1.0 M (3'.0").

4.5 Safe means of access shall be provided to all working platforms and other working places. Every ladder shall be securely fixed. No portable single ladder shall be over 9.0 M. (30') in length while the width between the side rails in rung ladder shall in no case be less than 30 cms (12 inches) for ladder up to and including 3.0 M. (10'), in longer ladders this width would be increased at least 6 mm (1/4") for each addition 30 c.m. (1.0) of length. Uniform step spacing shall not exceed 30 cms. (12"). Adequate

precaution shall be taken to prevent danger from electrical equipment. No materials on any of the side of work shall be so stacked or placed as to cause danger or inconvenience to any person or public. The Contractor shall also provide all necessary all necessary fencing and lights to protect the workers and staff from accidents, and shall be bound to bear the expenses of defence of every suit action or other proceedings at law that may be brought by any persons for injury sustained owing to neglect of the above precautions and to pay damages and costs which may be awarded in any such suit or action or proceedings to any such person, or which, may be with the consent of the Contractor be paid to compromise any claim by any such person.

5.0 Excavation :

5.1 All trenches 1.2 M (4') or more in depth, shall at all time be supplied with at least one ladder.

5.2 Ladder shall be extended bottom of the trench to at least 3" above the surface of the ground. The side of the trench which are 1.5 M (5') or more in depth shall be stopped back to give suitable slope, or securely held by timber bracing, so as to avoid the danger of sides to collapse. The excavated materials shall not be placed within 1.5 M (5') of the trench of half of the trench depth whichever is more. Cutting shall be done from top to bottom. Under no circumstances, undermining or under cutting be done.

6.0 Demolition :

6.1 Before any demolition work is commenced and also during the progress of the work all roads and open area adjacent to the work site shall either be closed or suitably protected.

6.2 No electric cable or apparatus which is liable to be a source of danger shall remain electricity charged.

6.3 All practical steps shall be taken to prevent danger to persons employed from risk of fire or explosion of flooding. No floor or other part of the building shall be so over loaded with debris or materials as to render it unsafe.

7.0 Safety Equipment :

7.1 All necessary personal safety equipment as considered necessary by the Engineer-In-Charge should be made available for the use of persons employed on the site and maintained in a condition suitable for immediate use, and the Contractor should take adequate steps to ensure proper use of equipment by those concerned.

7.2 Workers employed on mixing asphaltic materials, cement and line mortars shall be provided with protective footwear and protective gloves.

8.0 Risky Place :

8.1 When the work is done near any place where there is a risk of drowning, all necessary safety equipment shall be provided and kept ready for use and all necessary steps taken for prompt rescue of any person in danger and adequate provision should be made for prompt first-aid treatment of all injuries likely to be sustained during the course of the work.

9.0 Hoisting Equipment :

- 9.1 Use of hoisting machines and tackles including their attachments, and storage and supports shall conform to the following standards or conditions.
- 9.2 These shall be of good mechanical construction, sound material and adequate strength and free from patent defect and shall be kept in good condition and in good working order.
- 9.3 Every rope used in hoisting or lowering materials or as a means of suspension shall be of durable quality and adequate strength and free from patent defects.
- 9.4 Every crane driver or hoisting appliance operator shall be properly qualified and no person under the age of 21 Years should be in-charge of any hoisting machine including any scaffolding.
- 9.5 In case of every hoisting machine and of every chain ring hook, shackle, swivel and pulley block used in hoisting or lowering or as means of suspension, the safe working load shall be ascertained by adequate means. Every hoisting machine and all gear referred to above shall be plainly marked with the safe working load and the conditions under which it is applicable shall be clearly indicated. No part of any machine or any gear referred to above in this paragraph shall be loaded beyond the safe working load except for the purpose of testing.
- 9.6 In case of departmental machine, the safe work load shall be notified by the Engineer-In-Charge, as regards Contractor s machine, the Contractor shall, notify, the safety working load of the machine to the Engineer-In-Charge. Whenever the Contractor brings any machinery to site of work he should get it verified by the Engineer-In-Charge concerned.

10.0 Electrical Equipment :

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

11.0 Maintenance of Safety Devices :

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

12.0 Display of Safety Instructions :

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

13.0 Enforcement of Safety Regulations :

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

- 14.0 No Exemption :**
 14.1 Notwithstanding the above clause 1.0 to 13.0 there is nothing to exempt the Contractor from the operations of any other Act or Rules in force in the Republic of India.
 14.2 In addition to the above, the Contractor shall abide by the safety code provisions as per C.P.W.D. safety code framed from time to time.

GC-95 ACCIDENTS :
 It shall be Contractor's responsibility to protect against accidents on the works. He shall indemnify the owner against any claim for damage or for injury to person or property resulting from, and in the course of work and also under the provisions of the workman's compensation Act. On the occurrence of an accident arising out of the works which results in death or which is so serious as to be likely to result in death, the Contractor shall within twenty-four hours of such accident, report in writing to the Engineer-In-Charge, the facts stating clearly and in sufficient details the circumstances of such accident and the subsequent action. All other accidents on the works involving injuries to person or damage to property other than that of the Contractor shall be promptly reported to the Engineer-In-Charge, stating clearly and in sufficient details the facts and circumstances of the accidents and the action taken. In all cases, the Contractor shall indemnify the owner against all loss or damage resulting directly or indirectly from the Contractor's failure to report in the manner aforesaid. This includes penalties or fines, if any, payable by the owner as a consequence of failure to give notice under the Workman's Compensation Act, or failure to conform to the provisions of the said act in regard to such accidents.
 In the event of an accident in respect of which compensation may become payable under the Workman's Compensation Act VIII of 1923 including all modification thereof, the Engineer-In-Charge may retain out of money due and payable to the Contractor such sum of sums of money as may in the opinion of Engineer-In-Charge be sufficient to meet such liability. On receipt of award from the Labour Commissioner in regard to quantum of compensation, the difference in amount will be adjusted.

Addl/Asst. Engineer
R.M.C.

Dy.Ex.Engineer
R.M.C.

ADDL. CITY ENGINEER
R.M.C.

Signature of Contractor

PART-II

SECTION - 3

TECHNICAL SPECIFICATIONS

PART-II
SECTION – 3
TECHNICAL SPECIFICATIONS

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:: TECHNICAL SPECIFICATIONS ::

A. GENERAL

1. SCOPE OF CONTRACT :

The work entitled comprise of excavation of trenches with shoring and strutting wherever required bailing out water wherever necessary, laying of pipes, jointing including supply of material and material required for jointing, testing as per specifications, Construction of appurtenances such as brick Masonry / RCC chambers etc. as per the type design specified entirely of the specification of various works stipulated in the e- Tender. The work includes supply of sewer pipes ISI Marked and which shall have to be supplied at site or Municipal store by the contractor at specified and shown in schedule "B". Other material like cement etc shall have to supplied by the contractor from open market.

The scope of works comprises the following:

- ✓ Carrying out necessary topographical survey and geotechnical investigations
- ✓ Excavation of pipe trenches in soil, soft rock, hard rock, WBM and concrete roads, including dewatering.
- ✓ Supplying and Laying of DI pipes with all specials along the route as per the network map
- ✓ Jointing of pipes with existing pipes(wherever required) with all required accessories
- ✓ Obtaining statutory approval from railway and other government bodies.
- ✓ Contractor shall plan and accordingly phase the supply of items according to his requirement to best utilize the available storage space at site.
- ✓ Providing and fixing sluice valves, Scour valves and Air Valves on the existing as well as new pipeline, as specified in relevant datasheets, detailed technical specifications, particular technical specifications and BOQ.
- ✓ Providing pipe bedding as per the requirements.
- ✓ Backfilling of pipe trench with selected soil immediately after erection of pipe excluding pipe joints.
- ✓ Encasing of underground pipelines as per specifications.
- ✓ Hydro testing of pipeline in segments.
- ✓ Backfilling of pipe trench at pipe joints.

- ✓ Construction of RCC Sluice/ Butterfly Valve Chambers/RCC Thrust blocks/ Saddles/ Anchor blocks. The typical drawings for various structures are enclosed in Bid drawings for reference.
- ✓ Reinstatement of WBM, Tar and Concrete Roads after laying and testing of pipeline.
- ✓ Demolishing old structures in the route of pipeline, if required.
- ✓ Flushing of entire pipeline with clean water at least for 24 hours.
- ✓ Testing and commissioning.
- ✓ Preparation of as-built drawings.

2. e-TENDER PRICE:

The rates quoted in the bill of quantities shall cover everything necessary for the due and complete execution of the work according to the drawings and other condition and stipulations of the contract including specifications of the evident, intend and meaning of all or either of them or according to customary usage and for periodical and final inspection and test and proof of the work in every respect and for measuring, numbering or weighing the same, including setting out and laying or fixing in position and the provision of all materials, power, tools, rammers, labour, tackle, platforms with impervious lapped joints for scaffolding, ranging roads, straight edged, cantering and boxing, wedges, moulds, templates, posts, straight rods, straight edged, cantering and boxing, wedges, moulds, templates, posts, straight rails, boning staves strutting, barriers, fencing lighting pumping apparatus, temporary arrangement for passage of traffic access to premises and continuance to drainage water supply and lighting (if interrupted by contractor's work) temporary sheds, painting, varnishing, polishing establishment for efficient supervision and stating arrangements for the efficient protective of life and property and all requisite plant and machinery of every kind.

The contractor shall keep every portion of the work clear of accumulation from time to time and shall leave every portion of the work clean, clear, perfect and at the conclusion of whole, providing at their own cost all such material implement, appliances and labour as the Engineer in charge may require to prove if it to be so.

3. COMPLETION SCHEDULE:

The contract period shall be as prescribed in tender document, from the date of notice to proceed i.e Work Order. The Contractor shall submit his completion schedule and the program of works together with this e-Tender in conformity with completion schedule given in the documents.

4. Packing and Handling:

- 4.1. Necessary care shall be taken and required packing shall be provided to avoid damage to pipe barrels and the edges of the pipe ends in transit.
- 4.2. Where the goods are required to be dispatched at Railway risk, special packing as per IRCA rules are absolutely necessary, which would be payable by the contractor himself.
- 4.3. The contractor shall use proper handling equipment or follow suitable standard handling method for **DI pipes & DI Specials** as approved by the Engineer-in-charge to unload the materials at the delivery site to prevent damage to the goods.
- 4.4. The contractor shall take all care for Transportation & supply of HC connections items to be supplied with its standard handling process, stored at site under his store / the delivery site to prevent damage to the goods.

5. GENERAL TECHNICAL GUIDELINE:

- 5.1. All the items occurring in the work and as found necessary during actual execution shall be carried out in the best workman like manner as per specifications and the written order of the Engineer in charge
- 5.2. Extra Claim in respect of extra work shall be allowed only if such work is ordered to be carried out in writing by the Engineer in charge
- 5.3. The contractor shall engage a qualified Engineer for the Execution of work who will remain present for all the time on site and will receive instructions and orders from the Engineer in charge or his authorized representative. The instruction and orders given to the contractor representative on site shall be considered as it given to the contractor himself.
- 5.4. The work order book as prescribed shall be maintained on the site of the work by the contractor and the contractor shall sign the orders given by the inspecting officers and shall carry out them properly.
- 5.5. Quantities specified in the e-Tender may vary at the time of actual execution and the contractor shall have no claim for compensation on account of such variation
- 5.6. Unexcavated lengths shall be left wherever required and so directed by the Engineer in charge during the currency of the contract and shall be tackled. If required, before completion of work.

- 5.7. Diversion of road, if necessary, shall be provided and maintained during the currency of the contract by the contractor at his cost.
- 5.8. Figured Dimensions of drawing shall supersede measurements by scale, special dimensions or directions in the specifications shall supersede all other dimensions.
- 5.9. All levels are given on drawings and the contractor shall be responsible to take regular level on the approved alignment before actually starting the work. The levels shall be commence to the G.T.S. levels and shall be got approved from the Engineer in charge
- 5.10. If the arrangement of temporary drainage is required to be made during any work of this Contract, this shall be made by the Contractor without claiming any extra cost.

6. 5CLASSIFICATION OF STRATA:

- 6.1. All materials encountered in excavation will be classified in the following groups irrespective of mode of excavating the materials and the decision of the Engineer in charge in this regard shall be final and binding to the contractor.
- 6.2. Soils :
Soils of all sorts, silt, sand, gravel, soft murrum, stiff clay, kunkar and other soft excavation not covered in the items mentioned hereunder.
- 6.3. Hard Murrum :
Hard Materials comprising of all kinds of disintegrated rock or shale or indurate conglomerate interspersed with boulders, weathered and decomposed rock which could be removed with pick, bar, shove, wedges and hammers, though not without some difficulties.
- 6.4. Soft – Rock:
This shall include all materials which is rock but which does not need blasting and can be removed with a pick bar, wedges, pavement breakers, pneumatic tools etc.
- 6.5. Hard Rock:
This shall include rock accusing in mass or boulders which need blasting, this will also include rock to be removed by chiseling or any other method where blasting is not permissible.

7. The rates are inclusive of dewatering, if required.

8. Regarding water supply for hydro testing, necessary water, power,

labour, etc. required for necessary test shall be arranged by the contractor at his own cost.

9. During construction activity, proper care must be taken for labour safety and must follow the provisions of the Labour laws.
10. TMT bars of Fe-500 should be confirming to IS:1786. The approved makes shall be TATA, SAIL, Vizag, Gallant, JSW Steel, Electrotherm, Kamdhenu, Utkarsh, Ultratech or other equivalent make as approved by engineer-in-charge.
11. 10. Cement shall be ordinary Portland cement 53 Grade conforming to IS:269, IS:8112 or IS:12269 for all the works as per the instructions of engineer-incharge. The approved makes shall be Ambuja, Ultratech, TATA, LOTUS, Hathi or as per IS confirming. Minimum Cement content for the work should be as per attached circular No.RMC/C/Vigi.(Tech)/231 dt. 11/03/2022.
12. Minimum Cement content for the work should be as per attached circular No.RMC/C/Vigi.(Tech)/231 dt. 11/03/2022
13. Testing of the materials like Brick, Sand, Aggregate, Reinforcement steel, etc. should have to be tested periodically as suggested by the Engineer-in-charge at Government approved material testing Laboratory and testing charges for the same has to be borne by the contractor.
14. In case of any ambiguity found in inspections / drawings etc, the decision of engineer-in-charge shall be final and binding to the contractor.

A. DETAILED TECHNICAL SPECIFICATIONS

B2 LABOUR SPECIFICATION

DETAIL TECHNICAL SPECIFICATIONS

Item No.1:

Excavation for pipe line trenches for drainage, manhole etc. all with shoring and strutting if required as per required gradient and line including safety provisions using site rails and stacking excavated stuff including up to all required lead cleaning the site etc.complete for all lifts and strata as specified

- Excavation of Paver Road (except for Road works)
- 0 to 1.50 mt depth.
---do--- in all sorts of soil,soft murrum, hard murrum, boulders and mecadam road
---do--- In soft rock , Hard rock
- 1.50 to 7.50 mt depth
---do--- in all sorts of soil,soft murrum, hard murrum, boulders and mecadam road
---do--- In soft rock , Hard rock

Excavation for pipe line trenches with shoring, strutting, bailing or pumping out watered from trenches whenever necessary of required length, width and depth including extra excavations for sockets and all safety measures and provisions such as site rails fencing, lighting, watching including refilling the trenches in layers including ramming and removing the excavated staff with

90m lead and clearing the site etc. as stipulated in the tender specification complete before starting work and after completion of work for all lifts and soil strata as specified

- a) In all sorts of soil soft murmur, hard murrum, boulders, macadam and asphalt roads including breaking of lime and cement masonry and lime concrete.
- b) In soft rock, cement concrete, hard rock and cutting of cement concrete and R.C.C. of any proportion, etc. with controlled blasting and or chiseling whichever is necessary and feasible as required by site conditions.
- c) In hard rock

1.1 Clearing of sites :

1.1.1 The site at which the pipe line is to laid and the area required for setting out and other operations shall be cleared of all obstructions , loose stones, and rubbish of all kinds ; stumps of trees, brushwood as well as all trees shall be removed as directe The roots shall be entirely grubbed up.

1.1.2 The products of the clearings to be stacked in such a place and in such a manner. As directed by the Engineer-in-charge.

1.1.3 In site clearing, all trees not specially marked for preservation, bamboos jungle wood and brush wood shall be cut down and their roots grubbed up. All wood and materials from the clearing s hall be the property of corporation and shall be arranged as directed by the Engineer-in-charge or his authorized agent. The materials found to be useful by

the Engineer-in-charge shall be conveyed and properly stacked as directed within the specified limit. Unless materials will be burnt or otherwise disposed off as directed

1.1.4 All holes or hollows, whether originally existing or produced by digging up roots, shall be carefully filled up with earth, well rammed and leveled off, as may be directed shall not be paid for. The contractor shall get approval of design of shoring. The shoring shall be of sufficient strength to resist side pressure and ensure safety from slips and blows and to prevent damage to work and property and injury to persons. It shall be removed as directed after all the items of work for which it is required are complete

1.1.5 Protection:

1.1.5.1 The foundation pits and trenches, etc shall be strongly fenced and red light Signals shall be kept at night in charge of watch-man to prevent accidents. Sufficient care and protective measure shall be taken to see that the excavation shall not affect or damage the adjoining structures. The contractor shall be entirely responsible for any injury to life and damage to the properties etc. Necessary protection work such as guide ropes, crossing places, barricades, the contractor at his own cost shall provide caution boards etc.

1.6 Classification of Strata :

1.6.1 The decision regarding classification of strata shall rest with the Engineer-in- Charge and his decision shall be final and binding to the contractor.

1.6.2 All the materials encountered in the excavation shall be classified as described in 2.0 of general specifications.

1.7 Dewatering :

1.7.1 Unless specially provided for as a separate item in the contract, the rate of excavation would include bailing or pumping out all water met with in excavation or which may accumulate in the excavation during the progress of the work either, by percolation, seepage, springs , rain or any other cause and diverting surface flow if any, by earthen bunds or by other means. The bunds shall be removed as soon as the work is complete

1.7.2 Unless specially provided as a separate item of contract, pumping of water from foundation pit, trenches etc shall be carried out by the contractor at his own cost and he shall arrange for required numbers of dewatering pumping sets for the above work. He shall take precaution to prevent any damage to the foundation trenches, concrete or masonry or any adjacent structure. The excavation shall be kept free from water by the contractor (1) during inspection and measurement (2) When concrete and/or masonry work are in progress and till the construction work reaches above the natural water level and (3) till the Engineer – in – charge considers that

the mortar is sufficiently set. The rate shall be paid for cum. of excavation.

1.8 Excavation in Rock :

1.8.1 Blasting with Gun Power:

Blasting operations shall be carried out with the prior permission and in the presence of the Engineer – in – charge or his authorized representative and during fixed time hours of the day. All safety precautions such as providing safety nylon netting etc. shall be carried out as per instructions of the Engineer – in – charge.

Red danger flags shall be prominently displayed and all the people, except those who have actually to light the fuse must be away to a safe distance, not less than 200 meters.

All fuses shall be cut to the length required before being inserted into the holes.

The number of charges to be fired and the actual number of shots heard shall be compared and the person responsible must satisfy himself by examination that all the charges have exploded before work people are permitted to approach the scene. The withdrawal of a charge which has not exploded shall under no circumstances be permitted, but the tamping and charge shall be flooded with water and the hole marked in a distinguishing manner. The next hole to be fired shall be at a distance of about 500mm from the old hole and fired in the usual way.

The contractor or any of his competent authorized person shall be in charge of the blasting operations and shall be held responsible for strictly observing the safety rules, particularly applicable to blasting operations, in addition to other safety rules.

In blasting rocks with dynamite, the following general principles shall be observe In general, the following diameter of drills shall be used for different depth of boreholes:

- From 1 – 2 metres 25 mm diameter
- From 2 – 3 metres 37 – 50 mm diameter
- From 3 – 4.75 metres 50 – 60 mm diameter

The borehole should generally be not more than 1.3m deep and the distance apart should be from one and half to twice the depth.

Cracks and fissures in the rock to be blasted shall be carefully studied to ascertain the best portion forth the boreholes. Charge shall always be placed in a round piece of rock, if possible not nearer than 30mm from the crack.

Rules for blasting with dynamite and other high explosives

The person - in- charge must show that he is thoroughly acquainted with all blasting operations and that he understands the rules herewith laid down. He will be held responsible for any accident that may occur.

Boreholes must be of such sizes that the cartridge can easily pass down them. The position of all holes to be drilled must be marked out with white paint and the person-in-charge must take particular note of these positions.

The drilling operation being finished, the person-in-charge must make a second inspection and satisfy himself that the boreholes marked out by him have been drilled. The person-in-charge must prepare all charges necessary for boreholes.

Only ten holes may be loaded and fixed at one time and the charges should be fixed simultaneously as far as practicable. Boreholes must be thoroughly cleared before a cartridge is inserted.

The loading is to be done by the person-in-charge himself and the position of the charge holes carefully noted by him. Wooden tamping rods only to be used in charging holes (not pointed but cylindrical throughout, one cartridge at a time must be inserted and gently pressed with the tamping rod).

Immediately before firing blast, due warning must be given and the person-in-charge must see that all the labourers have retired to safety.

The safety fuse of the charged holes are to be lighted in the presence of the person-in-charge, who must see that the fuses of the holes charged have properly ignited. After the blast, the person-in-charge must carefully inspect the work and satisfy himself that all the charges have exploded.

1.8.2 Misfires:

Misfires are a source of great danger, if it is suspected that part of the blast failed to fire or is delayed, allow sufficient time to elapse before entering the danger zone. When fuse and blasting caps are used, a safe time, at least of an hour should be allowed.

None of the drillers are to work near this hole until the two following separations have been done by the person-in-charge.

(a) The person-in-charge should very carefully extract the tamping with a wooden scrapper and withdraw the fuse with the primer and detonator attached, after which a fresh primer and detonator with fuse should be placed in this hole and fired or.

The hole may be cleared of 300mm of tamping and the direction then ascertained by placing a stick in the hole. Another hole may then be drilled 150mm away and parallel to it, the hole to be then charged and fired. The person-in-charge shall also at once report to the Engineer – in charge all cases of misfire, that cause of the same and what steps have been taken in connection herewith.

Precautions against misfire:

The safety fuse should be cut in an oblique direction with a knife.

All saw dust must be cleared from the inside of the detonator this can be

done by blowing down the detonator and tapping the open end. No instrument shall be inserted into the detonator for this purpose.

After inserting the fuse in the detonator, it shall be fixed by means of nippers.

If there is water present, or if the boreholes be damp, the junction of the fuse and detonator must be made water tight by means of grease, white or lead.

