



**TAMILNADU SMALL INDUSTRIES DEVELOPMENT CORPORATION LIMITED
CORPORATE OFFICE
CHENNAI**

NAME OF WORK : Restoring & Removing Blockages in the
External Sewer Lines and Construction of
Manholes at TANSIDCO Industrial Estate,
Kakkalur in Thiruvallur District

EMD AMOUNT : Rs.73,000/-

DATE OF TENDER: 12.04.2022

GENERAL INFORMATION AND EMD DETAILS

1	EMD Details DD No and date: Amount in Rs. Name of the Bank:	
2	Name and Address of the Bidder:	
3	Contacts:	
4	Telephones:	
5	Fax:	
6	E-mail:	
7	Mobile No:	
8	Category of the Bidder (Whether company, partnership firm or Proprietary concern)	
9	Name of Chief Executive Officer and Telephone No.	
10	Year of Establishment	
11	GST No	
12	Income Tax PAN/GIR No.	
13	Yearly Turnover of the Last 3 years.	
14	Name and Address of the Banker	
15	List of major Clients and the size of orders executed	

Note: Separate sheets may be attached wherever necessary.

Signature of the Bidder
With stamp and date

Signature of the
Contractor/Tenderer

Superintending Engineer i/c
TANSIDCO, Chennai-32

A. METHODS OF TENDERING:

1. If the Qualification bid is made by an individual, it should be signed by the individual, with his full name and his current address.
2. If the Qualification bid is made by a sole Proprietary firm, it shall be signed by the proprietor along with his full name and full name of the firm with it's current address. Documents with regard to registration as firm by the Registrar of Firms should be produced.
3. If the Qualification bid is made by a FIRM in partnership, it shall be signed by all the partners of the firm with their full names and current address or by a partner authorised by the firm (either as per Articles of the Deed of Partnership / by power of attorney)- for signing in Tenders, Agreements etc. In which case, certified copy of the registered deed of Partnership along with the current address of all the partners and a certified photocopy of the Registered Power of Attorney issued in favour of the signatory, should be produced.
4. If the Qualification bid is made by a "Limited Company" or a "Limited Corporation ", it shall be signed by a duly authorised person holding the Power of attorney for signing the bid, in which case, the certified copy of the power of attorney shall accompany the qualification bid. Such limited company or corporation shall also furnish satisfactory evidence of its' existence along with the Qualification schedule.
5. **Qualification Bid from Joint Ventures are not acceptable.**

Note:

1. If any of the information furnished by the applicant is found to be concealed or false at a later date, the contract will be terminated forthwith without prejudice to the rights thereon, consequent on termination and the contractor will be banned from business dealings.
2. All the documentary evidences should be stitched neatly and the pages should be serially numbered. Index of the Documents produced should be prepared and reference to page number of the documents produced should be furnished in the index.
3. The Qualification Tender evaluation shall be done on a **QUALIFIED or NOT QUALIFIED** basis against each of the above Criteria.

4. The evaluation will be done only based on the information, evidence, documents, records, particulars furnished by the applicant and hence the applicants are advised to furnish adequate and relevant information along with requisite documentary evidences without any omission.
5. As far as possible, details shall be furnished in the schedules appended to this Application. If the space left is found insufficient, additional sheets may be attached to the schedules.
6. Photograph of the works completed by the applicants may be pasted in thick white paper and produced along with the documents.
7. Brochures, Pamphlets etc, shall also be stitched along with the documents volume.
8. All bidders are cautioned that the Qualification Tender application containing any deviation from the contractual terms and conditions, specifications or other requirements will be rejected as Non-Responsive and low performance reliability.

MINIMUM QUALIFYING CRITERIA

1. Attested copy of valid registration as Civil Contractor in the appropriate class stipulated along with the valid live certificate.
2. Attested copy of the registration under GST Act along with the assigned Number, Income Tax / PAN Number.
3. EPF Code of their own Registration.
4. Evidence of having executed works of similar nature and magnitude under a single agreement costing not less than **Rs.50.00 Lakhs** under in any one of the Government Departments / Organizations etc.
5. Proof of Cumulative Turnover shall not be less than **Rs.200.00 Lakhs** for the past three financial years.

EVALUATION CRITERIA

The Tender accepting authority shall cause the evaluation of tenders to be carried out strictly in accordance with the qualifications criteria in terms of the required experience, available construction capacity. Technical and other manpower and financial status furnished along with the tender.

Tenders which an initial examination are found to be not substantially responsive may be rejected by the tender accepting authority.

Out of the tenders found to be substantially responsive after the initial examination, the tenderer who has tendered the lowest evaluated price in accordance with the evaluation criteria shall be determined.

GENERAL

1. Bid form shall be duly filled in, signed and complete in all respects.
2. The price should be inclusive of all taxes and local levies if any On FOR destination basis but excluding GST and GST should be indicated separately.
3. Rates shall be firm throughout the contract period and no escalation shall be permitted.
4. **The tender invited excluding GST. At the time of acceptance of the tender and signing of agreement, the applicable GST of 18% will be included for this work.**

TENDER APPLICATION

From

To

Superintending Engineer i/c,
TANSIDCO,
Chennai – 600 032.