The detonator shall be inserted into the cartridge, so that about one third of the copper tube is left exposed outside the explosives. The safety fuse outside the detonator, shall be necessarily tied in position in the cartridge. Water proof fuse only to be used in the damp boreholes, or when water is present in the bore-holes.

If a misfire has been found to be due to defective fuse detonator or dynamite, the whole quantity or box from which the defective article was used shall be rejected.

Storage of materials for blasting shall be as per regulations/stipulations of the concerned authorities.

It shall be the contractor's responsibilities to arrange proper storage of explosives and obtain required permission from concerned authorities. No separate payment will be made for the above.

The refilling will generally refer to refilling of trenches up to ground level with excavated stuff. Filling materials shall be from excavated stuff.

Excavated stuff to be used shall be cleared of all rubbish, large size stones, brick bats etc. Big clods shall be broken down to a size of 50 mm or less.

Refilling :

After the pipes have been laid and jointed and the chambers are constructed and as soon as the joints have been inspected and passed by the Engineer-in-charge, the pipe line has been tested for water tightness, and after all concrete work thoroughly set the trenches shall be fulfilled with the materials taken there from. In refilling the trenches, the utmost care shall be exercised so as not to disturb, break or damage the jointed pipes. Over and around every pipe, the finest selected material shall be put. No lumps of rock earth or other material around the pipe or be thrown into the trenches until the same has been broken to specified size and pipes covered by the fine material above referred to. The selected fine material shall be carefully placed next to the permanent work and well packed and well rammed in layers of 150mm for a depth of at least 300mm over the top of the pipe. The remaining of the excavation shall be filled in with the best and most suitable portions of the excavated material in layers of not more than 600 mm deep, each layer shall be thoroughly rammed before the next layer is placed. One man shall be employed for hand ramming for every 30m of refilling up to the level of 300mm over the top of the pipe. Surplus soil shall

be piled on top of the filling to the extent possible for expected subsidence. All road materials to form a compact neat surface. The surface of the filled in trench shall be hand rolled by a hand roller weighing not less the ½ tones as directed by the Engineer- in-charge.

The contractor shall maintain all refilling and surfaces until reinstate The contractor shall responsible for claims arising from accidents due to subsidence or inadequate maintenance or improperly refilling work.

The contractor s hall be responsible for any settlement during the defects liability period including monsoon and the same shall be refilled with stuff brought from outside, if necessary.

Where excavated material is not considered suitable for refilling by the Engineer-in-charge, the Contractor will be required to cart selected surplus excavated materials in place of unsuitable materials. The contractor may also be instructed to supply suitable granular or other hard filling material for use in refilling. Such imported filling material s hall be paid for at the rates given in the Bill of quantities.

No payment shall be made for carting away surplus material arising either because of rejection of excavated material for refilling or because of surplus material.

Measurement:

The contractor's shall be for the unit of one cubic meter of the quantity excavated limited to the dimensions and provisions specified in the specifications or as directed by the Engineer-in- charge. The extra excavation to provide for jointing pipes, s boring etc. will not be paid for. The rates shall include cleaning and clearing the trench site by cutting grass, shrubs and trees of girth (circumference) not exceeding 10 feet and removing their obstructing roots in the trench cleaning the site, setting out works as per sanctioned plans, provide s boring, excavation and removal of all material from trenches.

(a) Excavations up to depth of 1.5M

The trench section is to be provided with Max. width OD of pipe + 250 mm to 300mm either sides. Depth of trench shall be minimum Bedding + OD of pipe + 0.60mt. cover above the top of pipe. (For 100mm dia pipe). Depth of trench shall be minimum Bedding + OD of pipe + 1.0mt. cover above the top of pipe. (For Other dia pipe).

Refilling the pipeline trenches including ramming, watering, consolidating disposal of surplus stuff as directed within a radius of 3km.

On completion of the pipe laying operations in any section, for a length of about 100m and while further work is still in progress, refilling of trenches shall be started by the Contractor with a view of restricting the length of open trenches. Pipe laying shall closely follow the progress of Trench Excavation and the Contractor shall not permit unreasonably excessive lengths of trench excavation to remain open while awaiting testing of the

pipeline. If the Engineer considers that the Contractor is not complying with any of the foregoing requirements, he may prohibit further trench excavation until he is satisfied with the progress of laying and testing of pipes and refilling of trenches. The excavated material nearest to the trench shall be used filling. Care shall be taken during backfilling, not to injure or disturb the pipes, joints or coating. Filling shall be carried out simultaneously on both sides of the pipes so that unequal pressure does not occur. Walking or working on the completed pipeline unless the trench has been filled to height of at least 30cm over the top of the pipe except as may be necessary for tamping etc., during backfilling work.

The remaining portion of the trench may be filled in with a mixture of hard and soft material free from boulders and clods of earth larger than 150mm in size if sufficient quantity of good earth and murrum are not available. The trench shall be refilled so as to build up to the original ground level, keeping due allowance for subsequent settlement likely to take place. The top 300mm layer or fertile agricultural soil shall be kept aside during excavation and shall be laid in layers near ground level during refilling.

To prevent buckling of pipe shell of diameters 1200mm and above, pipes shall be strutted from inside while the work of refilling is in progress, for which no separate payment shall be made.

Strutting shall be done by means of strong spiders having at least 6 arms which shall be sufficiently stiff to resist all deformation. Spiders shall be provided at a maximum interval of 2m & shall be welded in such a way that internal coating does not get burnt.

The Engineer shall, at all times, have powers to decide which portion of the excavated materials shall be for filling and in which portion of the site and in what manner it shall be so use

If any material remains as surplus it shall be disposed of as directed by the Engineer, which includes loading, unloading, transporting and spreading as directed within all lea If the Contractor fails to remove the earth from site within 7 days after the period specified in a written notice, the Engineer may arrange to carry out such work at the Contractor's risk and cost or may impose such fine for such omission as he may deem fit. Particular care shall be taken to keep the trench dry during the entire refilling operation.

If suitable material for refilling is not available for excavation the Contractor shall bring earth, murrum of approved quality as directed by the Engineer.

No mechanical plant other than approved compacting equipment shall run over or operate within the trench until backfilling has reached its final level or the approval of the Engineer has been obtained Subsidence in filling in : Should any subsidence take place either in the filling of the trenches or near about it during the maintenance period of 12 months from the completion of the Contract Works, the Contractor shall make good the same at his own cost or the Engineer may without notice to the Contractor, make good the same in any way and with any material that he may think proper, at the expense of the Contractor. The Engineer may also, if he anticipates occurrence of any subsidence, employ persons to give him timely notice of

the necessity of making good the same, and the expenses on this account shall be charged to the Contractor.

Measurement and Payment

Payment of refilling shall be made on Cubic meter basis.

Removing Surplus earth and disposing it within city limit including spreading as directed by Engineer In-Charge. (Up to 15 km) (with carting)

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

1. Beside Kotharia Police Station near Stone Quarry
2. All Quarry areas of Raiya Smart City
3. TP Scheme No.10, FP-87, Dhebar Road (South), Atika Area, Nr. PGVCL Office
4. TP Scheme No.23, FP-23, Nr. IOC Godown, Morbi Road
5. TP reservation plot at Samrat industrial Area, Bh. ST Workshop
6. TP Scheme No.9, FP-5, Nr. Raiyadhar Garbage Station
7. TP Scheme No.20, FP-35, Bh. Pradhuman Green
8. TP Scheme No.28 (Mavdi), FP-46/A, Nr. GETCO Circle
9. TP Scheme No.12, FP-38/A and 39/B, Nr. Lijjat Papad, Kothariya Nationla Highway

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

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

The payment will be made on cu.mt. basis of completed item.

Item No.2:

Providing Cement Concrete Bedding for Stoneware Pipe in M-10 using 12 to 20 mm machine crushed metal including, vibrating, curing as per design for drainage pipeline etc. complete.

- 1.0. Materials
 - 1.1 Water shall conform to M-1. Cement shall conform shall conform to M-3. Sand shall conform to M-6. Stones aggregate 20 mm. nominal size shall conform to M- 12.
- 2.0 Workmanship
 - 2.1 General

- 2.1.1 Before starting concrete the bed of foundation trenches shall be cleared of all loose materials, leveled, watered and rammed as directed.
- 2.2 Proportion of Mix
 - 2.2.1 The proportion of cement, sand and coarse aggregate shall be one part of cement, 3 parts of sand and 6 parts of stone aggregate; and shall be measured by volume.
- 2.3 Mixing
 - 2.3.1 The concrete shall be mixed in a mechanical mixer at the site of work. Hand mixing may however be allowed for smaller quantity of work if approved by the Engineer-in-charge. When hand mixing is permitted by the Engineer-in-charge in case of break-down of machineries and in the interest of the work, it shall be carried out on a water tight platform and care shall be taken to ensure that mixing is continued until the mass is uniform in colour and consistency. However in such cases 10% more cement than otherwise required shall have to be used without any extra cost. The mixing in mechanical mixer shall be done for a period 1½ to 2 minutes. The quantity of water shall be just sufficient to produce a dense concrete of required workability for the purpose.
- 2.4 Transporting & placing the concrete.
 - 2.4.1 The concrete shall, be handed from the place of mixing to the final position in not more than 15 minute by the method as directed and shall be placed into its final position, compacted and finished within 30 minutes of mixing with water i.e. before the setting commences.
 - 2.4.1 The concrete shall be laid in layers of 15 cms to 20 cms.
- 2.5 Compacting:
 - 2.5.1 The concrete shall be rammed with heavy iron rammers and rapidly to get the required compaction and to allow all the interstices to be filled with mortar.
- 2.6 Curing
 - 2.6.1 After the final set, the concrete shall be kept continuously wet if required by ponding for a period of not less than 7 days from the date of placement.
- 2.7 Mode of measurements and payment:
 - 2.7.1 The concrete shall be measured for its length, breadth, and depth, limiting dimensions to those specified on plan or as directed.
 - 2.7.2 The rate shall be for a unit of one cubic meter.

Item No.3:

Glazed Stoneware ISI pipe supply, laying, jointing, fixing work of pipes required. Specials jointing materials, lighting, all necessary safety arrangements and necessary testing to be done. (Excluding

excavation, bedding and refilling) with supply and fixing—100 mm / 150 mm and 200 mm dia

1.1 TECHNICAL SPECIFICATION FOR S & S STONEWARE GLAZED PIPE.

All the specifications mentioned in the I.S Code 651-1992 & its latest revised addition shall be strictly followed.

1.1.1 In the revision of the above said code, grading based on Hydraulic test has been deleted and the standard monogram has also been modified and it appears as ISI symbol with IS: 651.

1.1.2 Tests for Acid & Alkali resistance for pipes and fittings which were earlier optional have now been made mandatory.

1.1.3 GLAZED STONEWARE PIPES AND FITTINGS:

1.1.3.1 This standard covers dimensions and performance requirements for the following glazed stoneware pipes and fittings:

- a) Straight pipes and taper pipes
- b) Bends
- c) Taper bend
- d) junctions
- e) half section channels, straight and taper
- f) channel junctions
- g) channel bends
- h) channel interceptors
- i) gully traps, and
- j) inspection pipes

1.1.3.1.1 The pipes as covered in this standard are not meant for potable water applications.

1.1.4 Dimensions of glazed stoneware pipes and fittings are grouped into two sections, A&B. Section-A covers dimensions of straight pipes and all such fittings which normally form part of pipeline and which are subject to same conditions, specifications and tests as straight pipes. Section-B includes dimensions of fittings which are commonly used but do not form a part of the normal pipeline. The fittings in section-B being hand-moulded articles, their conformity to dimensional specifications is not required to be so accurate as for those in Section-A.

1.1.5 REFERENCES:

1.1.5.1 The following Indian Standards are the necessary adjunct to this standard.

IS No	Title
808 : 1989	Dimensions for hot rolled steel beam, column, channel and angle section (third revision)
2730 : 1977	Magnesium sulphate (Epsom salt) (first revision)

2781 : 19/5	Glossary of terms relating to ceramic ware (first revision)
4905 : 1968	Method for random sampling

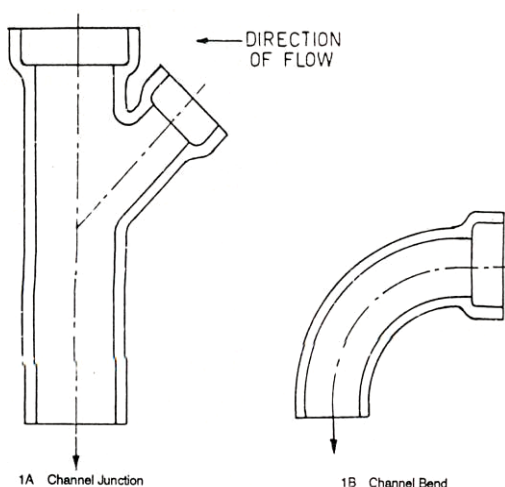
1.1.6. TERMINOLOGY:

1.1.6. For the purpose of this standard, the definitions of terms given in IS 2781 : 1975 shall apply.

1.1.7. RIGHT-HAND AND LEFT-HAND FITTINGS:

1.1.7.1. A right-hand fitting is such that when viewed from the spigot towards the socket, the arm of a junction or the socket of a bend projects to the right (See Fig. 1A and 1B). a left-hand fitting is such that when viewed as above, the arm of socket projects to the left.

RIGHT-HAND FITTINGS



1.1.8 GENERAL QUALITY:

1.1.8.1 All pipes and fittings shall be sound and free from visible defects which impair the strength, durability and serviceability. The glazed of pipes and fittings shall give a sharp clear note when struck with a light hammer

1.1.8.2. For pipes and fittings, a maximum of 10 percent shall be acceptable with any one of the following blemishes which do not impair the strength, durability and serviceability provided these pipes and fittings satisfactorily pass the hydraulic test specified in 4.1.10.2.

- a) A thin chipping not exceeding one quarter of the thickness of the body and not exceeding 10 cm^2 on the outside of spigot or on either side of the socket.
- b) One blister, unbroken, not more than 3 mm high not more than 40 mm in largest dimension inside or outside of the pipe; and
- c) Hairline surface cracks.

1.1.8.3. Colour of pipes / fittings may vary from yellow to dark brown /

black.

1.1.9. GLAZING:

- 1.1.9.1. The interior and exterior surfaces of the pipes and fittings which remain exposed after jointing shall be glazed. The portion which remains covered after jointing may or may not be glazed. The glaze shall be obtained by the action of fumes of volatilized common salt on the material of the pipes and fittings during the process of burning or glazed shall be ceramic glaze consisting of glazing material applied prior to fixing.

1.1.10. TESTS:

1.1.10.1. Testing Facilities:

The manufacturer shall at his premises and at his own cost, provide the necessary gauges, supply and prepare all test pieces and supply all labour and apparatus for testing which may be necessary for carrying out the tests as required by this standard.

1.1.10.2. Hydraulic Test:

When subjected to the hydraulic test straight pipes shall withstand the internal hydraulic test pressure of 0.15 MPa (1 MPa = 10.2 kg/cm^2) on the barrels and fittings covered in Section-A and 0.075 MPa for fittings covered in Section-B without showing signs of injury or leakage. The pressure shall be applied on pipes and fittings at a rate not exceeding 0.075 MPa in 5 seconds, and full pressure shall be maintained for at least 5 seconds. Care shall be taken to ensure that all air is expelled before the test is commenced.

1.1.10.3. Absorption Test:

The test pieces for testing shall be taken from the body of the pipe or fittings but not from within 150 mm of the end.

Each test pieces shall be of the whole thickness of the wall of the pipe or fittings and shall have two glazed surfaces each having an area of not less than 50 cm^2 and not more than 130 cm^2 . The test pieces shall be cleaned by wire brush to dislodge any loose particles which may increase loss of mass during boiling. The test piece shall be dried at a temperature of not less than 150°C until no further loss of mass is noted and cooled in a desiccator to the room temperature and the specimen weighed to an accuracy of 0.1 g. The test piece may be suitable suspended in cold distilled water by means of thread so that the test piece may not strike against each other or the container and incur loss in mass and the water in the container shall then be brought to the

boiling point. The water shall be maintained at that temperature for 1 hour and after it has been allowed to cool to room temperature, the test pieces shall be removed carefully wiped with a dry cloth and then the mass determined. The percentage increase in mass of each test piece by absorption of water shall not exceed the following values:

Thickness of pipe or fitting mm	Increase in Mass percent
Up to and including 20	6
Over 20 and up to 25	7
Over 25 and up to 32	8
Over 32 and up to 38	9
over 38	10

1.1.10.4. Test for Acid Resistance:

Pipes and fittings shall be tested for acid resistance in accordance with the procedure given in Annexure-A. The loss in mass shall not exceed 2.5%.

1.1.10.5. Test for Alkali Resistance:

Pipes and fittings shall be tested to the action of magnesium sulphate in accordance with the procedure given in Annexure-B. There shall be no evidence of pitting, softening, spalling or cracking in the pipe or fitting after the test.

1.1.10.6. Crushing Strength Test:

When tested along the full length of the pipe barrel from shoulder to spigot in accordance with Annex.C, the pipe tested shall have a minimum crushing strength of 16 k N/m length.

1.1.11 SAMPLING AND CRITERIA FOR CONFORMITY:

1.1.11.1 The scale of sampling and the criteria for conformity of a lot shall be as prescribed in Annexure-D.

1.1.12. MARKING:

1.1.12.1 Every pipe and fitting shall have legibly impressed upon it before firing the following:

- a) Name or trade-mark of the manufacturer, and b)
- Size (Internal Dia.)

1.1.12.2 Each pipe and fitting may also be marked with the Standard Mark.

SECTION - A PIPES AND FITTINGS FORMING PART OF PIPE LINE

1.13 INTERNAL DIAMETER:

1.13.1 The internal diameter of the barrels of straight pipes, junctions and bends shall be as specified in col 1 of Table-1.

1.13.2 Permissible Tolerances:

The internal diameters specified in 4.1.13.1 shall be within the following tolerances:

Internal diameter of pipes mm	Permissible Tolerance mm
100	±
150	±
200, 230	±
250 to 350	±
400, 450	±
500, 600	±

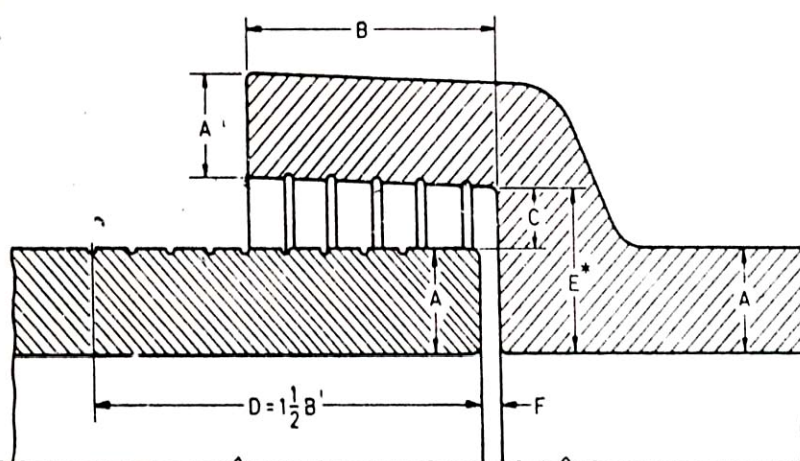


Table-1 Dimensions of Barrels and Sockets
(Clauses 1.1.13.1, 1.1.13.2, 1.1.14.1, 1.1.16.1)

(All Dimensions In Millimeters)

Internal Diameter	Mean Thickness of Barrel and Socket, Min A	a) Internal Depth of Socket, Min B	Excess shoulder Measurement, Min C	Length of Grooving of Spigot, Min
1	2	3	4	5
100	12	50	10	75
150	15	57	11	85.5
200	16	63	12	94.5
230 +	19	63	12	94.5
250	20	70	16	105
300	25	70	16	105
350	30	75	16	112.5
400	35	75	16	112.5
450	37	76	16	14
500	40	80	19	120
600	43	90	19	135

- E = width of shoulder of socket which shall exceed the mean thickness of the barrel of the pipe (ascertained as directed in 4.1.14.1) by not less than the values for C given in col 4.
- + This is non-preferred size and has been included to facilitate replacements.

1.1.13.3 The pipes shall be inspected by Third Party Inspection Agency, the cost of which is to be borne by contractor. The Third Party Inspection Agency will be from any

Government undertaking agency like RITES, EIL, CEIL, MACON, WAPCOS, SGS etc approved by Gujarat Water Supply & Sewerage Board..

1.1.14. THICKNESS OF BARRELS, SOCKETS AND BENDS:

1.1.14.1 The mean thickness of the barrel and the socket of the pipes junctions and bends shall not be less than the means thickness given in col 2 of Table 1. Such mean thickness of the barrels or sockets of any individual pipe junctions and bends shall be ascertained by making several minimum 4 measurements and adding the measured minimum thickness (not in the groove) to the maximum thickness and dividing the sum by two. The mean thickness of the barrel and socket shall be determined separately.

1.1.14.2. Permissible Variation:

The difference between the minimum and maximum measured thicknesses mentioned in 4.1.14.1 shall not exceed the amounts given below:

Internal diameter of pipe (in mm)	Permissible variation in Thickness of Barrel and Sockets (in mm)
Not exceeding 450	2
500 and 600	3

ANNEX-A (Clause-1.1.10.4.) TEST FOR RESISTANCE TO ACIDS

A-0 PRINCIPLE:

A-0-1 The test specimen is completely immersed in the test solution and the resistance to acid is determined as the percentage of acid soluble matter expressed as sulphate.

A-1 REAGENTS:

A-1.1 Sulphuric Acid - 4.90 percent, specify gravity 1.84.

A-2 PREPARATION OF TEST SPECIMEN:

A-2.1 Test specimen shall be sound with all edges freshly broken, free from cracks or shattered edges, about 5 cm square, not more than 200 g in mass, and shall be thoroughly cleaned with wire brush.

A-3 WEIGHING APPARATUS:

A-3.1 The weighing shall be made on a balance accurate to 0.01 g when loaded with 200 g.

A-4 PROCEDURE:

A-4.1 The specimens to be tested shall be dried to a constant mass (M₁) at a temperature not less than 150°C. The specimens upon reaching constant mass shall be completely immersed in the test solution at the ambient temperature for a period of 48 hours. Then removed from the solution and carefully and thoroughly washed with hot distilled water, allowing the wash to run into the solution in which specimens were immersed. The solution shall be filtered and to the filtrate shall be added 5 ml of concentrated sulphuric acid. The solution shall then be evaporated (avoiding loss by ignition) and heated cautiously to dryness. It shall then be ignited to constant mass (M₂)

A-5 CALCULATION:

A-5.1 The percentage of acid soluble matter, expressed as sulphate shall be calculated as follows:

$$\text{Loss in mass \%} = \frac{\text{Mass of residue (M}_2\text{)}}{\text{Mass of dry specimen (M}_1\text{)}} \times 100$$

ANNEX-B
(Clause-1.1.10.5.)
TEST FOR ALKALI RESISTANCE

B-0 PRINCIPLE:

B-0.1 The resistance of stoneware pipes or fittings to alkali is determined by reaching it with magnesium sulphate solution.