Sir,

Sub: Restoring & Removing Blockages in the External Sewer Lines and Construction of Manholes at TANSIDCO Industrial Estate, Kakkalur in Thiruvallur District

Ref: Tender Notice No:4365(TN-8)/GM(T)/DB/2021 Date: 24.03.2022

- 1 Having examined the tender documents including scope of work, Time Frame for construction and the criteria stipulated for Qualification. I / We hereby submit all necessary information and relevant documents for qualifying me/us, to offer my/our tender for the above mentioned work.
- 2 The Application is made by me / us on behalf of (Partnership firm / Private limited company / Public Limited Company) in the capacity of _ _ _ _ _ duly authorised to submit the tender.
- 3 Necessary evidence admissible in law in respect of authority assigned to me / us on behalf of the Partnership Firm / Private Limited Company / Public Limited Company, for applying for qualification is attached herewith.
- 4 We present my / our documents herewith taking into consideration all the instructions in the Qualification schedule supplied to me / us including special instructions to Applicants / Criteria for Qualification schedule / Information and Instructions in the detailed tender notice etc.
- 5 The EMD amount is enclosed in the shape as notified in the tender notice.

I.

II.

III.

Signature of the
Contractor/Tenderer

Superintending Engineer i/c
TANSIDCO, Chennai-32

I / We understand that the **Superintending Engineer i/c, TANSIDCO, Chennai-32** reserves the right to reject any or all the tenders or drop the proposals of receiving tenders without assigning any reason therefor

Date:

**Signature of the Bidder including
Title Capacity in which Application is made**

Name:

(IN BLOCK LETTERS)

Encl:

Tender conditions, Tender schedule & Qualification documents

.....

.....

.....

Signature of the
Contractor/Tenderer

Superintending Engineer i/c
TANSIDCO, Chennai-32

Tamil Nadu Small Industries Development Corporation Ltd.,
(A Govt. of Tamil Nadu Undertaking)
Thiru Vi Ka Industrial Estate, Guindy, Chennai - 600 032.

APPENDIX -1 TENDER NOTICE (L.S. CONTRACT)

1. On behalf of the Tamil Nadu Small Industries Development Corporation Limited, Chennai – 600 032 Sealed Tenders will be received by the Superintending Engineer i/c, TANSIDCO at his office upto 3.00 PM on **12.04.2022** for the work of **“Restoring & Removing Blockages in the External Sewer Lines and Construction of Manholes at TANSIDCO Industrial Estate, Kakkalur in Thiruvallur District”**.
- 1.1 The Tender should be in the prescribed form obtainable from the office of the Superintending Engineer i/c, SIDCO, Chennai - 600 032. The tenders will be opened by the Superintending Engineer i/c, SIDCO at 3.30 PM, at the place and on the date aforementioned.
- 1.2 The tenderers or their agents are expected to be present at the time of opening of tenders. The tender receiving officer will, on opening each tender, prepare a statement of the attested and unattested correction therein and hand it over to the tenderer concerned and initial all corrections in the presence of the tenderer. If any of the tenderers or their agents finds it inconvenient to be present at the time, then in such a case, the tender receiving Officer will, on opening the tender of the absentee tenderer, make out a statement of the unattested correction and communicate it to him. The absentee tenderer shall then accept the statement of corrections without any question whatsoever.
2. Tenders must be submitted in the cover along with the schedule duly sealed and should be addressed to the Superintending Engineer i/c, SIDCO, Chennai, the name of the tenderer with their address and the name of the work being noted on the covers.
- 2.1 The tenders will not be sent by post, courier or e-mail. If the tenders received by posts are damaged, for which SIDCO will not held responsible. The tenders will be dropped in the tender box kept in the SIDCO Office. Tender submitted in any other mode will not be accepted.
- 2.2 If the tender is made by an individual, it shall be signed with his full name and his address shall be given. If it is made by a firm, it shall be signed with the co-partnership name by a member of the firm, who shall also sign his own name and the name and address of each member of the firm shall be given. If the tender is made by a corporation, it shall be signed by a duly authorized officer who shall produce with his tender, satisfactory evidence of his authorization. Such tendering Corporation may be required, before the contract is executed, to furnish evidence of its corporate existence.
- 3.0 Each tenderer must also send a certificate of income tax verification from the appropriate income tax authority in the form prescribed therefore. The certificate will be valid for one year from the date of issue for all tenders submitted during the period. Each tenderer must also send GST verification issued during current year from the appropriate authority.
- 3.1 In the case of proprietary or partnership firm it will be necessary to produce the certificate aforementioned for the proprietors and for each of the partners as the case may be.

Signature of the
Contractor/Tenderer

Superintending Engineer i/c
TANSIDCO, Chennai-32

- 3.2 If the tenderer is a registered contractor and if a certificate for the current year had already been produced by him during the Calendar year in which the tender is made, it will be sufficient, if particulars regarding the previous occasion on which the said certificate was produced are given.
- 3.3 All tenders received without a certificate as aforementioned will be summarily rejected.
4. Each tender must pay, as Earnest Money, a sum of **Rs.73,000/- (Rupees Seventy Three Thousand Only)** which may be remitted in any form as may be approved by the Govt. of Tamil Nadu from time to time as per para 155 of TNPWD code in favour of Tamilnadu Small Industries Development Corporation Limited, Chennai - 32, Tenders submitted without Earnest Money Deposit will be summarily rejected. This earnest money will be refunded to the unsuccessful tenderers on application, after intimation is sent of rejection of the tender or at the expiration of three months from the date of tender; whichever is earlier. The earnest money retained in the case of the successful tenderer will not carry any interest. It will be death with as provided in the tender.
5. (i) The tender will remain valid for a period of three Calendar months from the last date for receipt of tender. The validity period can be extended further, if the contractor gives his consent in writing, specifying the period of extension.
- (ii) The tenderer whose tender is under consideration shall attend the Office of the Superintending Engineer i/c before the end of the period specified by written intimation to him. If the tenderer fails to attend the office before the end of the specified period, his tender will not be considered. He shall forthwith upon and intimation being given to him of acceptance of his tender, by the officer duly authorized in this behalf, here in after called "the accepting authority" must agree for the payment of security deposit at 2% of the value of contract in one lump sum i.e. by taking into account of the amount of earnest money deposit, already deposited with the tender, it would be sufficient to pay the balance amount to make up the 2% of the value of contract for the purpose of security deposit) The security deposit together with earnest money deposit and the amount with held according to clause 64-1 of General conditions to the contract, shall be retained as Security for due fulfillment of contract.
- iii) On receipt of written communication of acceptance of tender if the tenderer fails to pay the requisite security deposit within the period specified in the written communication or backs out from the tender or withdraws his tender, the earnest money deposit shall be forfeited to SIDCO.
- (iv) If the contractor fails to carry out the contract, after paying the requisite deposits, then he will be liable for the excess expenditure if any incurred to complete the work as contemplated in the General conditions to the contract.
- (v) It shall be expressly understood by the tenderer that on receipt of written communication of acceptance of tender from the accepting authority, there emerges a valid contract between SIDCO and the tenderer, for execution of the work. For this purpose, the tender documents, i.e.. tender notice, tender offered by the contractor, General conditions to the contract, special conditions to the contract, written communication of acceptance of tender etc. Shall constitute a valid contract, and that will be the foundation of the rights of both the parties to the contract.

6. The tenderer shall examine closely the Tamilnadu Building Practice and also the general conditions to contract contained therein and sign the Divisional Office copy of the Tamilnadu Building Practice and its addenda volume in token of such study before submitting his tender unit rates, which shall be for finished work in situ. He shall also carefully study the drawings and additional specifications and all the documents connected with the contract. The Tamilnadu Building Practice and other documents connected with the contract such as specifications, plans, descriptive specification sheet regarding materials etc. can be seen at any time between 10.00 A.M. and 5.45 P.M. on office days in the office of the Superintending Engineer i/c, SIDCO, Chennai - 32. A copy of the set of contract documents can also be had on payment of the required amount.
7. The tenderer's attention is directed to the requirements for materials under the clause "Materials and Workmanship" in the general conditions to the contract. Materials conforming to the I.S.I. standards only shall be used on the work, and the tenderer shall quote his rates accordingly.
8. Every tenderer is expected before quoting his rates, to inspect the site of the proposed work. He should also inspect the quarries and satisfy himself about the quality and availability of materials. The names of quarries and kilns etc. where from certain materials are to be obtained will be given in the descriptive specification sheet. The best class of materials to be obtained from the quarries or other source defined, shall be used on the work. In every case the materials must comply with the relevant standard specifications. Samples of materials as called for in the standard specification or in this tender notice or as required by the Superintending Engineer i/c in any case shall be submitted for the Superintending Engineer i/c's approval before the supply to site of work begun. If the contractor, after examination of the source of materials defined in the descriptive specification sheet is of the opinion that materials complying with the standard or other specifications of the contract cannot be obtained in quality or sufficient quantity, from the source defined in the descriptive .specification sheet, he shall so state in his tender and state wherefrom he intends to obtain materials, subject to the approval of the Superintending Engineer i/c.

SIDCO will not, however, after acceptance of contract rate, pay any extra charges for lead or for any other reason, in case the contractor is found later on to have misjudged the materials available. Attention of the contractor is directed to the 'General conditions to the contract regarding payment of seignior age, tolls etc.,'

9. The tenderer's particular attention is drawn to the Sections and clauses in the General conditions to the contract dealing with:
 1. Test, inspection and rejection of defective materials & Work.
 2. Carriage,
 3. Construction plant
 4. Water and Lighting
 5. Cleaning up during progress and for delivery.
 6. Accidents
 7. Delays.
 8. Particulars of payment.

The contractor should closely peruse all the specification clauses which govern the rates, which he is tendering.