B-1 PREPARATION OF SAMPLE":

B-1.1 Test samples measuring not less than 75 cm² and not more than 130 cm² shall be broken from the pipe or fittings. The samples shall be sound, free from cracks or surface defects.

B-2 REAGENTS:

B-2.1 Saturated Solution of Magnesium Sulphate - Conforming to IS:2730:1977.

B-3 PROCEDURE:

B.3.1. Heat the magnesium sulphate solution (specific gravity 1.295 to 1.308) to the boiling temperature. Place the test sample in a wire basket and submerge it into the boiling solution; continue heating for two hours. then remove the sample and bring it to a constant mass in a drier or oven at a temperature not less than 110oC. Subject to the test sample to at least five cycles using fresh solution for each cycle. After the completion of five cycles remove the sample from the solution, wash it and bring it to constant mass in a drier or oven at a temperature not less than 110oC. Air cool the sample and observe.

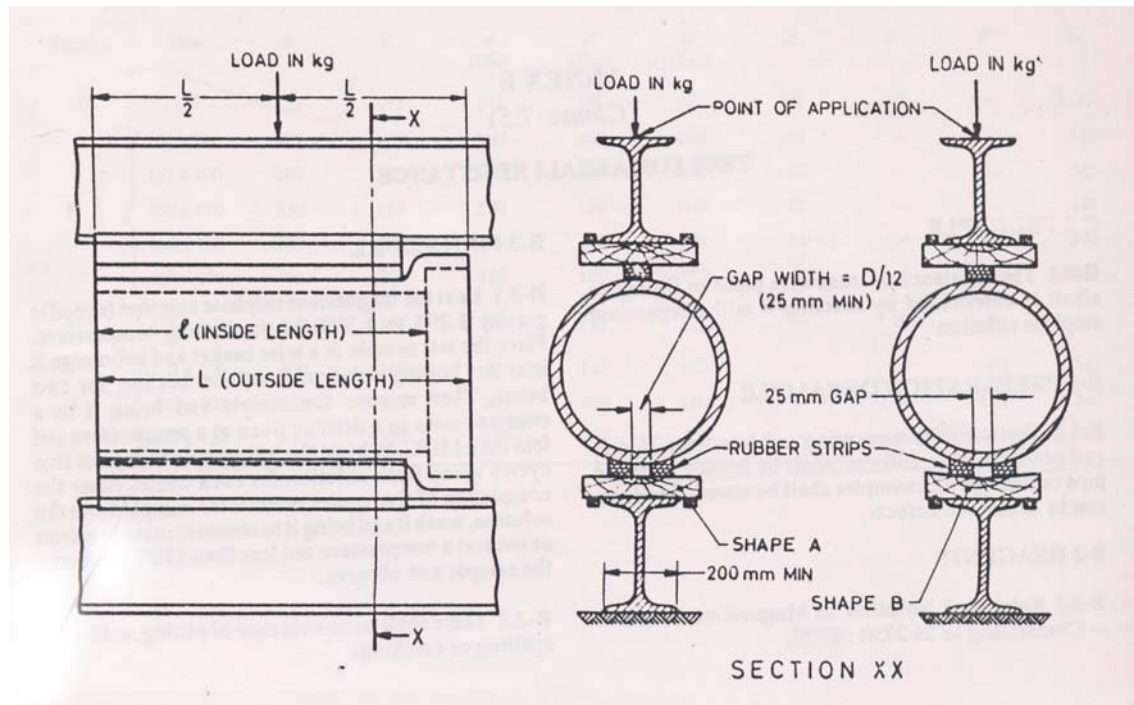
B.3.2. There shall be no evidence of pitting, softening, spalling or cracking.

ANNEX-C (Clause-4.1.10.6.) CRUSHING STRENGTH TEST

C-1 CRUSHING STRENGTH TESTING MACHINE:

C-1.1. While the pipe to be tested is supported in a horizontal position on two bearings parallel to its axis, the load shall be applied to it along the length of the barrel through a third bearing on top of the barrel (see Fig below).

CRUSHING TEST RIG



C-1.2 Any testing machine having a device that will apply the load at a uniform rate of about 30 (kN/m) min. or in increments of not more than 500 N at the same rate, may be used for making the test.

C-1.3 The testing machine shall be substantial and rigid throughout, so that the distribution of the load will not be affected appreciably by the deformation or yielding of any part. The bearings shall be as specified in C-1.4, C-1.5, C-1.6 and C-2.1, and shall be attached to the machine so as to receive and uniformly transmit maximum loads required in the tests without lost motion, vibrations, or sudden shock. The machine and bearings shall be designed to transmit the load in a vertical plane through the longitudinal center lines of the bearings and pipe.

C-1.4 The three bearings shall consist of a lower member, being a rigid beam on which two bearing strips are symmetrically disposed parallel to a vertical plane passing through the longitudinal axis of the pipe, and an upper member also being a rigid beam, on which one bearing strip is centred and disposed so that it lies in the vertical

plane passing through the longitudinal axis of the pipe (See Fig. Crushing Test Rig).

C-1.5 The beam on which the bearing strips are disposed shall be structural steel beams single or of compound sections having moments of inertia about the vertical and horizontal axis of the cross section not less than those of WB 250 (See IS 808 : 1989) and with a width of flange not less than 200 mm.

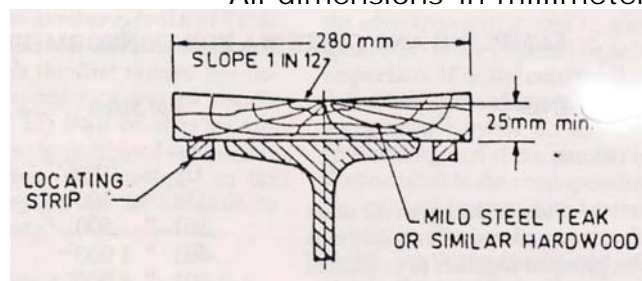
C-1.6 Mild steel, teak or similar hardwood shall be used to face the upper flange of the bottom beam. The facing shall be straight and free of warping or twisting and shall be centrally located on the flange of the beam by means of hardwood strips attached to its lower face and in contact with the edges of the flange. The cross section of the facing may have either of two shapes at the discretion of the pipe manufacturer.

Shape A shall be rectangular 280 x 25 mm minimum, without a joint. Shape B is shown in (Fig. **DETAILS OF ALTERNATIVE FACING**).

A similar facing of shape A may be used to face the lower flange of the upper beam if desired.

DETAILS OF ALTERNATIVE FACING

All dimensions in millimeters



C-2 BEARING STRIPS:

C-2.1 The bearing strips shall consist of rubber cut or formed from material having sufficient hardness. The strips shall be of rectangular cross section having a width of 50 mm and a thickness of not less than 25 mm or more than 40 mm. The two bottom strips shall be of equal thickness.

C-2.2 The single top bearing strip shall be used with the 50 mm dimension in contact with the pipe. It may be positioned on the bearing by the use of wood or metal strips along its outside edges, provided the thickness of the positioning strips does not exceed one-half the thickness of the rubber bearing strip.

C-2.3 The two lower bearing strips shall be laid on the 50 mm dimension and may be positioned on the bearing with wood or metal strips between them and adjacent to their outside edges, provided the

thickness of these positioning strips does not exceed one-half the thickness of these rubber bearing strips. The two strips shall be parallel and, when used with a facing of Shape A shall be spaced a distance apart of approximately 1 mm per 12 mm of pipe diameter but in no case has than 25 mm. When used with Shape B they shall be parallel and 25 mm apart for all pipe diameters.

C-2.4 The rubber bearing strips may be attached to the facings, or in the case of the single upper strip, directly to the upper beam, by adhesive if desired, provided, such method of attachment results in the strip remaining firmly fixed in position when carrying the maximum load.

C-3 APPLICATION OF LOAD:

C-3.1 The load shall be applied to the top bearing at a point distant from the spigot and of the pipe equal to one-half of the overall length of the pipe including the socket if any. The test load shall be applied to the top bearing in such a way that the bearing is free to rotate in vertical plane through the longitudinal center line, of the top and bottom bearings. In testing a pipe that is not straight it shall be placed between the bearings in the position that appears to give the most favourable bearing conditions for fair test.

C-3.2 The loading of the pipe shall be a continuous operation, and the pipe shall not be allowed to stand under load longer than is required to apply the load and record the observations.

C-4 EVALUATION OF CRUSHING STRENGTH:

C-4.1 The ultimate crushing strength in kN per linear metre shall be calculated by dividing the total applied load at fracture by the inside length of the barrel of the sample broken

ANNEX-D (Clause-1.1.11.1) SAMPLING AND CRITERIA FOR CONFORMITY

D-1 SCALE OF SMAPLING: D.1 Lot:

All the pipes or fittings of the same type, size and manufactured under similar conditions of production, shall be grouped together to constitute a lot.

D.2 The number of pipes or fittings to be selected at random from the lot depends upon the size of the lot and shall be in accordance with col 1 to 4 of Table 2.

D.3 NUMBER OF TESTS:

D.3.1 All the pipes or fittings selected as in D.2 shall be inspected for general quality (See 1.1.8.), dimensions (See Section A or Section B).

D.3.2. The number of pipes or fittings to be tested for hydraulic test (See 1.1.10.2.) shall be 5% of the lot as prescribed in D1. These pipes may be selected at random from those already selected in D.2 and suitable test specimens.

D.3.3 The number of pipes of fittings to be tested for absorption (1.1.10.3.) for resistance to action of acids (1.1.10.4.) and of alkali (See 1.1.10.5) and crushing strength (See 1.1.10.6.) shall be as given below:

Lot size	No.of pipes to be tested
Up to 150	3
151 to 1200	5
1201 to 10,000	8

These pipes may be selected at random from those already selected in D.2 and suitable test specimens shall be selected from them.

D.4 CRITERIA FOR CONFORMITY:

D.4.1 A lot shall be considered as conforming to the requirements of the specifications, if the conditions mentioned in D.4.2 to D.4.6 are all satisfied.

D.4.2. General Quality (See 1.1.8.) and Dimensions (See Section A and Section B).

The number of pipes and fittings in the first sample (See Col 2 and 3 of Table-2) shall be first selected and subjected to inspection for general quality and dimensions. If in the first sample the number of defectives, that is those failing either for general quality or dimensions, is less than or equal to the corresponding acceptance number a_c (col 5 of Table-2), the lot

shall be considered as conforming to the requirements of general quality and dimensions. If the number of defectives in the first sample is greater than or equal to the corresponding rejection number r_c (col 6 of Table-2), the lot shall be considered as not conforming. If the number of defectives in the first sample lies between the corresponding a_c and r_c a second sample (see col 2 and 3 of Table-2) shall be selected and subjected to inspection. If in the combined sample, the number of defectives is greater than or equal to the corresponding rejection number r_c the lot shall be considered as not conforming.

**Table-2 :Sample Size and Criteria for Conformity
(Clause D.2)**

Lot size	Sample	Sample Size	Cumulative sample size	General Quality (See 4.1.8) and dimensions Section a & B)	
				5	6
1	2	3	4		
Upto 150	First	20	20	1	4
	Second	20	40	4	5
151 to 280	First	32	32	2	5
	Second	32	64	6	7
281 to 500	First	50	50	3	7
	Second	50	100	8	9
500 to 1200	First	80	80	5	9
	Second	80	160	12	13
1201 to 3200	First	125	125	7	11
	Second	125	250	18	19
3201 to 10,000	First	200	200	11	16
	Second	200	400	26	27

D.4.3 For the hydraulic test, all the specimens shall satisfy the requirements as specified in 1.1.10.2.

D.4.4 For water absorption test, the mean and range (difference between the highest and the lowest value) of the test results obtained shall be calculated and (mean + 0.6 range) shall be less than or equal to the maximum limit specified in 1.1.10.3.

D.4.5. For resistance to action of acids and of alkali shall satisfy the requirements specified in 1.1.10.4. and 1.1.10.5. respectively.

D.4.6 For crushing strength test all the test specimen shall satisfy the requirement as specified in 1.1.10.6.

The rate shall be for a unit of one running meter basis.

Item No.4:

Providing, supplying, lowering, laying and jointing RCC pipes in C.M. 1:1 of following diameters in proper position grade and alignment as directed by Engineer-in-charge including labour, giving necessary testing etc., complete including cost of jointing – 300 mm / 450 mm / 600 mm dia

2. PROVIDING AND TESTING OF RCC PIPES AS PER THE TENDER SPECIFICATIONS.

2.1 SCOPE

All the specifications mentioned in the I.S Code 458-2003 & its latest revised addition shall be strictly followed.

- 2.1.1** This standard covers the requirements for reinforced unreinforced precast cement concrete pipes, of both pressure and non – pressure varieties used for water mains, sewers, culverts and irrigation. The requirements for collars are also covered by this standard.

NOTES

- 1 This standard covers the requirements for pressure and also non–pressure pipes of class NP3 and NP4 manufactured by vibrated casting process.
- 2 In addition to the requirements specified specifically for the collars, the requirements given in the following clause shall also apply for the collars:

2.5.2,2.5.3,2.5.4,2.5.5.1,2.5.5.3,2.5.5.4,2.5.7,2.5.8,2.7.1,2.7.2,2.7.2.1,2.7.2.2,2.7.3,2.7.3.1,2.7.4,2.8.2,2.9.1,2.9.1.1,2.9.1.2,2.9.1.3,2.9.1.4, 2.12.1 and 2.12.1.1.

- 2.1.2** Pre-stressed concrete pipes and pipes with non-circular section are not covered by this standard

2.2 TERMINOLOGY

2.2 For the purpose of this standard, the following definitions shall apply.

- 2.2.1 Working Pressure** – The maximum sustained internal pressure excluding surge, to which each portion of the pipeline may be subjected when installed.

- 2.2.2 Site Test Pressure** – 1.5 times working pressure pertaining to the section or 1.1 times static pressure. Whichever is

more (surge pressure is to be controlled within 25 percent pump head in case of pumping mains).

2.2.3 Hydrostatic Test Pressure – It is the maximum pressure which the pipe can withstand without pressure which the pipe can withstand without any leakage when tested for hydrostatic pressure in accordance with this standard and IS 3597.

2.2.4 Surge (Water Hammer) Pressure – It is a pressure which is produce by a change of velocity of the moving stream and becomes maximum when there is a sudden stoppage which may be caused by the closing of a valve or by shutting down a pump station. Surge head.

2.3 CLASSIFICATION

2.3.1 For the purpose of this standard, concrete pipes shall be classified as under:

Class Description Conditions Where Normally Used

NP1 Unreinforced concrete non–pressure pipes

NP2 Reinforced concrete, light–duty, non – pressure pipes

NP3 Reinforced and also unreinforced (in case of pipes manufactured by vibrated casting process) concrete, medium–duty, non–pressure pipes.

NP4 Reinforced and also unreinforced (in case of pipes manufactured by vibrated casting process) concrete, heavy – duty, non–pressure pipes

P1 Reinforced concrete pressure pipes tested to a hydrostatic pressure of 0.2 MPa (20m head)

P1 Reinforced concrete pressure pipes tested to a P1 Reinforced concrete pressure pipes tested to a hydrostatic pressure of 0.4 MPa (40m head)

P3 Reinforced concrete pressure pipes tested to a hydrostatic pressure of 0.6 MPa (60m head)

For drainage and Irrigation use, above ground or in shallow trenches

For drainage and irrigation use, for cross drains/culverts carrying light traffic

For drainage and irrigation use, for cross drains/culvert carrying heavy medium traffic

For drainage and irrigation use, for cross drain/culvert carrying heavy traffic

For use on gravity mains, the site test pressure not exceeding two – thirds of the hydrostatic test pressure

For use on pumping mains the site test

For use on pumping mains, the site test pressure not exceeding half of the hydrostatic test pressure

For use on pumping mains, the site test pressure not exceeding half of the hydrostatic test pressure

Note:—The uses are only by way of recommendations as a general guidance and the exact usage shall be decided by the engineer – in – charge.

- 2.3.2** Unreinforced and reinforced concrete non-pressure pipes shall be capable of withstanding a test pressure of 0.07 MPa (7m head).

2.4 MATERIALS

- 2.4.1** For precast concrete pipes, materials complying with the requirements given in 2.4.2 to 2.4 .8 shall be used.

2.4.2 Cement

Cement used for the manufacture of unreinforced and reinforced concrete pipes shall conform to IS 269 or IS 455 or IS 1489 (Part 1) (see Note 1) or IS 1489 (Part 2) or IS 8041 or IS 8043 or IS 8112 or IS 12269 or IS:12330.

NOTES

1. Unless otherwise specified by the purchaser, the type of cement to be used is left to the discretion of the manufacturer. Fly ash based cement conforming to IS 1489 (Part 1) with fly ash contents up to 25 percent is permitted for non-pressure pipe only.
2. Sulphate resisting Portland cement (see IS 12330) shall be used, where sulphate is predominant.
3. Site blending with fly ash up to a maximum of 25 percent may be carried out provided its uniform blending with ordinary Portland cement is ensured. Such blended cement shall be used only for non-pressure pipes. The fly ash used for blending shall be either from ESP or processed by established fly ash processing units and shall conform to Grade 1 of IS:3812. Specified requirements

of concrete strength, permeability, hydrostatic test and three-edge bearing test shall be met to the satisfaction of customer before it is used for regular production.

2.4.3 Aggregates

Aggregates used for the manufacture of unreinforced and reinforced concrete pipes shall conform to 3 of IS:383. The maximum size of aggregates should not exceed one third thickness of the pipes or 20 mm, whichever is smaller for pipes above 250 mm internal diameter. But for pipes of internal diameter 80 to 250 mm the maximum size of aggregates should be 10 mm.

NOTE:- It is preferable to have the size and grading of aggregates conforming to IS 383. It is also preferable that materials finer than 75 micron IS Sieve is restricted to 3.0 percent by mass.

2.4.4 Reinforcement

Reinforcement used for the manufacture of the reinforced concrete pipes shall conform to mild steel Grade 1 or medium tensile steel bars conforming to IS 432 (Part 1) or hard-drawn steel wire conforming to IS 432 (Part 2) or structural steel (standard quality) bars conforming to IS:2062.

NOTE :- Wire fabric conforming to IS 1556 or deformed bars and wires conforming to IS 1786 or plan hard -drawn steel wire for pre-stressed concrete to IS 1785 (Part 1) or IS 1785 (Part 2) may also be used. For such reinforcement maximum tensile stress shall be as given in 6.1.

2.4.5 Concrete Mortar

2.4.5.1 The concrete quality (concrete mix, maximum water-cement ratio, minimum cement content, etc) shall be as per IS 456 for at least very server environment exposure condition. Design mix requirements shall be as per IS 456. However, in case of pipes cast by spinning process higher cement contents, more fines and higher water-cement ration may be the need of the process. For non-pressure pipes, if mortar is used, it shall have a minimum cement content of 450 kg/m³ and a compressive strength not less than 35 N/mm² at 28 days. For pressure pipes if mortar is used, it shall have a minimum cement content of 600 kg/m³ and a compressive strength not less than 35 N/mm² at 28 days. However, in case of pipes manufactured by vibrated casting process, concrete shall

minimum compressive strength as indicated in Tables 4, 5, 7 and 8 for the respective classes of pipes.

Where the process of manufacture is such that the strength of concrete or mortar in the pipe differs from that given by tests on cubes, the two may be related by a suitable conversion factor. If the purchaser requires evidence of this factor, he shall ask for it before placing the order. The conversion factor for 28 days compressive strength for spun concrete may be taken as 1.25 in the absence of any data.

2.4.5.2 For pressure pipes, splitting tensile strength of concrete cylinders at 28 days, when tested in accordance with IS 5816, shall be not less than 2.25 N/mm².

2.4.5.3 Compressive strength tests shall be conducted on 150 mm cubes in accordance with the relevant requirements of IS 456 and IS 516.

2.4.5.4 The manufacture shall give a certificate indicating the quantity of cement in the concrete mix.

2.4.6 Rubber Ring

Rubber ring chords used in pipe joints shall conform to Type 2 of IS 5382.

2.4.7 Water

Water used for mixing of concrete and curing of pipes shall conform to 5.4 of IS 456.

2.4.8 Chemical Admixtures

The admixtures, where used, shall conform to IS 9103.

2.5 DESIGN

2.5.1 General

Reinforced concrete pipes either spun or vibrated cast shall be designed such that the maximum tensile stress in the circumferential steel due to specified hydrostatic test pressure does not exceed the limit of 125

N/mm² in the case of mild steel rods, 140 N/mm² in the case of hard-drawn steel wires and high strength deformed steel bars and wires.

2.5.1.1 The barrel thickness shall be such that under the specified hydrostatic test pressure, the maximum tensile stress in concrete, when considered as effective to take stress

along with the tensile reinforcement, shall not exceed 2 N/mm² for pressure pipes and 1.5 N/mm² for non-pressure pipes. But the barrel wall thickness shall be not less than those given in **Table 1** subject to 2.7.2 (iii) for pipes manufactured by spun process. For pipes manufactured by vibrated casting process, the barrel wall thickness shall be as given in **Table 2, 3**

2.5.1.2 Pipes of length above 3 m and up to 4 m may be supplied by agreement between the user and the supplier and for such pipes, the quantity of reinforcement shall be modified as per

2.5.1.2.1

2.5.1.2.1 Longitudinal reinforcement

Reinforced cement concrete pipes of lengths up to 4 m may be accepted if the longitudinal reinforcement is increased in proportion to the square of length compared with what is used for 3 m length as specified in **Tables 1 and 3**, except for **Table 2**

For 'L' (in metre) length of pipe, longitudinal reinforcement shall be $L^2/3^2$ times the longitudinal reinforcement used for 3 m long pipes.

2.5.1.3 Longitudinal reinforcement shall be provided to ensure rigidity and correct location of cages (girds) longitudinally and to limit the effects of transverse cracking. Minimum longitudinal reinforcement shall be as given in **Table-1** for pipes manufactured by spinning process. For reinforced pipes manufactured by vibrated casting process, the minimum longitudinal reinforcement shall be as given in **Table 3**

2.5.2 Reinforcement

The reinforcement in the reinforced concrete pipe shall extend throughout the length of the pipe and shall be so designed that it may be readily placed and maintained to designed shape and in the proper position maintained to designed shape and in the proper position within the pipe mould during the manufacturing process. The circumferential and longitudinal reinforcement shall be adequate to satisfy the requirements specified under 2.5.1.