10. A schedule of quantities accompanies this tender notice. It shall be definitely understood that SIDCO does not accept any responsibility for the correctness or completeness of this schedule and that this schedule is liable to alterations by omissions, deductions or additions at the discretion of the Superintending Engineer i/c, SIDCO or as set forth in the conditions of contract. The tenderer will, however, base his lump sum tender on this schedule of quantities. He should quote specific rates for each item in the schedule and the rates should be in Rupees and in sums of five paise. The rates should be written both in words and figures and the units in words. The tenderer should also show the totals of each item, and the grand total of the whole contract and quote in the tender a lumpsum for which he will undertake to do the whole work subject to the conditions of contract, such lumpsum agreeing with the total amount of schedule A. This schedule accompanying the lumpsum tender shall be written legibly and free from erasures, over writings or initialing, dating and rewriting.
11. The Tenders offering a percentage reduction from or increase on the estimate amount (except in the case of tender called for specifically under the percentage rate tender system) and those not submitted in proper form and in due time will be rejected. Rate or lumpsum amounts for items not called for shall not be included in the tender. No alternation which is made by the tenderer in the contract form, the conditions of contract the drawings, specifications or quantities accompanying same will be recognized and if any such alterations are made, the tender will be void.
12. The tenderer should work out his own rates, without reference being made to the Public Works Department current scheduled rates or the Estimate.
13. The price at which and the source from which certain particular materials shall be obtained by the contractor are given at the end of the schedule accompanying the tender form. Tenderers must accept the materials at these prices and shall quote their price for finished work accordingly. Notwithstanding any subsequent change in the market value for those materials, the charge to the contractor will remain as originally entered in the written contract. No centage or incidental charges will be borne by SIDCO in connection with this supply.
14. The attention of the tenderers is directed to the contract requirements as to the time of beginning work, the rate of progress and the dates for the completion of the whole work and its several parts. The following rate of progress and proportionate value of work done from time to time as will be indicated by the Superintending Engineer i/c's certificates of the value of work done, will be required. Date of commencement of this programme will be the date on which the site (or premises) is handed over to the contractor.

MILE STONE

The attention of the tenderer is directed to the contract requirements as to the time of beginning work, the rates of progress and the dates for the completion of the whole work and its several parts. The following rate of progress and of proportionate value of work done from time to time as will be indicated by the Superintending Engineer i/c certificates of the value of the work done, will be required. Date of commencement of this programme will be the date on which the site (or premises) is handed over to the contractor.

SI No	Duration	Percentage of Work Completed
1	1st Month	25%
2	2nd Month	50%
3	3rd Month	75%
4	4th Month	100%

THE LIQUIDITY DAMAGES

The Liquidity damages (0.05 %) for the whole of the works are **Rs.6,278/-** per day.

1st Month Mile Stone not achieved liquidity damages at 0.05% of the balance value of work to be done will be charged per day.

2nd Month Mile Stone not achieved liquidity damages at 0.05% of the balance value of work to be done will be charged per day.

3rd Month Mile Stone not achieved liquidity damages at 0.05% of the balance value of work to be done will be charged per day.

4th Month Mile Stone not achieved liquidity damages at 0.05% of the balance value of work to be done will be charged per day.

Maximum amount of liquidity damages will be 5% of the Agreement Value.

Note: The periods to be entered in column 1 for the purpose of defining the rate of progress as may be fixed by the Superintending Engineer i/c based on balance work to suit each case.

Signature of the
Contractor/Tenderer

Superintending Engineer i/c
TANSIDCO, Chennai-32

15. No part of the contract shall be sub-let without written permission of the Superintending Engineer i/c, nor shall transfer be made by power of attorney, authorizing other to receive payment on the contractor's behalf.
16. If further information is required, the Superintending Engineer i/c of the SIDCO Divisions will furnish such information, but it must be clearly understood that tenders must be received in order and according to instructions.
17. The Superintending Engineer i/c or other sanctioning authority reserves the right to reject any tender or all the tenders.
18. The tenderers who are themselves are not professionally qualified shall undertake to employ qualified technical personnel at his cost to look after the work. The tenderer should state in clear terms whether they are professionally qualified or whether they undertake to employ technical personnel required by SIDCO, specified in the schedule below for the work. In case the selected tenderer is professionally qualified or has undertaken to employ technical personnel under him, he should see that the technically qualified personnel are always at the site of the work during working hours personally checking all items of works and paying extra attention to such works as may demand special attention e.g. reinforced concrete works etc.

Employment of Technical personnel:

<i>Sl. No.</i>	<i>Value of contract</i>	<i>Qualification and No. of Technical Assistants to be employed</i>
(1)	(2)	(3)
Value of Contract		Qualification and No. of Technical Assistance to be employed
1. Upto Rs.1.00 lakhs		No. Technical Assistant need the employed, if situation and nature of work warrants. i. A Diploma holder in Civil Engineer (or) ii. A retired Junior Engineer may be employed.
2. From Rs.1.00 lakhs upto Rs.5.00 lakhs		i. One diploma holder in civil Engineering (or) ii. Not less than one retired Junior Engineer
3. From Rs.5.00 lakhs upto Rs.10.00 Lakhs		i. One B.E. (Civil) or ii. Equivalent degrees holder or iii. Not less than one retired sub-Divisional Officer / Assistant Executive Engineer / Assistant Divisional Officer (or) iv. One diploma holder with 3 years experience
4. From Rs.10.00 lakhs upto Rs.25.00 Lakhs		i. One B.E. (Civil) with 3 years experience plus one diploma holder in Civil Engineering (or) ii. Equivalent Degree holder with 3 years experience plus one diploma holder in Civil Engineering (or) iii. Not less than one retired sub-Divisional Officer plus one Diploma holder in Civil Engineering. iv. Two Diploma holders in Civil Engineering with 3 and 5 years experience respectively.