For non-welded cages spiral reinforcement of the same diameter shall be closely spaced at the end of the pipe for a length of 150 mm to minimize damage during handling. The spacing of such end spirals shall not exceed 50 mm or half the pitch whichever is less. Such spiral reinforcement at ends shall be part of the total spiral

reinforcement specified in different tables.

2.5.2.1 The pitch of circumferential reinforcement shall be not more than the following:

- a) 200 mm for pipes of nominal internal diameter 80 to 150 mm.
- b) 150 mm for pipes of nominal internal diameter 200 to 350 mm, and
- c) 100 mm for pipes of nominal internal diameter 400 mm and above.

The pitch shall also be not less than the maximum size of aggregate plus the diameter of the reinforcement bar used.

2.5.2.2 The quantity and disposition of steel in pipes may be decided by mutual agreement between the purchaser and the supplier; however, it shall be proved by calculations and tests that the quantity of the reinforcement conforms to all the requirements specified in the standard. In the absence of calculations and tests, the reinforcement given in Table 1 for pipes manufactured by spinning process and in Table 3 for pipes manufactured by vibrated casting process shall be used as minimum reinforcement subject to the requirements of 2.5.2.2.1.

2.5.2.2.1 Tolerances given in IS 432 (part 1), IS 432 (Part 2), and IS 2062 shall be applied to the minimum mass to longitudinal reinforcement specified in different tables. Total mass of longitudinal reinforcement shall be calculated taking into account the clear cover provided at each end of the pipe.

NOTE: For longitudinal reinforcement conforming to IS:432 (Part-2), tolerance on mass shall be calculated from the diameter tolerance.

2.5.2.3 If so required by the purchaser, the manufacturer shall give a certifying the details relating to quality, quantity and dispersion of steel in the pipes as well as the clear cover to the steel provided in the pipes.

2.5.3 Ends of Pipes

Spigot and Socket ended pipes shall be used for water mains, sewer, irrigation and culverts/cross drains. Whereas, flush jointed (NP3 and NP4) and collar jointed (NP2) pipes shall be used for culverts/cross drains only. The ends of concrete pipes used for water mains, sewer and irrigation shall be suitable for socket and spigot, roll on joints or confined gasket joints. Dimensions of spigot and socket for

various classes of pipes shall be as given in Table 4,5 for pipes manufactured by spinning process. However the dimensions of spigot and socket shall be as given in Tables 6 in case of pipes manufactured by vibrated casting process. Reinforcement in socket of rubber ring jointed pipes shall be as given in Table 7.

However, the ends of concrete pipes used for road culverts/cross drains may be suitable for flush (NP3 and NP4) or collar joints (NP2) (see Fig.1 and 2). For pipes of diameter up to 700 mm, external flush joint and for diameters above 700 mm, internal flush joint is recommended.

NOTES

1. Bends, junctions and specials for concrete pipes covered under this standard shall conform to the requirements of IS 7322.
2. Same typical arrangement of reinforcement in socket are illustrated in **Fig. 3 and Fig.4.**

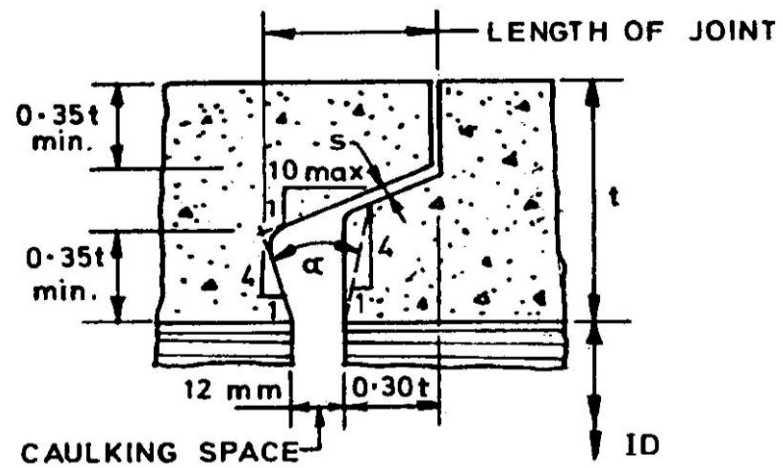
2.5.3.1 Only flexible rubber ring joints shall be used for the joints in (a) all pressure pipes and (b) all non-pressure pipes except when used for road culverts/cross drains. The pipe joints shall be capable of withstanding the same pressure as the pipe.

NOTE : The requirements of 2.5.3.1 does not imply that the collar shall also be tested for the test pressure for pipes specified in 2.3.1, 2.3.2 and 2.9.

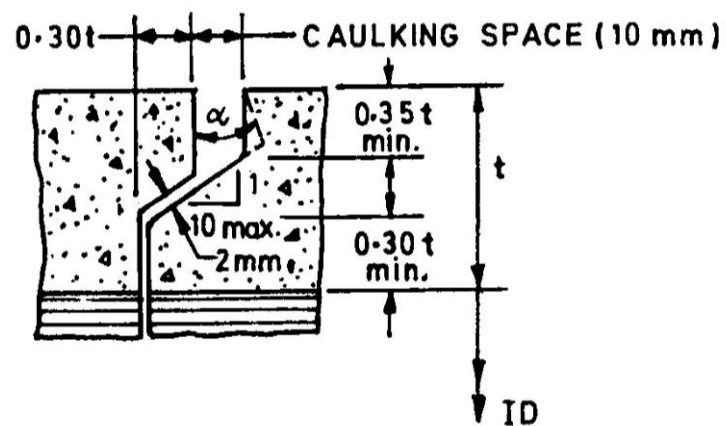
2.5.4 Cover

The minimum clear covers for reinforcement in pipes and collars shall be as given below:

<i>SI NO</i>	<i>Precast Concrete Pipe/Collar</i>	<i>Minimum Clear Cover. mm</i>
i)	Barrel wall thickness :	
	a) Up to and including 75 mm	8
	b) Over 75 mm	15
ii)	At spigot steps	5
iii)	At end of longitudinal	5



1A Internal Flush Joints



1B External Flush Joints

- t – wall thickness.
 s – 0.002 of internal dia or 2 mm, *Min.*
 ID – internal diameter.
 α – included angle not more than 25° (only for design purp not be measured).

Fig. 1 DETAILS OF FLUSH JOINT

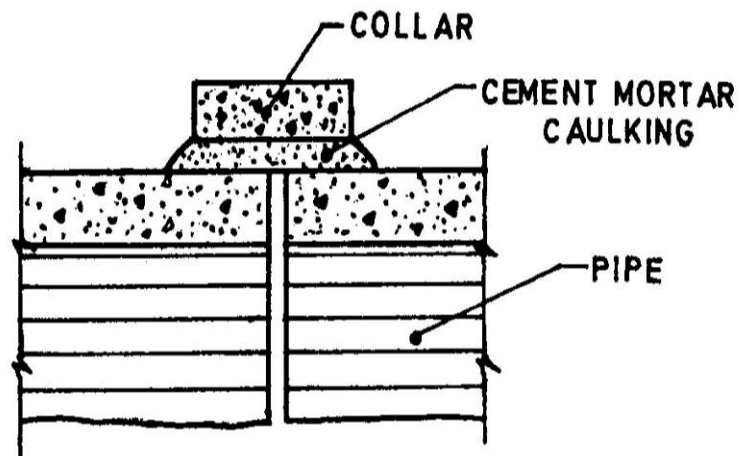


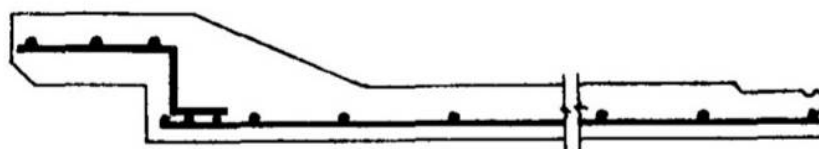
FIG-2 COLLOR JOINT(RIGID)

NOTE : - An effective means shall be provided for maintaining the reinforcement in position and for ensuring correct cover during manufacture of the unit. Spacers for this purposes shall be of rustproof materials or of steel protected against corrosion.

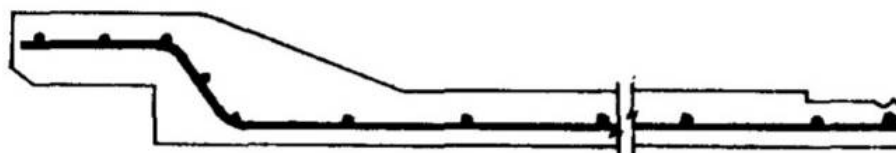


NOTE — No. of Z bars : Minimum half the number of longitudinals.
Maximum equal to number of longitudinals.

**3A Socket Cage Connected to Barrel
Cage by Means of Z Bars**



**3B Socket Cage Longitudinals Suitably Bent
for Connecting to Barrel Cage**



3C Cage made of Continuous Longitudinals

**FIG. 3 TYPICAL ARRANGEMENTS OF REINFORCEMENT
IN SOCKET FOR SINGLE CAGE**

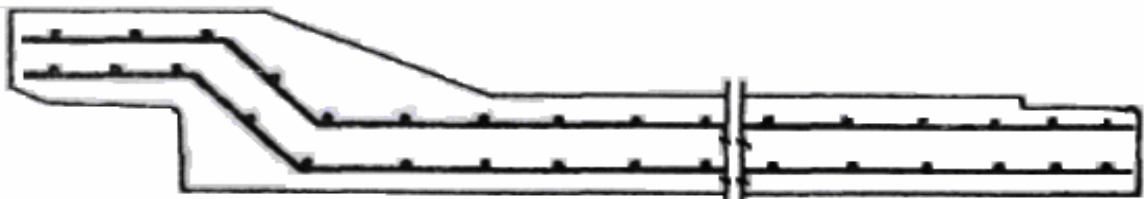


NOTE — No. of Z bars : Minimum half the number of longitudinals.
Maximum equal to number of longitudinals.

**4A Socket Cage Connected to Barrel
Cage by Means of Z Bars**



**4B Socket Cage Longitudinal Suitably Bent for
Connecting to Barrel Cage**



4C Cage made of Continuous Longitudinal

**Fig 4. Typical arrangements of reinforcement in socket
for double cage (use suitable type of spacers)**

2.6 MANUFACTURE

2.6.1 General

The method of manufacture shall be such that the forms and dimensions of the finished pipe are accurate within the limits specified in this standard. The surfaces and the limits specified in this standard. The surfaces and edges of the pipes shall be well defined and true, and their ends shall be square with the longitudinal axis.

2.6.2 Concrete Mixing and Placing

2.6.2.1 Concrete shall be mixed in a mechanical mixer. Mixing shall be continued until there is a uniform distribution of the materials and the mass is uniform in colour and consistency, but in no case shall the mixing be done for less than 2 min.

- 2.6.2.2** Concrete shall be placed before setting has commenced. It should be ensured that the concrete is not dropped freely so as to cause segregation. The concrete shall be consolidated by spinning, vibrating, spinning combined with vibrations, or other appropriate mechanical means.

2.6.3 Reinforcement Cages

Reinforcement cages for pipes shall extend throughout the pipes barrel. The cages shall consist of spirals or circular rings and straights of hard- drawn steel wire or mild steel rod. Reinforcement cages shall be placed symmetrically with respect to the thickness of the pipe wall. The spirals shall end in a complete ring at both the ends of a pipe.

- 2.6.3.1** Pipes having barrel wall thickness 100 mm and above shall have double reinforcement cage and the amount of spirals steel in the outer cage shall be 75 percent of the mass of spiral steel in the inner cage, whilst the total shall conform to the requirements specified in the relevant tables of this standard. The mass of longitudinals in the outer cage and inner cage should be the same, that is equal to half the total mass of longitudinals steel per pipe shall be given in the relevant tables.

NOTES : It is preferable that single reinforcement cage should be located near the inner surface of the pipe with adequate clear cover.

- 2.6.3.2** Diagonal reinforcement may be provided in pipes, the cages for which are not welded so as to help in binding the cage securely. It shall, however, be ensured that the clear cover for any reinforcement is not below the limits specified in 2.5.4. Diagonal reinforcement is a process requirement and shall not be counted against longitudinal and spiral reinforcement.

2.6.4 Curing

Curing shall be either by steam or by water or by a combination of steam and water, or by use of approved curing compounds. If water curing is used, the pipes shall be cured for a minimum period of 7 days in case of non-pressure pipes and 14 days in case of pressure pipes. In case of pipes where cement with fly ash or slag is used, the minimum period of water curing shall be 14 days, if steam curing is used, after that is shall be water cured for 3 days.

2.7. DIMENSIONS

2.7.1 Pipes

The internal diameter, barrel wall thickness, length, the minimum reinforcement and strength test requirements for different classes of pipes (see 2.2.1), shall be as specified in Table 1 to 3. However, in case of pipes manufactured by vibrated casting process, the internal diameter, wall thickness, the minimum reinforcement (in case of reinforced pipes) and strength test requirements for different classes of pipes shall be as given in Table The manufacturer shall inform the purchaser of the effective length of spigot and socket, and flush jointed pipes that he is able to supply. For collar jointed pipes, effective length shall be 2 m or 2.5 m up to 250 mm nominal diameter pipes and 2.5 m, 3.0 m or 4.0 m for pipes above 250 mm nominal diameter 900 mm and above, the effective length may also be 1.25 m.

NOTES : Pipes of internal diameter, barrel wall thickness and length of barrel and collar other than those specified in 2.7.1 may be supplied by mutual agreement between the purchaser and the supplier. In such case, the design of pipes submitted to the purchaser shall include all standard details as covered in Tables 1 to 3.

2.7.2 Tolerances

The following tolerances shall be permitted:

<i>Sr No.</i>	<i>Dimensions</i>		<i>Tolerances</i>
i)	Overall length	:	± 1 percent of standard length
ii)	Internal diameter of pipes	:	
	a) Up to and including 300 mm	:	$\pm 3^{\text{mm}}$
	b) Over 300 mm and up to and including 600	:	$\pm 5^{\text{mm}}$
	c) Over 600 mm	:	$\pm 10^{\text{mm}}$
iii)	Barrel wall thickness	:	
	a) Up to and including 30 mm	:	$+ 2^{\text{mm}}$ $- 1^{\text{mm}}$
	b) Over 30 mm up to and including 50 mm	:	$+ 3^{\text{mm}}$ $- 1.5^{\text{mm}}$
	c) Over 50 mm up to and including 65	:	$+ 4^{\text{mm}}$ $- 2^{\text{mm}}$
	d) Over 65 mm up to and including 80 mm	:	$+ 5^{\text{mm}}$ $- 2.5^{\text{mm}}$

e) Over 80 mm up to and including 95 mm	:	+ 6 ^{mm} - 3 ^{mm}
f) Over 95 mm	:	+ 7 ^{mm} - 3.5 ^{mm}

NOTE - In case of pipes with flexible rubber ring joints, the tolerance on thickness near the ends will have to be reduced. Near the rubber ring joints, the tolerance on thickness shall be as given in Tables 4 to 6 in case of pipes manufactured by spinning process and as given in Table 5 in case of pipes manufactured by vibrated casting process.

2.8 WORKMANSHIP AND FINISH

2.8.1 Finish

Pipes shall be straight and free from cracks except that craze cracks may be permitted. The ends of the pipes shall be square with their longitudinal axis so that when placed in a straight line in the trench, no opening between ends in contact shall exceed 3 mm in pipes up to 600 mm diameter (inclusive), and 6 mm in pipes larger than 600 mm diameter.

2.8.1.1 The outside and inside surfaces of the pipes shall be dense and hard and shall not be coated with cement wash or other preparation unless otherwise agreed to between the purchaser and the manufacturer or the supplier. The inside surface of the pipe shall be smooth. For better bond, inner surface of the collar may be finished rough.

Table 1 Design and Strength Test Requirements of Concrete Pipes of Class NP3 – Reinforced Concrete, Medium Duty, Non – pressure Pipes

(Clauses 2.5.1.1, 2.5.1.2.1, 2.5.1.3, 2.5.2.2, 2.5.3.2 and 2.7.1; and Table 7)

Internal Diameter of Pipes	Barrel Wall Thickness	Reinforcements			Strength Test Requirement for Three Edge Bearing Test	
		Longitudinal, Mild Steel or Hard Drawn Steel	Spirals, Hard Drawn Steel		Load to Produce	Ultimate Load
mm	mm	Minimum number	Kg / linear meter	kg / linear meter	0.25 mm Crack kN/linear meter	kN / liner meter
(1)	(2)	(3)	(4)	(5)	(6)	(7)
300	40	8	0.78	1.80	15.50	23.25
350	75	8	0.78	2.95	16.77	25.16
400	75	8	0.78	3.30	19.16	28.74
450	75	8	0.78	3.79	21.56	32.34
500	75	8	0.78	4.82	23.95	35.93

600	85	8 or 6+6	1.18	7.01	28.74	43.11
700	85	8 or 6+6	1.18	10.27	33.53	50.30
800	95	8 or 6+6	2.66	13.04	38.32	57.48
900	100	6+6	2.66	18.30	43.11	64.67
1000	115	6+6	2.66	21.52	47.90	71.85
1100	115	6+6	2.66	27.99	52.69	79.00
1200	120	8+8	3.55	33.57	57.48	86.22
1400	135	8+8	3.55	46.21	67.06	100.60
1600	140	8+8	3.55	65.40	76.64	114.96
1800	150	12+12	9.36	87.10	86.22	129.33

NOTE :

1. If mild steel is used for spiral reinforcement, the weight specified under col 5 shall be increased to 140/125
2. The longitudinal reinforcement given in this table is valid for pipe up to 2.5m effective length for internal diameter of pipe up to 250mm and up to 3m effective length for higher diameter pipes
3. Total mass of longitudinal reinforcement shall be calculated by multiplying the value given in col 4 by the length of the pipe and then deducting for the cover length provided at the two ends.
4. Concrete for pipes shall have a minimum compressive strength of 35 N/mm² at 28 days.

Table 2 Design and Strength Test Requirement of Concrete Pipes of Class NP3 – Un reinforced Concrete, Medium – Duty, Nonpressure Pipes Made by Vibrated Casting Process (Clauses 2.4.5.1, 2.5.1.1, 2.5.3 and 2.7.1 and Table 7)

Internal Diameter of Pipes	Minimum Barrel Wall Thickness	Strength Test Requirement for Three Edge Bearing Test,
mm	Mm	kN Bearing Test, Ultimate
(1)	(2)	(3)
300	50	15.50
350	55	16.77
400	60	19.16
450	65	21.56
500	70	23.95
600	75	28.74
700	85	33.53
800	95	38.22
900	100	43.11
1000	115	47.90
1100	120	52.69
1200	125	57.48
1400	140	67.06
1600	165	76.64
1800	180	86.22

NOTE – Concrete for pipes shall have a minimum compressive strength of 45

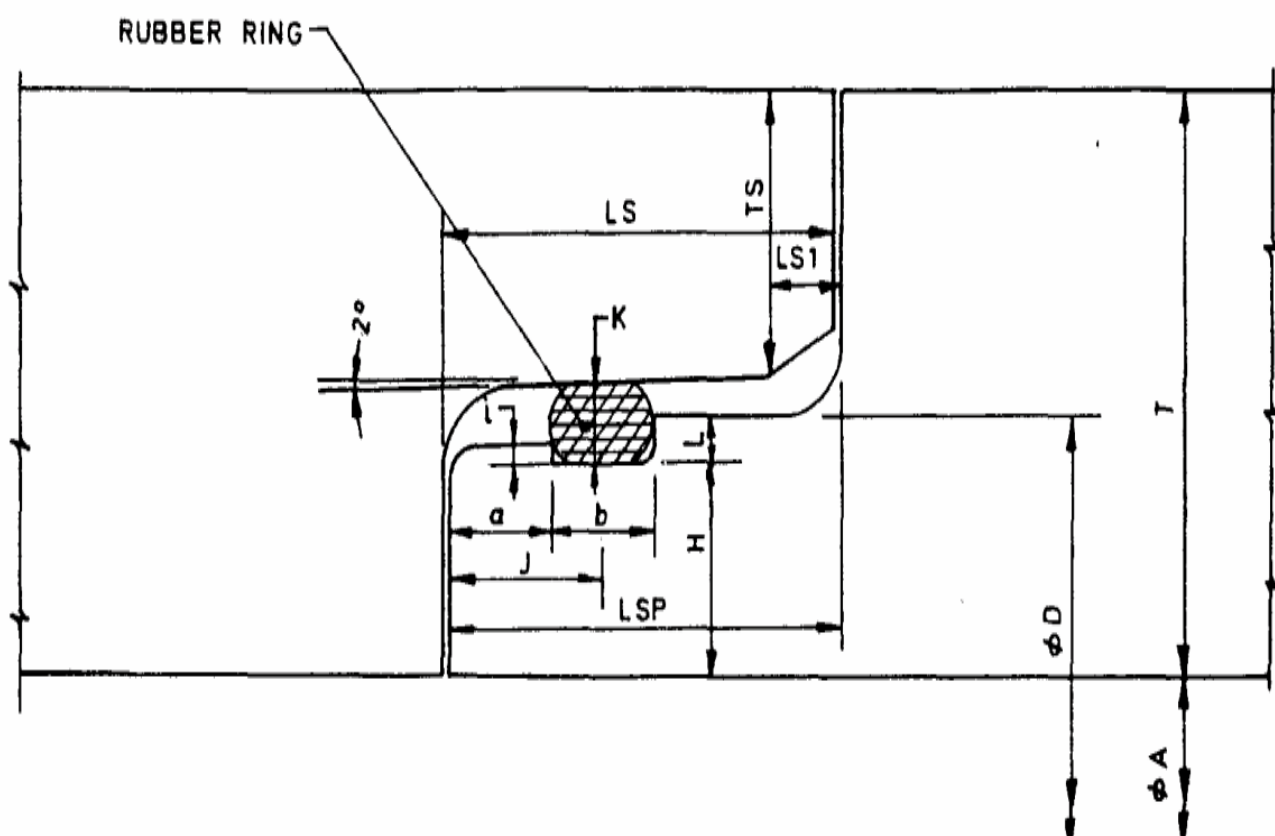
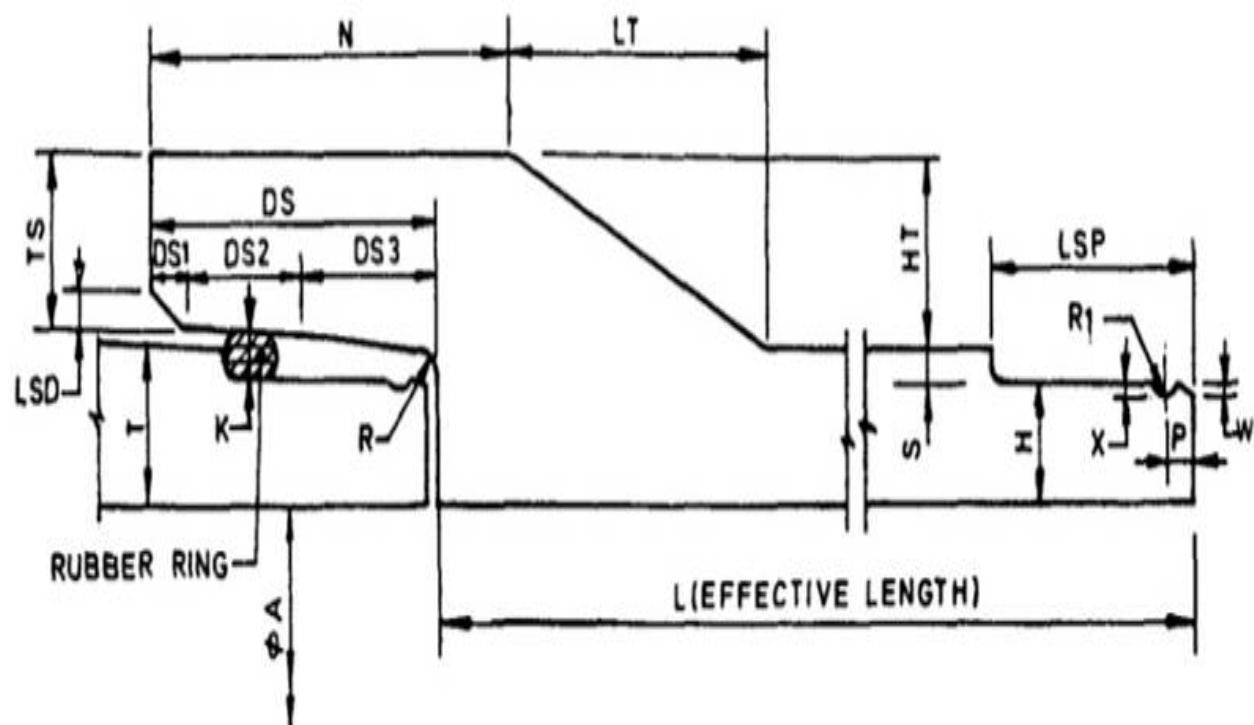