Signature of the
Contractor/Tenderer

Superintending Engineer i/c
TANSIDCO, Chennai-32

5. From Rs.25.00 lakhs upto Rs.50.00 Lakhs
- i. One B.E. (Civil) with three years experience plus two Diploma holder in Civil Engineering (or)
 - ii. One B.E. (Civil) with three years experience plus two retired Junior Engineers (or)
 - iii. Equivalent degree holder with 3 years experience plus two diploma holder in civil Engineering / two retired Junior Engineers.(or)
 - iv. One retired sub-Divisional Officer (Assistant Executive Engineer / Assistant Divisional Engineer) plus two diploma holder in Civil Engineers. (or)
 - v. One retired sub-Divisional Officer (Assistant Executive Engineer / Assistant Divisional Officer) plus two retired Junior Engineers.
6. Above Rs.50.00 lakhs
- To be examined in individual cases depending on the nature of work and the technical skill involved and defined in the tender notice regarding the number of qualified technical personnel to be employed by the contractor –
- i) Project Manager : 2 Nos. ME/BE (CIVIL) Engineering with atleast 10 years experience in executing similar works.
 - ii) Site Engineer: 6 Nos. B.E, (CIVIL) Engineering with atleast 5 years experience.
 - iii) Site Engineer: 5 Nos. Diploma in Civil Engineering with atleast 5 years experience.
7. A penalty of Rs. 2000/- P.M. for Diploma holder and Rs. 5,000/- P.M. for Degree holder be levied in case of default on the part of contractors in following the norms laid down above.
8. The employment of Technical Assistants would be based only on the value of contract Engineers with Mechanical Engineering qualification and retired from Civil Engineering Departments are also suitable to supervise the Civil Engineering works because of their experience in Civil Engineering field.
- NOTE: In case the contractor who is professionally qualified is not in a position to remain always at the site of work and to pay extra attention to such work as may demand special attention (e.g. R.C.C.work etc) he should employ technically qualified men as prescribed above.
19. Tenderers who have not already registered themselves as P.W.D. contractors shall furnish evidence of good record and capacity to do works.
20. A tenderer submitting a tender which the tender accepting authority consider excessive and / or indicative of the insufficient knowledge of current prices or definite attempt at profiteering will render himself liable to be debarred permanently from tendering or for such period as the tender accepting authority may decide. The tender rates should be based on the controlled price for materials if any fixed by the Govt. or the reasonable price permissible for the tenderer to charge a private purchaser under the provision of clause 8 of Hoarding and Profiteering Prevention Ordinance 1943 as amended from time to time and on similar principles in regard to labour and supervision in the construction.

21. The contractor should offer employment to ex-toddy tappers as far as possible. The number of ex-toddy tappers to whom he can so offer employment should be mentioned in the tender and he should undertake in the contract to offer such employment to such number.
22. The contractor shall comply with the provisions of the Apprentices Act, 1961 and the rules and orders issued thereunder, from time to time. If he fails to do so, his failure will be breach of the contract and the competent authority, may at his discretion, cancel the contract or invoke any of the penalties for the breach of contract provided in the conditions of contract. The contractor shall also be liable for any pecuniary liability arising on account of any violation by him of the provisions of the Act. Contractor shall, during the currency of the contract, ensure engagement of the apprentices in the categories mentioned below who may be assigned to him by the Director of Employment and Training State Apprenticeship Advisor, Tamilnadu. The contractor shall train them as required under the Apprentices Act, 1961, and the rules made thereunder and shall be responsible for all obligations of the employer under the said Act including the liability to make payments to the apprentices as required under the said Act.

<i>Value of contract</i>	<i>Category</i>	<i>Number appointed</i>
Rs. 1 lakh and upto Rs. 3 lakhs	1. Building Constructor	1
	2. Brick layer	1
Above Rs. 3 lakhs & upto Rs. 10 lakhs	1. Building constructor	1
	2. Brick layer	1
Above Rs. 10 lakhs & Upto Rs. 50 lakhs.	3. Diploma Holder in Civil Engineering	1
	1. Building constructor	1
Rs. 50 lakhs.	2. Brick Layer	1
	3. B.E. (Civil) or equivalent Degree holder	1

Unless the contractor has been exempted from engagement of apprentice by the Director of Employment and Training / State Apprenticeship Advisor, a certificate to the effect that the contractor had discharged his obligation under the said Act, satisfactorily should be obtained from the Director of Employment and Training / State Apprenticeship Advisor and the same should be produced by the contractor for final payment in the settlement of the contract.”

23. The contract should employ one I.T.I. Trained mason for every ten masons or parts thereof. In case of non availability of I.T.I. trained masons the contractor should obtain the prior approval of the Superintending Engineer i/c concerned before proceeding the contract with the other kinds of masons.

APPENDIX II (a) - Tender (L.S. Contract)

To

The Superintending Engineer i/c,
Tamil Nadu Small Industries Development Corporation Limited,
Thiru Vi Ka Industrial Estate,
Guindy, Chennai - 600 032.

Sir,

1. I / We do hereby-tender and if this tender be accepted undertake to executive the following Works viz

as shown in the drawings and described in the specification, deposited in the office of the Superintending Engineer i/c, SIDCO with such variations by way of alterations of, additions to and omission from the said Works and method of payment as are provided for in the 'conditions of contractor' of the sum of Rupees

or such other sum as may be arrived at under the clause of the "General conditions to the contract" relating to "payment on lumpsum basis or by final measurements at unit prices."

2. If We have also completed the priced list of items in schedule 'A' annexed (in words and figures) for which I / We agree to execute the Work and receive payment on measured quantities as per the General conditions to the contract.
3. I / We hereby distinctly and expressly declare and acknowledge that before the submission of my or our tender, I / We have carefully followed the instructions in the tender notice and have read the Tamilnadu Building Practice and the General conditions to the contract therein and the Tamilnadu Building Practice addenda volume; and If We have made such examination of the contract documents and of the plans, specifications, quantities and of the location where the said work is to be done and such investigation of the Work required to be done and in regard to the materials required to be furnished as to enable me/us to thoroughly understand the intention of same and the requirement, covenants, stipulations and restrictions contained in the contract and in the said plans and specifications; and distinctly agree that I / We will not hereafter make any claim or demand upon SIDCO based upon or arising out of any alleged misunderstanding or misconception or mistake on my/our .part of the said requirements, convents, stipulations, restrictions and conditions.

Signature of the
Contractor/Tenderer

Superintending Engineer i/c
TANSIDCO, Chennai-32

4. I / We being a registered Public Works Department contractor enclose an Income Tax verification certificate/have already produced an income tax verification certificate during the current calendar year in respect of (here particulars of the previous occasions on which the certificates was produced should be given). The legal address of the contractors for service of all letters and notices will be as follows

.....

5. (i) (a) I / We enclose herewith a valid form for the payment of the sum of rupees* as earnest money not to bear interest.
5. (i) (b) I / We have paid Rs. *
 (Rupees.....only) as
 against the E.M.D. of Rs. * (Rupees.....
 only)

6. If my / our tender is not accepted, this sum shall be returned to me / us on my / our application when intimation is sent to me / us of rejection or at the expiration of two months from the date of this tender, whichever is earlier. If my / our tender is accepted, the earnest money shall be retained by SIDCO as Security for the due fulfillment of contract. If upon intimations being given to me / us by the authority by the SIDCO (hereinafter called "the accepting authority") of acceptance tender, I/We fail to make the additional security deposit, then I/We agree to the forfeiture of earnest money deposit. Any notice required to be served on me / us hereunder shall be sufficiently served on me / us if delivered to me / us personally or forwarded to me / us by post to (Registered or ordinary) or left at my / our address given herein. Such notices shall, if sent by post be deemed to have been served on me / us at the time when in due course of post, it would be delivered at the address to which it is sent.
7. I / We fully understand that on receipt of communication of acceptance of tender from the accepting authority, there emerges a valid contract between me/us and the TANSIDCO and the tender documents i.e., tender notice, tender with schedules General conditions to the contract and special conditions of the tender, communication of acceptance of tenders shall constitute the contract for this purpose and be the foundation of rights of both the parties, as defined in clause (iv) of the tender notice, provided that, it shall be open to the accepting authority to insist on execution of any written agreement by tenderer, if administratively considered necessary or expedient.
8. I acknowledge of being bound by all conditions of the clauses of the General condition to the contract and all specifications for items of works described by a specification number in Schedule 'A'.

9. In consideration of the payment of Rupees.....or such other sum as may be arrived at under the clause of the General conditions to the contract, relating to payment on lumpsum basis or by final measurement at unit prices, I / We agree, subject to said conditions to execute and complete the works shown upon the said drawing serially numbered from 1 to inclusive (Schedule B) and described in the specifications (Schedule C) and to the extent of probable quantities shown in the Schedule-A with such variations by way of alteration of, additions to or deductions from the said works and method of payment therefore as are provided for in the said conditions.
10. The term "Superintending Engineer i/c" in the said conditions shall mean the SIDCO Officer incharge of the Divisions having Jurisdiction for the time being over the work who shall be competent to exercise all the powers and privileges reserved herein favour of SIDCO with the previous sanction of or subject to ratification by the competent authorities in case where such sanction or ratification may be necessary.
11. I / we agree that the time shall be considered as the essence of this contract and to commence the work as soon as this contract is accepted by the competent authority as defined by the Tamilnadu Public Works Department Code and the site (or premises) is handed over to me/us provided for in the said conditions and agree to complete the work within **4 (Four) Months** from the date or such handing over to the site (or premises) and to show progress as defined in the tabular statement "Rate of progress" subject nevertheless to the provisions for extension of time contained in clause 56 of the General conditions to the contract appended to the Tamilnadu Building Practice.
12. I / We agree that upon the terms and conditions of this contract being fulfilled and performed to the satisfaction of the Superintending Engineer i/c, the security amount deposited by me / us as herein before executed on such portion thereof as I/we may be entitled to under the said conditions be paid back to me / us provided in clause 64 of the General conditions to the contract.
13. I am / we are professionally qualified and my / our qualifications are as follows.