Table 4 Spigot and Socket Dimensions of NP3 and NP4 Class Pipes (Rubber Ring Roll on Joint) from 80 to 900 mm

Diameter (Clauses 2.5.3 and 2.7.2)

All dimensions in millimeters

Pipe Diameter ΦA	Rubber Ring Chord Diameter	Rubber Ring Internal Diameter	T	TS	DS	DS1	DS2	DS3	R	LSD	K	N	LT	HT	LSP	P	S	H	X	W	R1
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)
80	11	102	25	32.5	70	8	28	34	3	5.5	6.5	95	84	34	50	7	5.5	19.5	1	1	5.5
100	11	120	25	32.5	70	8	28	34	3	5.5	6.5	95	84	34	50	7	5.5	19.5	1	1	5.5
150	11	170	25	32.5	70	8	28	34	3	5.5	6.5	95	84	34	50	7	5.5	19.5	1	1	5.5
200	11	230	30	38	83	11	38	34	5	6.5	6.5	113	97	39.5	50	7	5.5	24.5	1	1	5.5
225	11	255	30	38	83	11	38	34	5	6.5	6.5	113	97	39.5	50	7	5.5	24.5	1	1	5.5
250	11	275	30	38	83	11	38	34	5	6.5	6.5	113	97	39.5	50	7	5.5	24.5	1	1	5.5
300	12	340	40	51	90	12	42	36	6	7	7	130	130	53	55	7.5	6	34	1	1	6
350	16	435	75	75	120	16	56	48	8	10	10	158	135	78	72	10	8	67	2	2	8
400	16	480	75	75	120	16	56	48	8	10	10	158	135	78	72	10	8	67	2	2	8
450	16	525	75	75	120	16	56	48	8	10	10	158	135	78	72	10	8	67	2	2	8
500	16	570	75	75	120	16	56	48	8	10	10	158	135	78	72	10	8	67	2	2	8
600	20	675	85	85	150	20	70	60	10	12	12	193	153	88.5	90	12	10	75	2	2	10
700	20	765	85	85	150	20	70	60	10	12	12	193	153	88.5	90	12	10	75	2	2	10
800	20	875	95	95	150	20	70	60	10	12	12	197	171	98.5	90	12	10	85	2	2	10
900	20	970	100	100	150	20	70	60	10	12	12	200	180	103.5	90	12	10	90	2	2	10

Table 4 (Concluded)

NOTES

- 1 Corners to be rounded off
- 2 The dimensions DS2, DS3, LSP, TS, T.H.S.HT and K shall conform to the values given in this table as there are critical dimensions. Other dimensions are for guidance only. The following tolerance shall apply on the critical dimensions.

Dimensions *Tolerances*

T and *HT* Same as that of barrel wall thickness given in 2.7.2

TS and *H* Half the tolerance on barrel wall thickness given in 2.7.2

DS2, DS3, LSP, K & S The tolerance, in mm, shall be given below :

Chord Diameter	<i>DS2</i>	<i>DS3</i>	<i>LSP</i>	<i>K</i>	<i>S</i>
11	± 2	± 3	± 4	± 1.25	± 0.75
12	± 2	± 3	± 4	± 1.25	± 0.75
16	± 2.5	± 3.5	± 5	± 2.00	± 1.25
20	± 3	± 4	± 5.5	± 2.25	± 1.50
25	± 4	± 5	± 7	± 3.25	± 2

**Table 5 Spigot and Socket Dimensions of NP3 and NP4 Class Pipes from 1000 to 2600 mm
Diameter (Rubber Ring Confined Joint)**
(Clauses 5.3 and 7.2)

All dimension in millimeters.

<i>Pipe Diameter Φ A</i>	<i>Rubber Ring Chord Diameter</i>	<i>Rubber Ring Internal Diameter</i>	<i>T</i>	<i>TS</i>	<i>LS</i>	<i>LS1</i>	<i>K</i>	<i>LSP</i>	<i>a</i>	<i>b</i>	<i>J</i>	<i>H</i>	<i>I</i>	<i>L</i>	<i>Ø D</i>
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)
1000	20	920	115	58.0	114	20	13	114	25	28	39	42	4	9	1102
1100	20	1003	115	58.0	114	20	13	114	25	28	39	42	4	9	1202
1200	20	1095	120	60.5	114	20	13	114	25	28	39	44.5	4	9	1307
1400	25	1275	135	67.5	114	20	16	114	25	35	42.5	50	4	10	1520
1600	25	1445	140	72.5	114	25	16	114	25	35	42.5	50	4	10	1720
1800	25	1620	150	77.5	114	25	16	114	25	35	42.5	55	4	10	1930
2000	25	1810	170	87.5	114	25	16	114	25	35	42.5	55	4	10	2150
2200	25	1995	185	95.0	114	25	16	114	25	35	42.5	72.5	4	10	2365
2400	25	2180	200	102.5	114	25	16	114	25	35	42.5	80	4	10	2580
2600	25	2360	215	110.0	114	25	16	114	25	35	42.5	87.5	4	10	2795

Table 5 (Concluded)**NOTES**

1 Corners to be rounded off.

2 The dimensions LS, LSP, TS, T, H, L, b and K shall conform to the values given in this table as these are critical dimensions.

Other dimensions are for guidance only. The following tolerances shall apply on the critical dimension.

Dimension Tolerances

LS and LSP $\pm 7\text{mm}$.

T Same as that of barrel wall thickness given in 2.7.2

H and TS Half the tolerance on barrel wall thickness given in 2.7.2

L $\pm 0.5\text{ mm}$.

b $\pm 1\text{mm}$. for 20mm. rubber ring chord diameter

K $\pm 2.5\text{mm}$. for 25mm. rubber ring chord diameter

Table 6

All dimension in millimeters.

d_i	G	R	T	D_o	L_t	L_b	d_s	D_m	L_m	I_s	S
300 \pm 4	13	322	50	487 \pm 4	112 \pm 4	105 \pm 2	370.07	386.07	49	50	8.00 \pm 1.0
350 \pm 5	13	370	55	555 \pm 4	112 \pm 4	105 \pm 2	425.07	441.07	49	50	8.00 \pm 1.0
400 \pm 5	13	417	60	615 \pm 4	112 \pm 4	105 \pm 2	480.07	496.07	49	50	8.00 \pm 1.0
450 \pm 5	13	465	65	680 \pm 4	112 \pm 4	105 \pm 2	536.07	552.07	49	50	8.00 \pm 1.0
500 \pm 5	13	513	70	735 \pm 4	112 \pm 4	105 \pm 2	590.07	606.07	49	50	8.00 \pm 1.0
600 \pm 5	13	609	75	850 \pm 4	112 \pm 4	105 \pm 2	700.07	716.07	49	50	8.00 \pm 1.0
700 \pm 7	18	706	85	980 \pm 5	141 \pm 5	132 \pm 3	808.00	830.00	61	65	11.00 \pm 1.2
800 \pm 7	18	803	95	1100 \pm 5	141 \pm 5	132 \pm 3	924.00	946.00	61	65	11.00 \pm 1.2
900 \pm 7	18	901	100	1215 \pm 5	141 \pm 5	132 \pm 3	1036.00	1058.00	61	65	11.00 \pm 1.2
1000 \pm 7	18	998	115	1330 \pm 5	141 \pm 5	132 \pm 3	1148.00	1170.00	61	65	11.00 \pm 1.2
1100 \pm 7	24	1097	120	1520 \pm 6	155 \pm 6	145 \pm 3	1262.00	1291.30	72	63	14.65 \pm 1.5
1200 \pm 7	24	1195	125	1640 \pm 6	155 \pm 6	145 \pm 3	1372.48	1401.78	72	63	14.65 \pm 1.5
1400 \pm 10	24	1383	140	1870 \pm 6	155 \pm 6	145 \pm 3	1590.91	1620.21	72	63	14.65 \pm 1.5
1600 \pm 10	24	1578	165	2100 \pm 6	155 \pm 6	145 \pm 3	1814.91	1844.21	72	63	14.65 \pm 1.5
1800 \pm 10	24	1774	180	2340 \pm 6	155 \pm 6	145 \pm 3	2040.00	2069.30	72	63	14.65 \pm 1.5
2000 \pm 12	28	1850	190	2380 \pm 8	173 \pm 8	168 \pm 4	2126.80	2161.00	75	78	17.10 \pm 1.8
2200 \pm 12	28	2037	210	2620 \pm 8	173 \pm 8	168 \pm 4	2341.80	2376.00	75	78	17.10 \pm 1.8
2400 \pm 12	28	2224	225	2850 \pm 8	173 \pm 8	168 \pm 4	2556.80	2591.00	75	78	17.10 \pm 1.8

NOTES

1. G is the diameter of the unstretched rubber chord, hardness 40 \pm 5 IRHD, stretching 15 percent.
2. R is the inner diameter of the unstretched rubber ring.
3. T is the minimum barrel wall thickness.
4. d_x D_m L_m and L_s are nominal diameter

**Table 7 Weight of Spirals (Hard Drawn Steel) in Socket of
R/R Joint RCC Pipes of Different Classes (kg/Number)
(Clause 2.5.3)**

Internal Diameter of Pipes	NP2 Class	NP3 Class	NP4 Class	P1 Class	P2 Class	P3 Class
(1)	(2)	(3)	(4)	(5)	(6)	(7)
80	0.08	0.08	0.08	0.08	0.08	0.08
100	0.09	0.09	0.09	0.09	0.09	0.09
150	0.12	0.12	0.12	0.12	0.12	0.15
200	0.14	0.14	0.21	0.14	0.21	0.35
225	0.15	0.15	0.26	0.15	0.26	0.43
250	0.16	0.16	0.31	0.16	0.31	0.51
300	0.45	0.45	0.53	0.45	0.53	0.84
350	0.51	0.64	0.64	0.51	0.74	1.24
400	0.56	0.71	0.71	0.56	0.99	1.66
450	0.63	0.76	0.76	0.63	1.23	2.26
500	0.68	0.87	1.08	0.68	1.57	2.85
600	0.81	1.00	2.12	1.52	2.88	4.74
700	0.92	2.16	3.02	1.79	3.96	6.79
800	1.14	2.87	4.67	2.04	6.28	9.99
900	1.50	4.06	6.03	2.63	8.29	-
1000	1.91	-	-	3.33	11.29	-
1100	2.34	-	-	4.08	-	-
1200	2.80	-	-	4.90	-	-
1400	3.82	-	-	-	-	-
1600	5.64	-	-	-	-	-
1800	7.25	-	-	-	-	-
2000	11.68	-	-	-	-	-
2200	12.88	-	-	-	-	-

NOTES

1. Longitudinal reinforcement shall be proportional to the length of socket cage as given in Table 1 & 2.
2. If mild steel is used for spiral reinforcement, the weight specified above shall be increased to 140/125.

**Table 8 Design Requirements of Reinforced
Concrete
Collars for Pipes of Class NP3 and
NP4 (Clauses 2.5.3 and 2.7.1)**

Nominal Internal Diameter of Pipe	Collar Dimensions			Reinforcements		
	Minimum Caulking Space	Minimum Thickness	Minimum Length	Longitudinal, Mild Steel or Hard Drawn Steel		Spiral Hard- Drawn Steel
mm (1)	mm (2)	mm (3)	mm (4)	No. (5)	kg/collar (6)	kg/collar (7)
90	13	25	150	6	0.08	0.07
100	13	25	150	6	0.08	0.08
150	13	25	150	6	0.08	0.10
200	13	25	150	6	0.08	0.12
225	13	25	150	6	0.08	0.14
250	13	25	150	6	0.08	0.16
300	16	30	150	8	0.11	0.22
350	19	35	200	8	0.15	0.40
400	19	35	200	8	0.15	0.50
450	19	35	200	8	0.15	0.60
500	19	40	200	8	0.15	0.70
600	19	40	200	8	0.23	1.05
700	19	45	200	8	0.23	1.85
800	19	50	200	8	0.23	2.05
900	19	55	200	8	0.33	2.25
1000	19	60	200	8	0.33	3.09
1100	19	65	200	8	0.33	4.11
1200	19	75	200	12	0.50	5.08
1400	19	80	200	12 or 8+8	0.67	6.55
1600	19	90	200	12 or 8+8	0.67	9.00
1800	19	100	200	12+12	1.00	12.15
2000	19	110	200	12+12	1.00	13.30

2.9 TESTING OF RCC NP3 PIPE

All the specifications mentioned in the I.S Code 3597-1998 & its latest revised addition shall be strictly followed.

SCOPE

2.9 This Standard covers methods for carrying out the following tests on concrete pipes, both reinforced concrete and prestressed concrete and of pressure and non pressure types to evaluate the properties stipulated in the relevant Indian Standards:

- Three-edge bearing test,

- b) Absorption test,
- c) Hydrostatic test,
- d) Permeability test, and
- e) Straightness test.

2.10 INSPECTION

2.10.1 The quality of all materials, process of manufacture and the finished pipes shall be subject to inspection and approval by the purchaser. If the pipe is tested for three-edge bearing or absorption, inspection of the reinforcement shall be made on the pipe sections used for those tests

2.10.2 The pipes & shall be inspected by Third Party Inspection Agency, the cost of which is to be borne by contractor. The Third Party Inspection Agency will be from any Government undertaking agency like RITES, EIL, CEIL, MACON, WAPCOS, SGS etc approved by Gujarat Water Supply & Sewerage Board.

2.11 GENERAL PRECAUTION

2.11.1 The test specimens shall not have been exposed to a temperature below 4° C for 24 hours immediately preceding the test and shall be free from all visible moisture. The specimens shall be inspected and any specimen with visible flaws shall be discarded

2.11.2 If any test specimen fails because of mechanical reasons, such as failure of testing equipment or improper specimen preparation, it shall be discarded and another specimen taken.

2.12 SELECTION OF TEST SPECIMENS

In addition to the requirements specified in this standard, the number of test specimens and the method of their selection shall be in accordance with the specification for type of pipe being tested.

2.13 THREE-EDGE BEARING TEST

2.13.1 GENERAL

Three-edge bearing test shall be performed by the method given in 2.13.2. The pipe shall be surface dry when tested. The test specimen shall be tested in a machine so designed that a crushing force may be exerted in a true vertical plane through one diameter and extending the full length of the pipe but excluding the sockets, if any.

2.13.2. Three-Edge Bearing Method

2.13.2.1 Apparatus

2.13.2.2 Testing machine

Any mechanical or hand-powered device may be used in which the head that applies the load moves at such a speed as to increase the load at a uniform rate of approximately 20 percent of the expected crushing load per linear meter per minute. The loading device shall be calibrated within an accuracy of ± 2 percent. The testing machine used for the load tests should produce a uniform deflection throughout, that the distribution of the test load along the length of the barrel of the pipe will not be appreciably affected by the deformation or yielding of any part of the machine during the application of the load.

2.13.2.3 Lower bearing block

The lower bearing block (see Fig 1) shall consist of two hardwood or hard rubber strips fastened to a wooden or steel beam or direct to a concrete base, which shall provide sufficient rigidity to permit application of maximum load without appreciable deflection. Wooden or rubber strips shall be straight, have a cross-section of not less than 50mm in width and not less than 25mm nor more than 40mm in height and shall have the top inside corners rounded to a radius of approximately 15mm. The interior vertical sides of the strips shall be parallel and spaced apart a distance of not more than $1/12^{\text{th}}$ of the specimen diameter but in no case less than 25mm. The bearing faces of the bottom strips shall not vary from a straight line vertically or horizontally by more than 1mm in 375 mm of the length under load.

About 6 mm thick hard rubber or felt should be placed/fixed at the lower face of the upper wooden block which shall come in contact with the surface of the pipe.

2.13.2.4 Upper bearing block

The upper bearing shall be a rigid hardwood block or a block with hard rubber facing at least 150 mm x 150 mm in cross-section. The wood block shall be free of knots and shall be straight and true from end to end. It shall be fastened to a steel or wood faced steel beam of such dimensions that deflection under maximum load will not be appreciable. The bearing face of the upper bearing block shall not deviate from a straight line by more than 1 mm in 375 mm of length under load.

2.13.2.5 The equipment shall be so designated that the load will be

distributed about the center of the overall length of the pipe(see Fig. 1).The load may be applied either at a single point or at multiple points dependent on the length of the pipe being tested and the rigidity of the test frame.

NOTE- Multiple points of load applicable to the top bearing will permit use of lighter beams without appreciable deflection.

2.13.2.6 Crack measuring gauge

The crack measuring gauge shall be made from 0.25 mm thick strip and shall be of a shape as shown in fig 2.

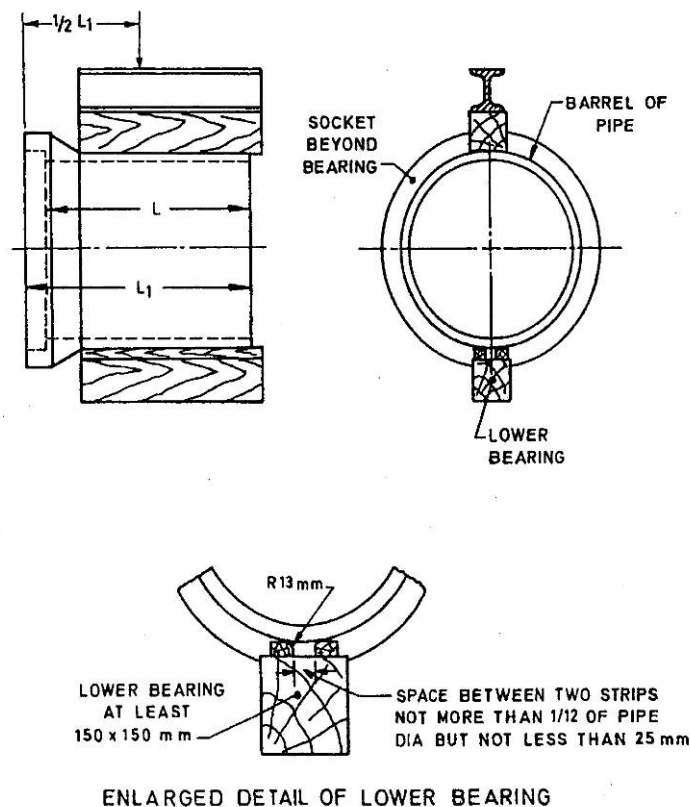


FIG. 1 THREE-EDGE BEARING METHOD

2.13.3 Procedure

2.13.3.1 The specimen shall be placed on the two bottom bearing strips in such a manner that the pipe tests firmly and with the most uniform possible bearing on each strip for the full length of the pipes less the socket portion ,if any.

If mutually agreed upon by the manufacturer and the purchaser prior to the test , a fillet of plaster of Paris not exceeding 25 mm in thickness may be cast on the surface of the upper and lower bearing before the pipe is placed. The width of the fillet cap, top or bottom, shall be not more than

25mm per 300mm diameter, but in no case less than 25 mm.

- 2.13.3.2 Each end of the pipe at a point mid-way between the lower bearing strips shall be marked and then diametrically opposite points thereof shall be established. The top bearing block shall be so placed that it contacts the two ends of the pipe at this marks. After placing the specimen in the machine on the bottom strips, the top bearing shall be symmetrically aligned in the testing machine. Load shall be applied at the rate indicated in 2.13.2.2. Until either the formation of 0.25 mm wide crack or ultimate strength load, as may be specified, has been reached.

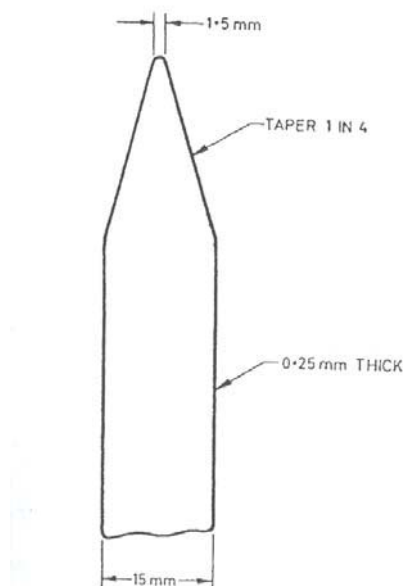


FIG. 2 GAUGE LEAF FOR MEASURING CRACKS

If both the 0.25 mm crack and ultimate load are required, the specified rate of loading need not be maintained after the load at 0.25 mm crack has been determined.