.....

.....

I / We in pursuance of clause of tender notice undertake to employ the following technical staff for supervising the work and will see that one of them is always at site during working hours personally checking all items of works and paying extra attention to such works as may require special attention (e.g.) Reinforced cement concrete.

Name of Technical Staff
proposed to be employed

Qualification and
Experience

14. I / We agree that the arbitrator for fulfilling the duties set forth in the arbitration clause of the General conditions to the contract shall be the person so appointed by the Managing Director, TamilNadu Small Industries Development Corporation Limited, Chennai - 32. in his sole discretion.
15. In pursuance of negotiation with the Superintending Engineer i/c, SIDCO, I / We agree to reduce the rates for the items in the schedule as follows:

Sl.No.	Item No. in the Schedule	Reduced rate per unit
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16. On behalf of the TANSIDCO, the above tender for a value of Rs.
 (Rupees
 is accepted on this day of 200
 for items only.

Signature of the witness in
 full and address with name in
 block letters

Signature of the
 Contractor/Tenderer

Superintending Engineer i/c
 TANSIDCO, Chennai-32

ANNEXURE TO TENDER NOTICE SCHEDULE - A

Schedule of Rates and Approximate Quantities

- a) The quantities here given are those upon which the lumpsum tender cost of the work is based but they are subject to alterations, omissions, deduction or additions as provided for in the conditions of this contract and do not necessarily show the actual quantities of work to be done. The unit rates noted below are those governing payment of extras for deductions omissions according to the conditions of the contract as set forth in the General conditions to the contract of the Tamilnadu Building Practice and other conditions or specifications of this contract.
- b) It is to be expressly understood that the measured work is to be taken net (not withstanding any custom or practice to be contrary) according to the actual quantities when in place and finished according to the drawings or as may be ordered from time to time by the Superintending Engineer i/c and cost calculated by measurement or weight at the respective prices, without any additional charges for any necessary and contingent works connected therewith. The rates quoted are for works in site and complete in every respect.
- c) The description given in schedule - A are to indicate the item of work only and need not be constructed as full specification. The quoted rate shall be for carrying out the item as per standards and specifications described in the relevant MOST and TNBP specifications. The contractor shall take no advantage of any apparent error or omission in the Schedule - A description.

Item No.	Probable Quantity (Figures)	Description of works.	TNBP No.	Rate (Words & Figures)	Unit	Amount
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(Vide separate sheet attached)

Date :

- The second Sub-Division of this Column (ie) column 3 is for entering description in words such as numbers, cubic metre, kg etc.

Signature of the
Contractor/Tenderer

Superintending Engineer i/c
TANSIDCO, Chennai-32

SCHEDULE – B

List of Drawings,

Supplemental List

Note : All drawings to be signed by the contractor as well as the Officer entering into the contract

As referred to in the specifications including the general conditions to the contract of Tamilnadu Building Practice

Serial No	Drawing No	Description	Serial No	Drawing No	Description	Date on which the Drawing was supplied

Signature of the
Contractor/Tenderer

Superintending Engineer i/c
TANSIDCO, Chennai-32

SCHEDULE - C

List of specifications for the various items of works supplementing those described in Schedule -A by standard specification numbers.

1. The Contractor shall employ the following technical staff for supervising the work and shall see that one of them is always at site during working hours, personally checking all items of work and paying extra attention to such works as may demand special attention eg. Reinforced Concrete work etc.

***Name of the members of the
Technical staff to be employed***

Qualifications

Note: 1. In case the contractor is himself professionally qualified, the above specification should be suitably altered and in cases where the contractor selected has not given an undertaking to employ qualified men, it should be scored out,

Note: 2. Additional specifications, if any, which have to be entered in Schedule 'C' should be entered below item (1) above and numbered continuously.

Signature of the
Contractor/Tenderer

Superintending Engineer i/c
TANSIDCO, Chennai-32

SPECIAL CONDITIONS

Amendment for inclusion of additional clauses 56-4, 56-5 and 56-6 to the General conditions of contract, TNBP Volume II

CLAUSE 56-4

In case where the Government under the terms of the contract with the contractor are liable to supply any materials, articles of things to the contractor for the performance by him of his part of the contract, the Superintending Engineer i/c, may at his absolute discretion extend the time within which such materials, articles or things may be supplied by the Government and the Government may supply to the contractor such materials articles or things within the time so extended without any liability on their part to compensate the contractor by reason of the extension of time for the supply of the materials articles of things.