- 2.13.3.3 The 0.25 mm crack load is the maximum load applied to the pipe before a crack having a width of 0.25 mm measured at close intervals, occurs throughout a length of 300 mm or more. The crack shall be considered 0.25mm in width when the point of the measuring gauge described in 2.13.2.6 penetrates 1.5 mm at close intervals throughout the specified distance of 300 mm. The ultimate load will be

reached when the pipe will sustain no greater load.

2.13.4 Calculation

The crushing strength in Newton per linear meter of pipe shall be calculated by dividing the total load on the specimen by the nominal laying length. Effective length of the pipe shall be taken as the nominal laying length of the specimen. In case of spigot and socket ended pipes, the effective length shall be equal to the overall length minus the depth of socket (see Fig 3) and in case of collar and flush jointed pipes, the effective length shall be equal to the overall length.

NOTE - In most machines the total load will include the dead weight of the top bearing plus the load applied by the loading apparatus.

2.14 ABSORPTION TEST

2.14.1 TEST SPECIMEN

Each specimen selected at random shall have a square area of $100 \text{ cm}^2 \pm 10$ percent of the length of the pipe as measured on surface of the pipe, and a thickness equal to the full depth of the pipe thickness and shall be free from visible cracks.

2.14.2 Procedure

2.14.2.1 Drying Specimens

Specimens shall be dried in a mechanical convection oven at a temperature of 105°C to 115°C until two successive weighings at intervals of not less than 8 h show an increment of loss not greater than 0.1 percent of the mass of the specimen. The drying time shall be not less than 36 h. the dry mass of the specimen shall be the mass after the final drying determined at ambient temperature.

2.14.2.2 After drying and weighing as specified in 2.14.2.1, the specimens shall be immersed in clean water at room temperature for the specified period. The specimens shall then be removed from the water and allowed to drain for not more than one minute. The superficial water shall then be removed by absorbent cloth or paper and the specimens weighted immediately.

2.14.2.3 The least count/accuracy of the weighing balance shall be 0.1 g which the test specimen shall be weighed.

2.14.2.4 Calculation and report

The increase in mass of the specimen over its dry mass shall be taken as the absorption of the specimen and shall be expressed as a percentage of the dry mass. The results shall be reported separately for each specimen.

2.15 HYDROSTATIC TEST

2.15.1 Test Specimen

The specimens for determination of leakage under interval hydrostatic pressure shall be sound and full size pipe. If the pipes are tested after storing in adverse weather condition presoaking shall be submerged in water or sprayed with water for a period not less than 6 hours prior to testing and excess water removed.

2.15.2 Procedure

2.15.2.1 The pipe shall be supported in such a way so that the longitudinal axis is approximately horizontal and the exterior surface excepting the supports can be examined readily.

2.15.2.2 The equipment for making the test shall be such that the specimen under test can be filled with water to the exclusion of air and subjected to the required hydrostatic pressure. Apply hydrostatic pressure to the whole pipe including the portion of socket and rebated joints, that is, subjected to pressure in 'as laid' condition.

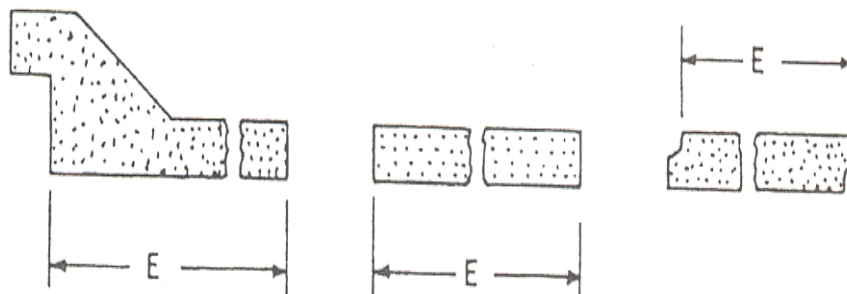


FIG. 3 ILLUSTRATING EFFECTIVE LENGTH 'E' OF PIPES

2.15.2.3 The specimen shall be filled with water and the air expelled.

Pressure shall be applied at a gradual rate until the specified test pressure is reached ,or beads of water on the pipe surface is seen , whichever occurs first.

2.15.2.4 Pressure shall be maintained for 1 min + 30 s for each 10mm of wall thickness (for precast concrete pipes wall thickness shall be full barrel wall thickness, whereas it shall be core thickness, in case of prestressed concrete pipe) or for twice that entire period if the application of pressure resulted in the formation of beads of water on the pipe surface.

2.15.2.5 At the end of the holding period, the pressure shall be released immediately if the test pressure has been maintained. If the beads of the water have not grown or run the pressure shall be increased slowly until the test pressure is reached or the beads of water grow or run (whichever occurs first).

2.15.2.6 If the test pressure has been reached without the beads of water growing or running , the test pressure shall be maintained constant for 1 min + 30 s for each 10 mm of wall thickness (for precast concrete pipes wall thickness shall be full barrel wall thickness ,whereas it shall be core thickness , in case of prestressed concrete pipe).At the end of the holding period the pressure shall be released immediately.

After releasing the pressure, the test pipe shall be drained completely.

2.16 PERMEABILITY TEST

2.16.1 Prestressed Concrete pipes and Precast Concrete Pipes

This test shall be done on outside surface of the pipe. No additional treatment of any type shall be done on the pipe before permeability test is carried out. For Prestressed Concrete Pipe, the test shall be conducted at 3 places on coating and for Precast Concrete pipe at 2 places simultaneously, immediately after curing is completed (see Fig 4). In case this is done later, the pipe shall be kept wet for 48 hours prior to test. For plain/flush ended precast pipes, it shall be carried out about 300mm away from both ends.

2.16.1.1 Procedure

The dry surface of the pipe shall be scrapped by wire brush and loose particles, if any, removed. Sealant shall then be applied to the lower portion of the cup and cup shall be pressed on the pipe. After hardening of sealant, water shall be

filled in cup with wash bottle. The glass tube with rubber cork shall then be fixed in the cup as shown in fig. Water in the tube shall then be filled using wash bottle and air shall be allowed to escape during filling. Precaution shall be taken , so that water does not leak either from cup ends or from the rubber stopper.

2.16.1.2 Initial Absorption

Water shall be filled up to zero mark and reading shall be taken at every half hour interval up to two hours. The drop in water level in the stand pipe at the end of two hours in the initial absorption.

2.16.1.3 Final Permeability

Fill the water in the stand pipe again up to zero mark and take the reading at one hour interval up to 4 h. The absorption in the fourth hour, that is , difference between fourth and third hour reading is the final permeability. The average of tests conducted at three places for prestressed Concrete pipe and two places for precast concrete pipe shall be expressed in cm^3 as final permeability.

Criteria for acceptance is the final permeability.

2.16 STRAIGHTNESS TEST

2.16.1 Procedure

2.16.1.1 A rigid straight edge, made into a gauge of the form and dimension shown in (fig 5) shall be placed in the bore of the pipe with edge x in contact with the pipe internal surface and/or the line parallel to the pipe axis. Hold the plane of the gauge in a radial plane.

2.16.2. If both ends of the gauge , when so placed are in contact with the internal surface of the pipe ,the deviation from straightness is excessive. If this condition occurs at any one of four different position of the gauge, approximately equally spaced around the pipe circumference the pipe does not comply with the particular requirement.

2.16.3 If both ends of the gauge , when used as described in 2.16.1.1 are not in contact with the internal surface of the pipe at both ends, the gauge shall be reversed so that edge y, placed as in 2.16.1.1 is adjusted to the internal surface of the pipe. If the two studs in edge y cannot be made to touch the surface of the pipe simultaneously, The deviation from the straightness is excessive.

If this condition occurs at any four position of the gauge the pipe does not conform with this particular requirement.

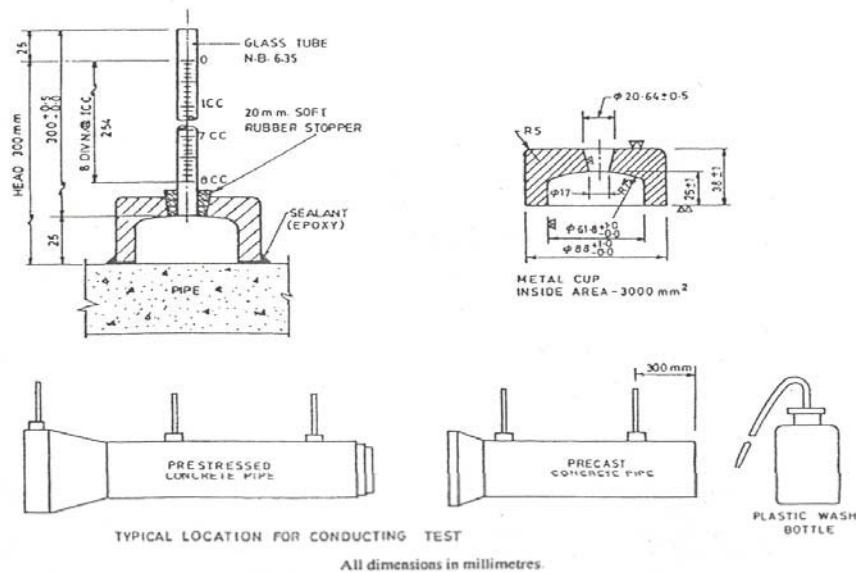


FIG. 4 METHOD FOR PERMEABILITY TESTING OF CONCRETE PIPES

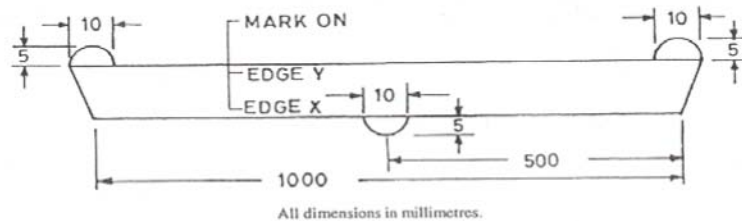


FIG. 5 STRAIGHTNESS TEST

Item No.5:

Construction of manhole – "A" Type

And

Construction of manhole – "A" Type – Extra Depth

And

Construction of manhole – "B" Type

And

Construction of manhole – "B" Type – Extra Depth

And

Construction of manhole – "C" Type

And

Construction of manhole – "C" Type – Extra Depth

The said drainage manhole as per drainage type design is to be carried out in brick masonry in CM 1:4 and CC in foundation in 1:3:6 including bedding, benching in 1:2:4 and the inside plaster work in niru finishing in CM 1:3 as per drainage drawing is to be carried out whereas the outer plaster in CM

1:3 is to be done with necessary fixing of HDPE reinforced plastic steps of size 385 x 165 x 0.25 mm as per given type design is to be done. Precast RCC manhole frame and cover is to be done 1:1.5:3 by filling coping and fixing work. The work shall be such that there shall not be no leakage in the manhole, in which, the rate for excavation shall be paid separately which is not included the prescribed rate. The frame and cover shall be provided by RMC Store and same shall have to be transported from Store to Site at the cost of contractor and fixing work is to be carried out accordingly, for which, the rate for only fixing work shall be paid.

The rate for manhole shall be for one number in which, the rate for frame and cover shall be paid separately where for additional depth, the rate shall be paid on one running meter basis as shown in Schedule of this tender.

THE MANHOLE AND DEPTH OF MANHOLES :-

The manholes on the sewers shall be constructed in the form and of the dimensions shown in the Drawing. The depth of the manholes shall be measured from the top of cover to the invert level of the manhole.

The manholes shall be constructed at places shown on the drawings or whatever directed by the Engineer. Type designs for these manholes are shown on the drawings but the actual type and dimensions shall in each case be determined by the Engineer as the circumstances may require. (Refer drawing No. R.M.C.- DRN - PHASE-III - 01 to 09)

CONSTRUCTION OF BRICK MASONRY MANHOLES :

The brick masonry shall be constructed as per the type design shown in the drawing enclosed. The various types of manholes to be adopted as per the requirement have been indicated in the L-section and sewer layout drawing in general. The manhole will be fitted with R.C.C. pre-cast medium or heavy duty manhole frame and cover as the case may be. The brick masonry manhole shall be plastered from inside and outside as shown in the drawing and as shown CM proportion and thickness.

FLOORS AND 0.80 ID CHANNEL PIPES :

The floor shall consist of cement concrete. Concrete of R.C. 0.80 ID channel pipes of the required size and curves shall be laid and bedded in cement on the concrete base to the same lines and fall as sewers unless otherwise directed. Both sides of the channel pipes shall be trenched up in concrete and rendered in cement mortar 20 mm thick and formed to a slope of not less than 1 in 12 to the channel.

STEPS :

Where the depth of the invert exceeds 0.90 M below the surface of the ground, HDPE reinforced steps of approved pattern shall be provided as per type design shown in manhole drawings.

RATE OF MANHOLES :

The rate for construction of manhole to be quoted in the bill of quantities shall include complete masonry, structure, concrete cap, plastering with cement from inside and outside, bottom concrete or channels including

providing and fixing of HDPE reinforced steps and fixing of R.C.C. manhole frame & covers complete as per type design drawing and cutting the pipes flush with the inside plaster of the wall. The manholes will be paid per numbers up to the minimum depth shown in the type design and for depth beyond the specified minimum depth for a particular type of manhole, extra will be paid per running meter depth. The rates includes dewatering during all stages of construction.

The brick masonry will be paid per number excluding excavation but including masonry, bottom concrete, plastering, benching channel fixing of RCC frame and covers. (Refer R.M.C. DRG for H.C.1, H.C.2)

The rate for Item no.5.1, 5.2 and 5.3 shall be for a unit of one number where as rate for item no. 5.1.1, 5.2.1 and 5.3.1 will be in running meter.

Item No.6 to 8:

Precast RCC Circular Frame and cover of 5, 10 and 20 Ton capacity round of 600 mm dia.

3 PROVIDING & SUPPLYING RCC PRE-CAST M.H. FRAME & COVER & HOUSE CONNECTION CHAMBER FRAME AND COVER.

i) GENERAL :-

The R.C.C. pre-cast manhole cover shall confirm to IS:12592 / 2002 or its latest version and as per detailed Drawing attached herewith.

ii) SHAPES & DIMENSIONS :-

Shapes :-_The shapes of pre-cast M.H. covers shall be circular only and 10 and 20 MT capacity for MHS and 5MT for HC chambers.

ii.a) DIMENSION & TOLERANCES: - length, breadth & diameter of pre-cast concrete manhole covers shall be such that the maximum clearance at top between the frame & the cover shall be 5mm. The minimum thickness of HD, MD & LD Covers shall be 90, 70 & 60 mm respectively.

ii.a.i) GRADES AND TYPES:

Manhole covers and frames shall be of the following four grades and types:

Grade	Grade Designation	Type/ Shape of Cover
Light Duty	LD-5	Rectangular, Square, Circular
Medium Duty	MD-10	Rectangular, Circular

Heavy Duty	HD-20	Rectangular (Scraper Manhole), Square, Circular
Extra Heavy Duty	EHD-35	Rectangular (Scraper Manhole), Square and Circular

ii.a.ii) Recommended locations for placement of different grades and types/ shapes of manhole covers and frames are as given in ii.a.ii.a to ii.a.ii.c.

ii.a.ii.a) ***LD-5 Rectangular, Square or Circular Types***

Suitable for use within residential and institutional complexes / areas with pedestrian but occasional light motor vehicle traffic. These are also used for 'Inspection chambers'.

ii.a.ii.b) ***MD 10 Circular or Rectangular Types***

Suitable for use in service lanes / roads, on pavements for use under medium duty vehicular traffic including for car parking areas.

ii.a.ii.c) ***HD-20 Circular, Lamphole, Square or Rectangular (Scraper Manhole) Types.***

Suitable for use in institutional / commercial areas / carriageways / city trunk roads/ bus terminals with heavy duty vehicular traffic of wheel load between 50 to 100 kN, like buses, trucks and parking areas and where the manhole chambers are located in between the pavement and the middle of the road.

iii) **SAMPLE:-** The contractor shall get approved sample of R.C.C. pre-cast M.H. Cover & frame & house connection chamber frame and covers and shall supply materials as per approved samples from approved factory.

iv) **TESTS:** - The contractor / manufacturer at his own cost shall give all the required tests of RCC manhole cover and frame and all the testing facilities shall be kept open for the officers of RMC / Engineer-In-Charge at his factory.

v) **RESPONSIBILITY:** - The contractor shall be responsible for the materials for a period of defect liability period. After payment of final bill of the work and during this period he will be responsible for defects in the materials & for road accidents due to defective M.H. / H.C.C. Frame & covers. He shall have to replace defective materials during this period at his cost.

vi) **LETTER OF COMMITMENT:-** Contractor shall have to provide the letter of commitment in favour of Rajkot Municipal Corporation from the standard manufacturer of RCC Pre-cast M.H. / H.C.C. frame and covers to supply the desired quantity given in the e-Tender document in time (i.e. well in advance not to remain any manhole or chamber open at site of work after construction) with all quality control. Manufacturer shall have a long experience for preparing the RCC Pre-cast M.H. / H.C.C. frame and covers of all types i.e. HD, MD and LD as per the relevant I.S. Code of practice. A supply Schedule shall be submitted immediately on receipt of Work Order.

vii) **R.C.C. MANHOLE COVERS AND FRAMES, FOLLOWING POINTS SHOULD BE CONSIDERED**

Sr.	Particulars	Heavy duty manhole covers and frames	Medium duty manhole covers and frames	Light duty manhole covers and frames
1	Clear opening of the manhole	500 mm dia.	500 mm dia.	500 mm dia.
2	Type of the covers & frames	Circular	Circular	Circular

The Rate shall be paid per Number basis / pair basis.

MATERIAL:

3.1. Cement

Cement used for the manufacture of precast concrete manhole covers shall conform to IS:269 or IS:455 or IS:1489 (Part-1) or IS:1489 (Part-2) or IS:6909 or IS:8041 or IS:8043 or IS:8112 or IS:12330 or IS:12269.

3.2. Aggregates

The aggregates used shall be well graded. The nominal maximum size of coarse aggregate shall not exceed 20 mm. The aggregates shall be clean and free from deleterious matter and shall conform to the requirements of IS:383.

3.3 Concrete

The mix proportions of concrete shall be determined by the manufacturer and shall be such as will produce a dense

concrete without voids, honey combs, etc (See IS:456). The minimum cement content in the concrete shall be 360 kg/m³, with a maximum water cement ratio of 0.45. Concrete weaker than grade M30 shall not be used. Compaction of concrete shall be done by machine vibration.

3.4. Reinforcement

The reinforcement steel shall conform to Grade A of IS 2062 or IS:432 (Part-1) or IS 432 (Part-2) or IS 1786.

- 3.4.1 Reinforcement shall be clean and free from loose mill scale, loose rust, mud, oil, grease or any other coating which may reduce or destroy the bond between concrete and steel. A slight film of rust may not be regarded as harmful but steel shall not be visibly pitted by rust.

3.5 Steel Fibers

The diameter / equivalent diameter of steel fibres where used, shall not be greater than 0.75 mm. The aspect ratio of the fibers (ratio of the length of the fibre to its diameter / equivalent diameter) shall be in the range of 50 to 80. The minimum volume of fibres shall be 0.5 percent of the volume of concrete.

In case of propriety fibres, manufacturer's recommendations shall be taken into account.

3.6. Admixtures

Where admixtures are used, they shall conform to IS 9103.

3.7. Water

The water used shall be free from matter harmful to concrete or reinforcement or matter likely to cause efflorescence in the units and shall conform to the requirements of IS 456.

3.8 SHAPES AND DIMENSIONS

3.8.1 Shapes

The pre-cast concrete manhole covers and frames shall be of any shape given in (ii.a.i)

3.8.2 Dimensions And Tolerances

The dimensions and tolerances on dimensions of frames shall be as shown in Table-1 but outside dimensions of cover at top shall match with the corresponding frame so that the maximum clearance at bottom between the frame and the cover all round the periphery is not more than 5 mm and the top surface of the frame and cover is in level within a tolerance of ± 5 mm. For facility of removing the cover from the frame, suitable taper matching with taper given for the frame shall be provided to the periphery of the cover (See Fig.1)

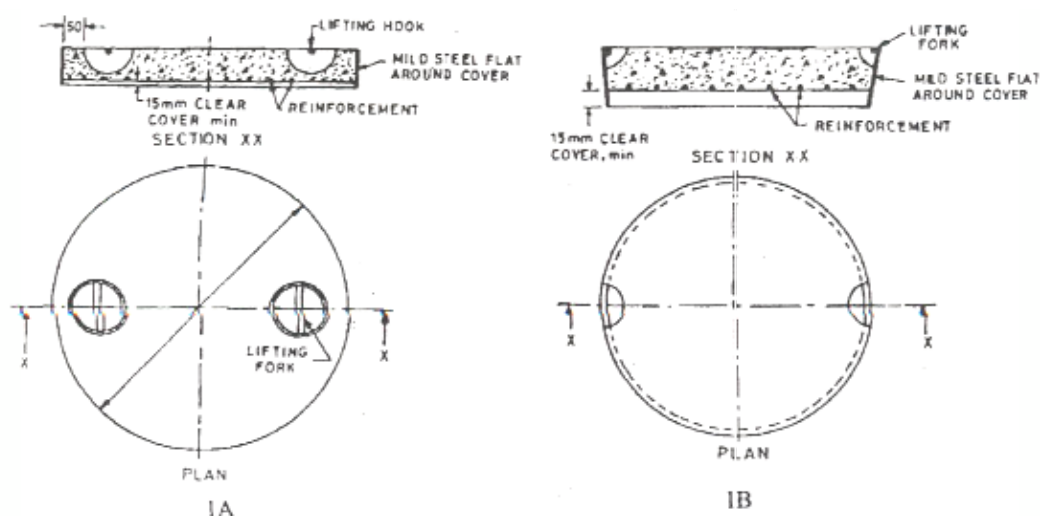


Fig.1 - Typical Illustration of Circular Precast Concrete Manhole Cover
All dimensions in millimeters

3.9 DESIGN:

The reinforced concrete manhole cover and frame shall be designed in accordance with the provisions of IS:456. If required by the purchaser, the manufacturer shall furnish the specification and drawings principle given in IS: 456

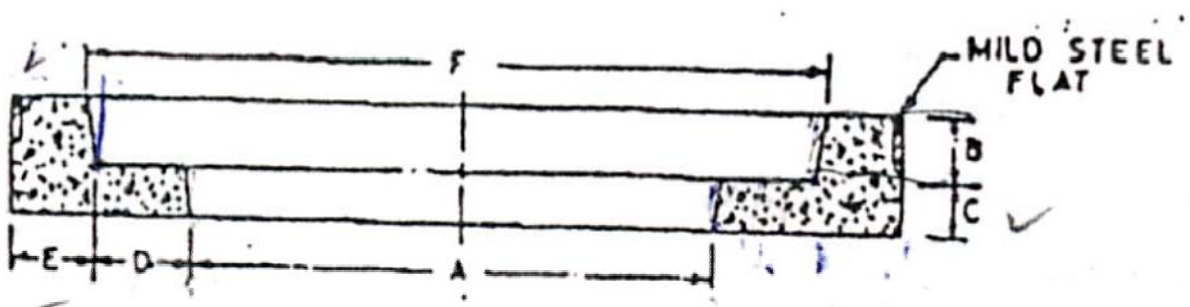
3.10 MANUFACTURER

3.10.1 Concrete SHALL BE MIXED IN A MECHANICAL Mixer. Mixing shall be continued until there is a uniform distribution of the materials and the mass is uniform in colour nad consistency. If steel fibres are used in addition to reinforcement, it shall be conformed to requirements given in 3.5.

3.10.2 Placing and Compaction

The reinforcement shall be placed in proper position in an appropriate mould coated with a thin layer of mould oil in case of frames and within the protective sheet (See 3.12.1) in case of covers. Concrete shall be filled to slightly overfill and compacted by vibration and struck off level with a trowel.

**Table-1 - Dimensions of Frame
(Clause 3.8.2)
All dimensions in millimeters**



Grade Designation	Description	Clear Opening in Frame	B	C	D	E	F
1	2	3	4	5	6	7	8
LD-5	Light Duty Rectangular	450 x 450	60	50	50	50	566
LD-5	Light Duty Square	450 x 450 400 x 400	50 50	50 50	50 50	50 50	566 x 566 516 x 516
LD-5	Light Duty Circular	370 560 500 450	50 50 50 50	50 50 50 50	50 50 50 50	50 50 50 50	486 676 616 566
MD-10	Medium Duty Rectangular	450 x 600	70	50	50	50	570 x 720
MD-10	Medium Duty Circular	450 500 560 600	70 70 70 70	50 50 50 50	50 50 50 50	50 50 50 50	570 620 680 720
HD-20	Heavy Duty Rectangular (Scraper)	900 x 450	100	75	75	75	1080 x 630
HD-20	Heavy Duty Square	560 x 560	100	75	75	75	740 x 740
HD-20	Heavy Duty Circular	450 500 560 600	90 90 90 90	75 75 75 75	75 75 75 75	75 75 75 75	630 680 740 780
HD-20	Heavy Duty Lamphole	350	100	75	75	75	530

Grade Designation	Description	Clear Opening in Frame	B	C	D	E	F
EHD-35	Extra Heavy Duty Rectangular	900 x 560	100	75	75	75	1078x 738
EHD-35	Extra Heavy Duty Square	560 x 560	100	75	75	75	738 x 738
EHD-35	Extra Heavy Duty Circular	450	100	75	75	75	628
		500	100	75	75	75	678
		560	100	75	75	75	738
		600	100	75	75	75	778

NOTES:

1. Tolerance on C shall be ± 5 mm, tolerance on A, B, D and E shall be $+5\text{mm } 0^{\text{mm}}$
2. For facility of removing the manhole cover suitable upward taper not more than 5° may be provided to the inner periphery of the frame.
3. If required for the removal of the moulds suitable taper not more than 5° can be given at the lower inner periphery of the frame (See figure).

3.10.2.1 Use of needle vibrators for compacting the wet concrete mix containing fibres is not recommended since the holes left by the vibrator in the wet mix may not close after its removal owing to the interlocking of the fibres with the mix. Compaction by means of shutter or form or table vibrators is recommended. In case of extra heavy duty and heavy duty cover and frame, compaction by means of pressure-cum-vibration technique may also be employed so as to achieve dense and strong concrete.

3.10.2.2 Clear cover to reinforcement shall be not less than 15 mm.

3.10.2.3 After demoulding, cover and frame shall be protected until they are sufficiently hardened to permit handling without damage.

3.11 Curing

3.11.1.1 The hardened concrete manhole cover and frame shall be placed in a curing water tank. The period of curing shall be as given in IS:456.

3.11.1.2 Steam curing of manhole cover and frames may be adopted instead of method specified in 3.11.1.1 followed

by normal curing for 7 days provided the requirements of pressure or non-pressure steam curing are fulfilled and the manhole cover and frames meet the requirements specified in this standard.

3.12 Edge Protection and Finishing

3.12.1 Cover

To prevent any possible damage from corrosion of reinforcing steel, the underside of the covers shall be treated with anticorrosive paint. The top surface of the covers shall be given a chequered finish.

In order to protect the edges of the covers from possible damage at the time of lifting and handling, it is necessary that the manhole covers shall be cast with a protective mild steel sheet of minimum 2 mm thickness around the periphery of the covers. Exposed surface of mild steel sheet shall be given suitable treatment with anti-corrosive paint or coating.

3.12.2 Suitable arrangement may be made for fixing the manhole cover and frame in position on the manholes by mutual agreement between the manufacturer and the purchaser.

3.12.3 The manufacture of manhole cover and frame shall be such as to ensure the compatibility of their seatings. For classes HD 20 and HD 35, these seatings shall be manufactured in such a way as to ensure stability and quietness in use. This may be achieved by grinding the contact surface, if needed.

3.13 LIFTING HOOKS:

The minimum diameter of mild steel rod used as lifting device shall be 12 mm for light and medium duty covers and 16 mm for heavy and extra heavy duty covers. The lifting device shall be protected from corrosion by hot dip galvanizing or any other suitable means approved by the purchaser or shall be made of naturally corrosion resistant metal rods.

The lifting arrangement shall be as agreed between the manufacturer and the purchaser. Typical arrangements of lifting devices are shown in Fig.1A and 1B.

3.14 PHYSICAL REQUIREMENTS:

3.14.1 General

All the covers and frames shall be sound and free from cracks and other defects which interferes with the proper placing of the unit or impair the strength or performance of the units. Minor chippings resulting from the customary method of handling and transportation shall not be deemed ground for rejection

3.14.2 Dimensions

The dimensions of the cover and frame shall be as specified in 3.8; the overall dimensions of the units shall be measured in accordance with Annexure-B.

3.14.3 Load Test

The breaking load of individual units when tested in accordance with the method described in Annex-C shall be not less than the values specified in Table-2. Also, the permanent set shall not exceed the requirement given in Annexure-C.

**Table-2 - Test Load and Diameter of Block
(Clause 3.14.3, 4.18.3 and C.1.1)**

Grade of Cover	Type	Load kN	Diameter of Block mm
1	2	3	4
LD-5	Rectangular, Square or	50	300
MD-10	Rectangular, or Circular	100	300
HD-20	Rectangular, Square or	200	300
EHD-35	Rectangular, Square or	350	300

3.15 TESTS

Tests shall be conducted on samples of covers and frames selected according to the sampling procedure given in 3.16, to ensure conformity with the physical requirements laid down in 3.14.

3.16 SAMPLING AND INSPECTION

3.16.1 Scale of Sampling

3.16.1.1 Lot

In any consignment, 500 precast concrete manhole covers and frames or a part thereof the same dimensions and belonging to the same batch of

manufacture, shall be grouped together to constitute a lot.

3.16.1.2 For ascertaining the conformity of the materials in the lot to the requirements of this specification, samples shall be tested from each lot separately.

3.16.1.3 The number of covers and frames to be selected from the lot shall depend on the size of the lot and shall be according to Table-3

Table 3 - Scale of Sampling and Permissible Number of Defectives
(Clause 3.16.1.3, 4.17.2. and 4.18.2)

No.of covers or frames in the lot.	Dimensional Requirements		Number of samples for load test on cover only
	Sample size	Acceptance Number	
1	2	3	4
Upto 100	10	1	2
101 to 200	15	1	3
201 to 300	20	2	4
301 to 500	30	3	5

Note: If the number of covers in the lot is 20 or less, the number of samples for load test shall be decided by mutual agreement between the purchaser and the manufacturer.

3.16.1.4 The R.C.C. precast manhole frames & covers shall be inspected by Third Party Inspection Agency, the cost of which is to be borne by contractor. The Third Party Inspection Agency will be from any Government undertaking agency like RITES, EIL, CEIL, MACON, WAPCOS, SGS etc approved by Gujarat Water Supply & Sewerage Board.

3.16.2 Sampling Covers and Frames in Motion

Whenever practicable, samples of covers and frames shall be taken when the units are being moved as in the case of loading, unloading, etc. The batch from where the samples are to be drawn shall be divided into a number of convenient portions such that when one sample is drawn from each of these portions, the minimum number of units specified under 3.16.1.3, is provided.

3.16.3 Sampling Covers and Frames from a Stack

The number of covers and frames required for the test shall be taken at random from across the top of the stacks,

the sides accessible and from the interior of the stacks by opening trenches from the top.

3.17 Number of Tests

3.17.1 All the covers and frames selected according to 3.16.1.3, shall be checked for dimensions (See 3.14.2) and inspected for visual defects (See 3.14.1).

3.17.2 The number of covers to be subjected to load test shall be according to col 4 of Table-3.

3.18 CRITERIA FOR CONFORMITY

3.18.1 The lot shall be considered as conforming to the requirements of the specification conditions mentioned in 4.18.2 and 4.18.3 are satisfied.

3.18.2 The number of covers and frames with dimensions outside the tolerance limit and / or with visual defects among those inspected shall be less than or equal to the corresponding acceptance number given in col 3 of Table-3.

3.18.3 For load test no value shall be less than the load specified in Table-2.

3.19 MANUFACTURER'S CERTIFICATE

The manufacturer shall satisfy himself that the manhole cover and frame conform to the requirements of this specification, and if requested, shall supply a certificate to this effect to the purchaser or his representative.

3.20 MARKING

3.20.1 Following information shall be clearly and permanently marked on top of each manhole cover and frame.

- a) Identification of the source of manufacturer
- b) Grade designation denoted by LD 2.5/ MD 10 / HD 20/ EHD 35 or 5T / 10T / 20T / 35T.
- c) Any identification mark as required by the purchaser.

ANNEX-B (Clause 3.14.2)

MEASUREMENT OF DIMENSIONS

B-1 PROCEDURE:

- B-1.1 Individually measurements of the dimensions of each unit shall be made with a steel scale graduated in 1 mm divisions and shall be read to the nearest division of scale and the average recorded.
- B-1.2 Length and diameter shall be measured on the longitudinal center line of each face, with of square or rectangular manhole covers across the top and bottom bearing at mid length and thickness on both faces at mid length.

B-2 REPORT

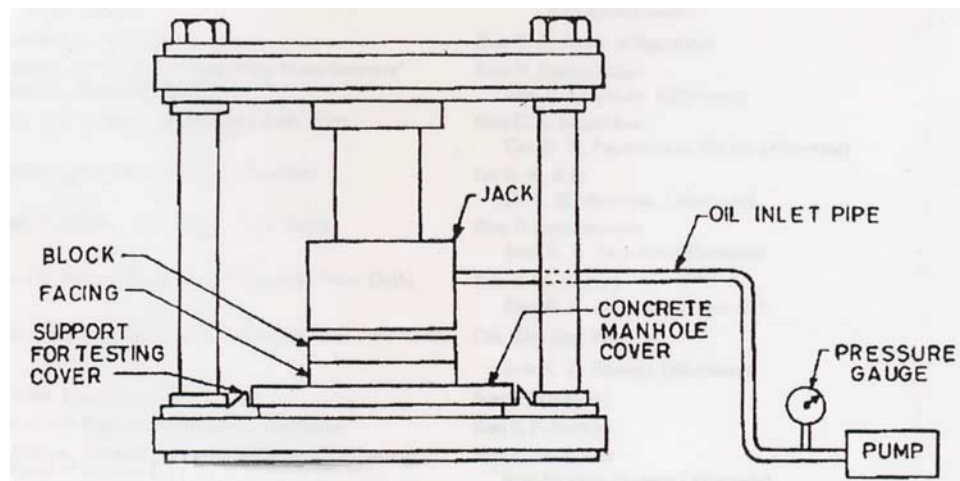
The report shall show the average length, width or diameter and thickness of each specimen.

ANNEX-C (Clause 3.14.3) METHOD FOR LOAD TEST

C-1 PROCEDURE:

C-1.1 A suitable testing arrangement is shown in Fig.2. The cover shall be supported in a frame which may be standard frame or a specially made testing appliance simulating normal conditions of use. The specified load as given in Table-2 shall be applied without shock through the medium of a bearing block faced with hard rubber or other resilient material. The bearing block shall be of the size specified in Table-2 and shall bear centrally on the cover. The block shall be sufficiently rigid to ensure that the load on the cover is uniformly distributed over the full area of the block.

**Fig.2 Arrangement For Load Test of
Manhole Cover**



C-1.2 All covers shall be submitted to the following tests:

- a) Measurement of the permanent set of the cover after the application of 2/3 of the test load.
- b) Application of test load

C-1.2.1 *Measurement of permanent Set of the Cover After the Application of 2/3 of the Test load.*

Before the load is applied take an initial reading at the geometric center of the cover.

The load shall be applied at the rate of approximately 0.6 ± 0.4 N/mm/s up to 2/3 of the test load. The load on the test

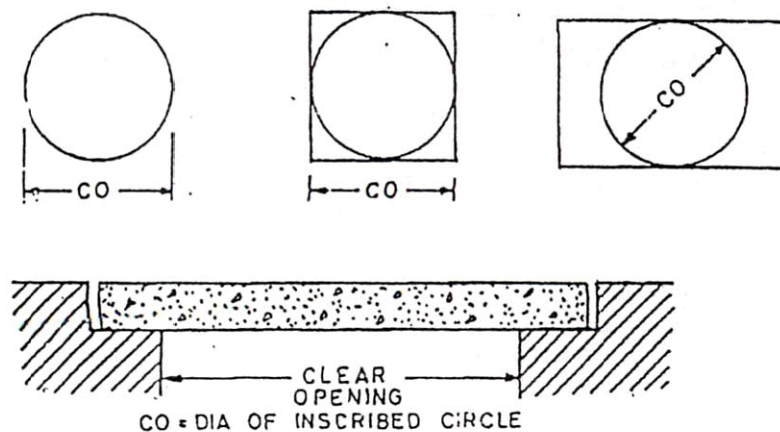
specimen is then released. This procedure shall be carried out five times. Then take reading at the geometric center.

The permanent set shall then be determined on the difference of the measured readings before the first and the fifth loading. The permanent set shall not exceed $1/100$ times the diameter of the largest circle that can be inscribed in the clear area of the frame as shown in Fig.3

C-1.2.2 *Application of the Test Load.*

Immediately after the test according to C-1.2.1, the test load shall be applied at the same rate given in C-1.2.1., the test load shall be applied until it is achieved. The test load to be maintained for 30 ± 2 s. Cover shall not show cracks in the course of the test.

Fig.3 Illustration of Largest Inscribed Circle in Clear Area



4 Providing supplying & fixing M.S. Frame and RCC Precleeper Beam & Sleeper Covers for Scrapper Manhole as per given type design and specifications:-

M.S. Frame and RCC Precast Beam & Covers for Scrapper Manhole shall be manufactured as per given type design shown in drawing No.16. The RCC Pre- cast Beam & Covers shall be casted in M-25 on vibrating platform.

The size of M.S. Frame and RCC Precast Sleeper Beam & Sleeper Covers shall be kept as under :-

- 1) M.S. Frame:- 1440 x 1120 mm (inside) by using 110 x 110 x 8 mm standard M.S. angle with braces for beam support and

necessary hold fast with lead primer paint.

- 2) RCC Precast Sleeper Beam: - 1400 x 100 x 100 mm.
- 3) RCC Precast Sleeper Cover: - 1100 x 350 x 100 mm with 15x15x3 mm size M.S. angle at outer top periphery.

For each Scrapper Manhole one set comprises of (a) M.S. frame-1 no. (b) RCC Precast Sleeper Beam-1 no. & (c) Sleeper Cover-4 nos, shall be provided with supply and fixing.

The rate of Providing, Supplying & Fixing of M.S. Frame and RCC Precast Sleeper Beam & Sleeper Covers for Scrapper Manhole shall be paid per set.

The rate shall be for a unit of one cover and one frame each number.

Item No.9:

Making holes in manhole with repairing complete

The hole in manhole is to be done not exceeding pipe size. After connecting the pipe to manhole, it is to be repaired with cement. The work is to be carried out as per the instructions from engineer-in-charge.

The rate for this item will be paid per hole basis.

Addl/Asst. Engineer
R.M.C.

Dy.Ex.Engineer
R.M.C.

ADDL. CITY ENGINEER
R.M.C.

Signature of Contractor:

D. ADDITIONAL CONDITIONS

D. ADDITIONAL CONDITIONS:

1. The contractor shall have to provide his own level instrument for this work.
2. Lowering, laying and jointing works of all the pipelines shall have to be carried out by using Sight Rails and Boning Staves.
3. Work is required to be carried out in residential area where all the services like water supply, sullage water pipeline, telephone / electric cable are existing. Under the circumstances, prior to starting the work agency shall have to excavate the trenches manually for up to 1 mt. depth. During the course of execution, all the services shall have to be maintained by the agency and any damage to any services or property, the agency shall have to get it repair at their cost.
4. For excavation of trench, use of JCB machine will not be permitted directly on the top surface of the road. After excavation up to minimum 1.00 mt. depth from road surface or existing ground level, same shall have to be carried out manually or by using Breaker and after locating underground services like; water supply pipeline, water connection lines, pipe gutters, telephone cables, electric cables etc., and thereafter upon taking the prior approval of the Engineer-In-Charge, the excavation can be carried out by using JCB machine.
5. Rajkot Municipal Corporation shall recommend to the competent authority to give Controlled Blasting License to the contractor for carrying out excavation in hard rock. In case of blasting license not permissible from the competent authority in some places then excavation is to be done by using wedges and hammers, chiseling, breakers, pneumatic tools, etc. Also in case where blasting license is permitted but even then if there is no possibility of carrying out the blasting for whatsoever reason, the excavation is to be done by using Wedges and hammers, chiseling, breakers, pneumatic tools etc. No extra payment shall be made for excavation to be carried out in any of the above mentioned both the situations.
6. Excavation in soft rock and hard rock shall have to be carried out only by Chiseling, Breaker (pneumatic tools) etc., as far as possible. If excavation is not possible in terms of above and if excavation is required to be carried out with the help of blasting then the same shall have to be carried out only after taking prior approval and necessary license for blasting from the competent authority.

7. In case of excavation not possible manually or by chiseling in certain place(s) as well as if blasting is also not possible due to various reasons i.e. to avoid damage to nearby water pipeline, pipe gutter, telephone cables / Duct, Raw houses / week buildings / narrow street etc., then the excavation by blasting will not be permitted. Under these circumstances, excavation shall have to be carried out only by Breaker (pneumatic tools) as per the instructions of the Engineer-In- Charge. No extra payment will be made for such type of excavation done by using Breaker. The rate for excavation shall be paid as per the rate of related item mentioned in Schedule-B.
8. The safety of the trenches is the prime important factor. Along the trenches on both the side, a hump of excavated stuff of minimum height 3 to 5 ft shall have to be provided till the work is got completed. However, where there is no defined road, in such area, the fencing/ lighting etc., requires to be provided as per clause 1.1.15. Sign Board shall have to be provided at required locations, so that there will not be any fatal accident.
9. Regarding the width of excavation, as (a) it is difficult to carry out the vertical trench excavation, (b) possibility of sliding the soil, and (c) uneven excavation trench width in case of blasting. In this connection, for every 1.5 mt lift if there is less width upto 5 cm at the bottom then the top width of excavated trench, it shall be considered as per the specified trench width or actual trench width carried out at the ground level by the contractor whichever is less. If excavation is carried out more than the specified width then the payment will be made only for the specified width of excavation. For mode of measurement for excavation, the width of excavation will be considered as given at the time of line out by engineer-in-charge or actual width done whichever is less.
10. The pipes shall be with ISI mark whereas that of manhole frame and cover shall be confirming to relevant IS.
11. After entering into an agreement, the agency shall have to finalize the agency for supply of the material like pipes, manhole / house connection chamber frame and covers etc., and the name of manufacturer / supplier should immediately be informed to Rajkot Municipal Corporation so that Rajkot Municipal Corporation can also expedite the manufacturer / supplier for the material. If necessary, Rajkot Municipal Corporation will visit and inspect the factory. During the inspection, if Rajkot Municipal Corporation is not satisfied then the contractor shall have to procure the material from other manufacturer(s).

12. While the work in progress, there is possibility of change in drainage line routes according to the site conditions. Under these circumstances, the contractor shall have to carry out the work accordingly, for which, no extra payment shall be made in such situations. Over and above, the decision of Engineer-in-charge for change in drainage line routes shall be final and binding to the contractor.
13. The quantity of various items mentioned in the schedule-B is liable to increase or decrease up to any extent. Under the circumstances, the contractor shall have to carry out the work accordingly without any rate escalation. Rajkot Municipal Corporation will not entertain any dispute in this regard.
14. In excavation, the decision regarding classification of strata shall rest with the Engineer-In-Charge and his decision in this regards shall be final and binding to the Contractor.
15. The rates are inclusive of dewatering, if required.
16. Regarding water supply for hydro / flow testing, necessary water, power, labour etc. required for the necessary test shall be arranged by the contractor at his own cost.
17. During construction activity, proper care must be taken for labour safety and must follow the provisions of the Labour Laws.
18. Testing of the material like; Brick, Sand, Aggregate etc. should have to be tested periodically as suggested by the engineer-in-charge at Government approved material testing Laboratory and testing charges for the same has to be borne by the contractor.
19. In case of any ambiguity found in specifications / drawings etc. the engineer-in-charge is empowered to take necessary decision for rectification and same shall be final and binding to the contractor.
20. The contractor shall have to get registered under ESI (Employer's State Insurance)
21. Act and obtain ESI Registration number if the number of workers are 10 Nos. or more. Also, the agency shall have to give all the benefits to the workers as available under the ESI Act. The agency should follow all the rules and regulations of ESI Act as per prevailing norms.
22. The contractor will be responsible to avail P F Code as per the prevailing Circular of Government for the employees on work. The

required documents regarding deduction of P F shall have to be submitted by the contractor to the competent authority.

23. Agency intending to carry out excavation will be able to carry out excavation / digging only after prior intimation through "Call before U Dig" mobile application.

**ADDL. CITY ENGINEER
R.M.C.**

Signature of Contractor

BILL OF QUANTITIES AND PRICE

The Bill of quantities consists of following sections :

CIVIL WORKS:

Civil works requires following:

Excavation of Trenches

- ✓ Providing, supplying, lowering, laying, jointing, testing and commissioning of various dia. distribution & street service DI pipeline with DI Specials network as per the detailed specifications shown in Vol-II.
- ✓ Bedding for pipes with selected murrum
- ✓ Support of piping system, Thrust blocks of RCC in various concrete etc.
- ✓ Refilling the pipeline trenches with proper ramming
- ✓ All required necessary items as directed by engineer in charge.

The bill of quantities forms the most important part of the e-tender documents. The supply, lowering laying jointing, erection testing and commissioning of pipeline which form a part of total works are indicated in the schedules separated include in the documents. The e-tendering contractors shall price of this document.

Performance testing and commissioning:

The bill of quantities, general conditions of contractor and the specifications which form an integral part of this contract shall be read in conjunction.

The bill of quantities, general conditions of contractor and the specifications which form an integral part of this contract shall be read in conjunction.

Payment for different items shall be paid on % (percentage) above or below quoted by the contractor online in the given price bid. However for any extra items to be carried out with permission of engineer in charge rates will be decided by the Rajkot Municipal Corporation as per GC-70 wherever not specified in the tender.

Whenever manufacturer is separate and contractor for lowering, laying, joining and testing is separate, the principal contractor shall enter into an agreement with DI pipes & DI Specials manufacturer for satisfactory manufacturing as per the relevant code of practice, testing, transporting, stacking & testing after laying at site as per RMC requirement.

PART-III
BILL OF QUANTITIES

BID FORM(WITH PRICE)

(Bidders are required to fill up all blank spaces in this Bid Form)

CONTRACT No: RMC/ENGG/EZ/24-25/37

The Commissioner
Rajkot Municipal Corporation
Dr. Ambedkar Bhavan
Dhebar Road
Rajkot

Dear Sir,

SUB : PROVIDING, LOWERING, LAYING, JOINTING AND TESTING WORK FOR UNDERGROUND SEWERAGE NETWORK AT TP SCHEME NO.14, 17, 18 IN WARD NO.4

1. Having visited the site and examined the Bid Documents, Drawings, Conditions of Contract, Specifications, Schedules, Annexures, Preamble to Price Schedules, Price Schedules etc. including Addenda/Amendments to the above, for the execution of the above Contract, we the undersigned offer to carry out as given in Conditions of Contract and in conformity with the Drawings, Conditions of Contract, Specifications, Preamble to Price Schedules, Price Schedules, Annexures, Bidding Documents, including Addenda Nos. _____ (insert numbers) for (quoted online) %age below / above than the rates given in Price Schedule.
2. I / We agree that
 - (a) if we fail to provide required facilities to the Employer's representative or any other person/agency by the employer to perform on his behalf for carrying out the inspection and testing of materials and workmanship
or
 - (b) if we incorporate into the Works, materials before they are tested and approved by the Engineer's representative
or
 - (c) if we fail to deliver raw water of required quantity according to the conditions/stipulations of the Contract, the Engineer-in-charge will be at liberty to take any action including termination of Contract and impose at his absolute discretion any penalties, and/or reject the work.

3. We undertake, if our Bid is accepted, to complete and deliver the Works in accordance with the Contract within **5 months** of construction period from the date of Work Order issued to us by you.
4. We agree to abide by this Bid for a period of 120 Days from the date of opening of technical bid and it shall remain binding upon us and may be accepted at any time before the expiry of that period.
5. In the event of our Bid being accepted, we agree to enter into a formal Contract Agreement with you within 10 days incorporating the conditions of Contract thereto annexed but until such agreement is prepared this Bid together with your written acceptance thereof shall constitute a binding Contract between us.
6. We agree, if our Bid is accepted, to furnish Performance Bond/Security in the forms and of value specified in the Conditions of Contract of a sum equivalent to 5% of the Contract price for due performance of the Contract.
7. We have independently considered the amounts of liquidated damages shown in Appendix to Bid and agree that they represent a fair estimate of the damages likely to be suffered by you in the event of the Work not being completed by us in time.
8. We understand that you are not bound to accept the lowest or any Bid you may receive.

Dated this _____ day of _____ 20_.

(Signature)

Company Seal

(Name of the person)

(Name of firm)

(In the capacity of)

Duly authorised to sign Bid for and on behalf of
(Fill in block capitals)

Witness

Signature _____

Name _____

Address _____

I/We have enclosed a DEMAND DRAFT / BANK GUARANTEE as an "**Earnest Money Deposit**", for the sum of **Rs. 42,500/-** the full value of which is to be absolutely forfeited to the Employer should I/We fail to commence the works specified. Otherwise the said sum shall be retained, by the Employer as on account of such 'Security Deposit' as provided for in the aforesaid documents.

I/We agree not to employ Sub-contractors other than those that may be approved in accordance with conditions in the aforesaid documents.

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

I/We shall refer all disputes arising out of or relating to the agreement to the arbitration in accordance with conditions of contract.

I/We am/are bound to execute the job if the work order is issued within **120 Days** from the date of opening of the technical bid of the tender.

I/We agree to pay the Government Income-Tax, CGST, SGST and other taxes prevailing from time to time on such items on which the same are levied and the rates quoted by me/us are inclusive of the same.

Yours faithfully,

Signature of Contractor

Date: _____

Address:

PREAMBLE TO PRICE SCHEDULES

Note on Schedule:

The bid is percentage rate bid for **PROVIDING, LOWERING, LAYING, JOINTING AND TESTING WORK FOR UNDERGROUND SEWERAGE NETWORK AT TP SCHEME NO.14, 17, 18 IN WARD NO.4.**

1. The whole work is to be done under the supervision of RMC.
2. Before starting the work, the details survey has to be done by the contractor and shall have to prepare and submit Survey and Level drawings in soft copy (Auto Cad) and Hard copy, and has to mark permanent levels at all necessary locations for Reference, for which, no extra payment will be made by Rajkot Municipal Corporation. After permission / approval from the engineering in charge, the work will have to be executed accordingly on site.
3. The rates and prices shall be submitted in the formats given in the enclosed Price Schedules. Rates and prices received in any other formats will be rejected and the Bids will be disqualified.
4. It will be entirely at the discretion of the Employer to accept or reject the bidder's proposal, without giving any reasons whatsoever.
5. In Price Schedule, bidder shall quote his percentage Equal/Above/Below for items listed in the schedule. Prices quoted in Schedule only will be considered for price evaluation & shall form a part of the Contract Agreement.
6. Only Price Schedule will be considered for financial evaluation of the bid with the successful bidder.
7. The bidder shall be deemed to have allowed in his price for provision, maintenance and final removal of all temporary works of whatsoever nature required for construction including temporary bunds, diverting water, pumping, dewatering, etc. for the proper execution of works. The rates shall also be deemed to include any works and setting out that may be required to be carried out for laying out of all the works involved.
8. Where there is a discrepancy between the unit rates and the amount entered, in the price schedule the latter shall govern.
9. The Price Schedules are to be read in conjunction with the Conditions of Contract, the Specifications and other sections of these bid documents and these documents are to be taken as mutually explanatory of one another.

10. Prices quoted by the bidder shall be firm for the entire period of Contract without any escalation.
11. The bidder shall interpret the data furnished and carry out any additional survey work, or investigation work required at his own cost.
12. The prices quoted shall also include the cost of materials utilized for testing.
13. The bidder should acquaint himself with the site conditions including the access to Worksite. The successful bidder shall have to make suitable access to worksites at his own cost. These accesses will be used by the other contractors working for RMC.
14. From each Running Account Bill, labour cess will be deducted as per norms.
15. In Every running bill 0.25% amount shall be retained as extra security deposit if Drawings of work done are not submitted by agency.
16. As Road Restraining is the responsibility of work contract agency, in Every running bill 0.50% amount shall be retained as extra security deposit for purpose of Corrections for road restraining in case of settlement of surfaces of refilled trenches. These shall be released after Defect Liability Period.
17. The quoted rates should be inclusive of all taxes and duties.
18. The prices shall have to be quoted firm & fix including all the taxes & dutes without any statutory variation. RMC will not consider any statutory variation as well as the price rise in the market and if any, those shall be on account of contractor.
19. The work contract tax will be borne by the agency.
20. Use of ready mix concrete may be permitted if it fulfils tender specifications.
21. No extra item or extra width will be paid due to excavating method or type of machinery.
22. For any type of license regarding labour, etc. has to be achieved by agency.
23. This office Circular bearing No. RMC/C/329 dated 22-12-2012 and

Order No. RMC/C/132 dated 10-06-2013 are uploaded in tender document. The Contractors quoting their rates Above/Below shall have to read, implement, and submit the same duly signed along with the will be documents to be submitted during physical submission.

24. In reference to the above Circular and Order cited at above, the Contractor firm who have quoted their rates for this work will be called in person for verification of original documents. The date and time for verification of original documents will be intimated to the Contractors.
25. The routes and levels shown in the maps are indicative and not final. There are possibilities of change in routes and levels at the time of execution of work and due to which the diameter of pipeline and depth of drainage line may increase or decrease. Under the circumstances, the contractor shall have to carry out the work accordingly at the approved rates without any extra cost. Rajkot Municipal Corporation will not entertain any dispute in this regard.
26. The contractor shall have to carry out the Sub-soil strata investigation at his own cost.
27. Flow Test shall be done in two stage:

Stage 1

Pipe line shall be laid by resting the pipe line on supports at joints. The flow test and The drains, manholes and all joints of pipes shall be made thoroughly sound and water tight and any joint which may be observed to be leaky shall be immediately corrected. Thus after satisfactory flow test sand bedding shall be fill pipe line after laying pipe line. The refilling of trench shall be carried out then after.

Stage 2

After total laying & refilling of trenches, flow test shall be carried out again for particular section of length as suggested by engineer in charge.

28. If the progress of work is found slow then Extra security Deposit may be recovered from any running bill as decided by Engineer in charge up to maximum 5% amount of concerned R.A. Bill amount.
29. Wherever the sanction from Forest and State High Way (R & B) department is required that has to be procured and also any other sanction of any other Institute/Authority is required then contracting agency shall have to arrange itself i.e. whole liaison shall be on account of working agency. However, if required, RMC

will recommend for the same wherever necessary. The expenditure incurred for this type sanctions will be reimbursed by RMC on submission of necessary documentary evidence like; Receipt, as proof.

30. Blasting may not be permitted in the areas having dense population or any other unsuitability.
31. Big machinery may not enter in the areas having narrow streets (3 to 4 Mtr. wide).
32. Kachcha houses shall not be get damaged. Considering this, manual labour work is more feasible in these types of areas.
33. No extra item or extra width will be paid due to excavating method or type of machinery.
34. The bidders are advised to visit the project area and get acquainted with the local condition as the said area is residential area with numbers of underground utility services like water supply pipe line, sullage water pipe line, gas pipeline, telephone/electric cable, KHALKuVAS etc, which requires to be maintained during the progress of work. The safety of the work is prime important factor and all the bidder should be very much vigilant for the same. Thus, there may be some locations where clear ROW or ROU may not be available due to certain reasons like TP Road open Issues, Permissions etc. If work of that much location is affected due to such reasons time limit may be extended considering that non-working period but in no case Price Escalation will be given for that extended period.

Thus, it is to be clear that to work within utility services is a part of this work. If utilities are affected, it shall be the responsibility of contractor to make same as it was as before. The expenditure and arrangement shall be bear by contractor.

35. In case of Extra Item, No "**On**" %age i.e. +ve % age Rate will be given but if there is Down %age i.e, -ve % age Rate that will be applied to that rate of that Extra Item.
36. Before procurement of Material the Quality Assurance Plan (QAP) shall be approved by RMC. QAP for approval shall be submitted in 3 Original copy duly signed and stamped by Manufacturer, TPI/PMC and Bidder, The draft QAP has been attached herewith.
37. **The contractor have to quote their rates without GST** and including other taxes. The invoice should be submitted by

contractor showing the breakup of GST in the bill. GST will be paid extra at the prevailing rate at the time of execution.

The contractor shall have to purchase the material required for this tender work, only from the supplier having registered GST Number. RMC will not be responsible to pay any amount towards GST if the material is purchased from the unregistered supplier not having GST Number.

38. The contractor shall be responsible for Railway Crossing, Highway crossing etc and the detailed design shall have to be provided by the contractor and carry out the same, for which, payment will be made as per norms.
39. The contractor shall have to obtain the approval from the concerned authorities for level crossing, Highway, Gas etc. However, Rajkot Municipal Corporation will extend its cooperation in obtaining the approval. The charges as per norms shall be paid by the agency and same will be reimbursed by Rajkot Municipal Corporation.
40. Engineering Store of Rajkot Municipal Corporation will accept the un-utilized D I Pipes 100% whereas the fittings / specials upto **10%** of the quantity actually as may be confirmed at the time of work order.
41. **Scope of Testing period:** During the testing period, agency will have to look after the maintenance and rectification of fault, if any. No extra payment will be made by RMC for this purpose.
42. Only for existing house connection, if additional pipe is to be provided over and above the 5 mt. for 15 mm connection then additional payment is to be made Acceptable (Rate of only 15 mm dia pipeline as per the rates of SOR of RMC).
43. e-Tender price:
The tender price (Pipe/specials Supply as shown in above scope of work and as per the detailed specifications + Labor work for laying jointing, testing & commissioning) shall include all materials, labor, tools and tackles, plant and machinery etc. necessary for the proper manufacture of pipes and specials and for tests at the contractor's works, for insurance and for delivery to RMC's store or site of works indicated in the project area according to dispatch schedule and for laying and testing on site etc.

The rates quoted by the contractor online in the given price bid (Pipe /specials Supply + Labor work for laying jointing, testing &

commissioning) shall cover everything necessary for the due and complete execution of the work according to the drawings and other conditions and stipulations of the contract including specifications or the evident intent and meaning of all or either of them or according to customary usage and for periodical and final inspection and test and proof of the work in every respect and for measuring, numbering or weighing the same, including setting out and laying or fixing in positions and the provision of all materials, power, tools, rammers, labour, tackle, platforms with proper lapped joints for scaffolding, ranging rods, straight edges, centering and boxing, wedges, moulds, templates, posts, straight rails, boning-staves, strutting, barriers, fencing, lighting, pumping apparatus, temporary arrangement for passage of traffic, access to premises and continuance of drainage, water supply and lighting (if interrupted by contractor's work), temporary sheds, painting, varnishing, polishing, establishments for efficient supervision and watching arrangements for the efficient supervisions of life and property and all requisite plant and machinery of every kind except only such matter and things as it may be distinctly stated herein which are to be supplied to the contractor free. A rate for any one description of work is to be held to include such items of other classes of works as are obviously necessary for its due completion and for these no separate/specific charges will be admitted. The contractor shall keep every portion of the work clear of accumulation from time to time and shall leave every portion of the work clean, clear and perfect, at the conclusion of whole work at their own cost.

44. FDR or Bank Guarantee will not be acceptable towards Tender fee and Earnest Money Deposit.
45. Rajkot Municipal Corporation will engage TPI agency for pipe material inspection and testing at factory and to maintain the overall work supervision and quality control of the project. The TPI agency shall be from approved list of RMC or as decided by the competent authority of RMC. All necessary charges of TPI agency is to be borne by the contractor. The TPI charges is 0.70% of the project cost, which will be deducted from the bill of the agency and will paid to the TPI agency by contractor.
46. In case of damage to obstructing pipe line or other utilities is done by the agency then the rectification to the same and making it good shall have to be carried out by the agency at his own cost.
47. The contractor shall at his own cost fill up water in pipe line and given necessary hydraulic test section

48. Autocad drawings shall have to be provided in soft copy as well as hard copy, for which, decision of engineer-in-charge will be final and binding to the agency.

**ADDL. CITY ENGINEER
R.M.C.**

Signature of Contractor

SCHEDULE – A

Schedule showing a material to be supplied from Rajkot Municipal Corporation stores at free of cost for use in work contracted and to be executed

Name of Work:

PROVIDING, LOWERING, LAYING, JOINTING AND TESTING WORK FOR UNDERGROUND SEWERAGE NETWORK AT TP SCHEME NO.14, 17, 18 IN WARD NO.4

Sr.	Particulars	Qty.	Rate at which material will be charged to the contractor	Total Amount
1	N.A.			
			Total	
			Say	
Note No.1	The Contractor shall have to make his own arrangement for procuring the cement required for the work from open market. Cement shall be ordinary Portland cement confirming to IS 269. or IS 8112 Grade 43/53 of repute make only. No mini-plant cement shall be allowed.			
Note No.2	The person or firm submitting the tender should see that the rates in the above schedule are filled up by the Engineer-in-charge for the issue of the firm prior to submission of the tender.			
Note No.3	Material not included in "SCHEDULE – A" but required for the work shall be provided by the contractor and cost of such material shall be included in the respective tendered items by the contractor.			

Asst. Engineer
Rajkot Muni. Corporation

Dy. Executive Engineer
Rajkot Muni. Corporation

ADDL. CITY ENGINEER
Rajkot Muni. Corporation

PRICE SCHEDULE

Rajkot Municipal Corporation
Price Schedule - B

Name of work:

PROVIDING, LOWERING, LAYING, JOINTING AND TESTING WORK FOR UNDERGROUND SEWERAGE NETWORK AT TP SCHEME NO.14, 17, 18 IN WARD NO.4

Item No.	Quantity	Item	Rate	Per	Amount
1.0		Excavation for sewer line trenches, manholes incl. All safety provisions using site rails etc. including refilling the trenches & stacking the excavated stuff up to a lead of 90mt as directed.			
1.1		up to 1.50mt depth			
1.1.1	1152.81	In all sorts of soil and soft murrum, hard murrum, boulders, and macadam road. i.e. 55 % of qty	137.00	Cu.m.	157,934.97
1.1.2	943.21	In soft rock and hard rock.i.e. 45 % of qty	502.50	Cu.m.	473,960.51
1.2		1.50mt. to 3.00 mt. depth			
1.2.1	466.64	In all sorts of soil and soft murrum, hard murrum, boulders, and macadam road. i.e. 40 % of qty	151.50	Cu.m.	70,695.96
1.2.2	699.96	In soft rock and hard rock.i.e. 60 % of qty	534.00	Cu.m.	373,775.97
1.3		3.00mt to 4.50mt. depth			
1.3.1	34.04	In all sorts of soil and soft murrum, hard murrum, boulders, and macadam road.i.e. 5 % of 376.60	169.50	Cu.m.	5,769.78
1.3.2	306.33	In soft rock and hard rock.i.e. 90 % of qty	586.50	Cu.m.	179,659.61
1.4		4.51 mt to 6.00 mt. depth			
1.4.1	2.76	In all sorts of soil and soft murrum, hard murrum, boulders, and macadam road.i.e. 5 % of qty	199.50		550.62
1.4.2	52.37	In soft rock and hard rock.i.e. 95 % of qty	702.50		36,786.41
1.5		6.01 mt to 7.50 mt. depth			
1.5.1	0.00	In all sorts of soil and soft murrum, hard murrum, boulders, and macadam road.i.e. 0% of qty	256.00		-
1.5.2	14.70	In soft rock and hard rock.i.e. 100 % of qty	794.00		11,671.80

Item No.	Quantity	Item	Rate	Per	Amount
2.0	124.00	Providing c.c.bedding in 1:3:6 (M 100) using 12 to 20mm machine crushed metal incl. Consolidation curing etc. complete. (C-type bedding as per type design)	4745.00	Cu.m.	588,380.00
3.0		Providing, supplying, lowering, laying and jointing Stoneware pipes in C.M. 1:1 of following diameters in proper position grade and alignment as directed by Engineer-in-charge including labour, giving necessary testing etc., complete including cost of jointing materials including all the taxes, duties, freight, insurance etc. complete.			
3.1	1000.00	For 100 mm dia Stoneware pipes	276.00	Rmt.	276,000.00
3.2	400.00	For 150 mm dia Stoneware pipes	399.00	Rmt.	159,600.00
3.3	200.00	For 200 mm dia Stoneware pipes	609.00	Rmt.	121,800.00
4		Providing, supplying, lowering, laying and jointing RCC pipes in C.M. 1:1 of following diameters in proper position grade and alignment as directed by Engineer-in-charge including labour, giving necessary testing etc., complete including cost of jointing			
4.1	90.00	For 300 mm dia pipes	1166.00	Rmt.	104,940.00
4.3	90.00	For 450 mm dia pipes	2326.00	Rmt.	209,340.00
4.4	90.00	For 600 mm dia pipes	2726.00	Rmt.	245,340.00
5		Providing and constructing Sewer manholes, scraper manholes as per the type design in brick masonry in C.M. 1:4 and inside and outside plastering in C.M. 1:3 necessary coping in C.C. M-250 fixing H.D.P.E. Steps and fixing manhole frame and covers (But exc			
5.1	7.00	Manhole type "A" as above but up to 1.0 M depth	8084.00	Nos.	56,588.00
5.1.1	3.50	Extra depth beyond 1.0 M but up to 1.5M depth for "A" type manhole above	7461.00	Rmt.	26,113.50
5.2	15.00	Manhole type "B" as above 1.5M but up to 4.5 M depth	16003.00	Nos.	240,045.00

Item No.	Quantity	Item	Rate	Per	Amount
5.2.1	37.50	Extra depth beyond 1.5M but up to 4.0M depth for "B" type manhole above	12227.00	Rmt.	458,512.50
5.3	3.00	Manhole type "C" as above 4.00M but up to 6.00 M depth	51312.00	Nos.	153,936.00
5.3.1	8.00	Extra depth beyond 4.01M but up to 6.0M depth for "C" type manhole above	15239.00	Rmt.	121,912.00
6	80.00	Providing, supplying R.C.C. Precast manhole frame & covers 5 T.MD. as per specifications.	1508.00		120,640.00
7	15.00	Providing, supplying R.C.C. Precast manhole frame & covers 10 T.MD. as per specifications.	1787.00	Pair	26,805.00
8	5.00	Providing, supplying R.C.C. Precast manhole frame & covers 20 T.MD. as per specifications.	2685.00	Pair	13,425.00
9	25.00	Making holes in manhole with repairing complete	115.00	Nos.	2,875.00
		Total Rs.			4,237,057.63
		Say...			42,37,100.00
		GST 18%			762,670.37
		Total Rs.			4,999,728.00
		Say Total Rs.			5,000,000.00

Addl./Asst. Engineer
R.M.C.

Dy.Ex.Engineer
R.M.C.

ADDL. CITY ENGINEER
R.M.C.

I/We agree to carry out the above said work at (to be quoted online) % Equal / above / below on the tendered rates shown in Schedule.

Signature of Contractor