CLAUSE 56-5

In cases where the Government under the terms of the contract are liable to supply any materials, articles or things to the contractor for the performance by him of his part of the contract and the Government for any reason are unable to supply such materials, articles or things either within the time specified in the contract or within the time extended under Clauses 56-4. The Superintending Engineer i/c, may, at his discretion or at the request of the contractor, determine the whole or any part of the contract which cannot be performed by reason of the failure to supply such materials, articles or things and the contractor shall not be entitled to claim any damages or compensation in respect of such determination. The contractor shall, however be paid the value of the work already done by him and the cost of materials, articles or things if any collected by him up to the date of such determination and left unused on the work-spot (which shall be taken over by the Superintending Engineer i/c) either at the contract rates or at the values deduced from the through rates included in the contract. When the contract is determined at the discretion of the Superintending Engineer i/c, he shall give notice in writing to the contractor and the decision of the Superintending Engineer i/c to determine the contract shall be final and binding on the contractor.

Explanation: The expression 'Through Rates' means the rate for the furnished of work or the all in rates, that is to say, the rates for the finished items of work inclusive of the cost of materials and labour.

CLAUSE 56-6

If, at any time after the acceptance of the tender, the Government shall; for any reason whatsoever not required the whole or any part of the works to be carried out, the Superintending Engineer i/c shall give notice in writing of the fact to the contractor, who shall have no claim to any compensation or other payments whatsoever on account of any profit or advantage he might have derived from the execution of the work in full but which he didn't derive in consequence of the termination of the works. he shall be paid at contract rates for the work executed by him including any additional works such as clearing of site etc, that may be rendered necessary by such termination. He shall also be allowed a reasonable payment as decided by the authority next higher in rank to the authority which accepted the tender, for any expense incurred by him on account of labour and materials, articles or things collected, but which could not be utilised on the works as verified by the Superintending Engineer i/c such decision shall be final and binding on both the parties and shall not be subject to arbitration under clause – 69.

SPECIAL CONDITIONS TO THE TENDERERS

On evaluation of tender, if it is found that if the overall quoted amount of the tender is less than 5 to 15% of the value put to tender, the contractor shall pay an additional security at 2% of the estimated value.

If the tender discount exceeds 15% to 20% the contractor shall pay an additional security deposit of 50% of the difference between the quoted amount and estimate amount.

Failure to furnish the additional security deposit within 15 days from the date of receipt of acceptance order and execute the agreement shall entail cancellation of award of contract and forfeiture of EMD furnished.

SPECIAL CONDITIONS TO THE TENDERERS ON SEWAGE WORKS

1. ADDITIONAL CONDITION FOR CLEANING AND MAINTENANCE OF SEWER SYSTEM

Format of the undertaking to be given by contractor in case where the cleaning and maintenance of sewerage systems (including septic tanks) is outsourced

- 1) I (Name, Age, Father's name and Address of the Contractor) am aware of the directions of the Hon'ble High Court of Madras in its order dated 20.11.20008 in W.P.No. 24403 /2008, and the orders of the Government of Tamil Nadu in G.O.(Ms) No. 293, MA& WS (MW) Department, dated 26.11.2010, regarding the ban on manual scavenging and on the entry of sanitary workers into the sewerage system of septic tank. I undertake to abide by the said directions of the High Court and Government order in this regard.
- 2) I shall not allow sanitary workers to enter into the sewerage system / septic tank for cleaning or maintenance operations except in the 4 circumstances permitted in the orders of the High Court in WP .No. No. 24403 , dated 20.11.2008 .Iam aware that even in these 4 circumstances, I should allow the workers to enter only with adequate safety gadgets and under the supervision of a qualified staff, and only after duly observing all safety precautions including testing for the presence of toxic gases.
- 3) I am aware that violation of the said directions of the Hon'ble High Court and the G.O. will attract punishment under section 14 of the Employment of Manual Scavengers and Construction of Dry Latrines (Prohibition) Act, 1993.

**Signature of the contractor
With Seal:**

2. Additional conditions to be included in the Tender Documents as well as the agreement with the contractor in cases where the cleaning and maintenance of sewerage system (including septic tanks)

The Contractor shall strictly abide by the directions of the Hon'ble High Court of Madras in its order dated 20.11.2008 in W.P.No.24403/2008 and this orders of the Government of Tamil Nadu in G.O.(Ms) No.293, MA&WS(MW) Department dated 26.11.2010, regarding the ban on manual scavenging and on the entry of sanitary workers into the sewerage system or septic tank. All cleaning and maintenance operations shall be done only through mechanical devices.

The contractor shall not allow sanitary workers to enter into the sewerage system/ septic tank for cleaning or maintenance operations except in the 4 circumstances permitted in the orders of the High Court in W.P.No.24403, dated 20.11.2008 namely

- I. For the removal of concrete / FRP manhole door which gets damaged due to the heavy vehicular traffic and often falls inside the manhole causing obstructions / blocks in the sewer and which results in the blockage of sewerage system, and where mechanical equipments cannot be put into operation.
- II. For the purpose of inter –linking the newly laid sewer main with the existing sewer main, where it will be wholly necessary to block the main sewer main in the servicing manhole. Entry of sanitary workers on such occasions has to be necessarily permitted, in as much as it is stated that large size sewer i.e., where the diameter is more than 300mm , blocking the sewer main from the top of the manhole is not possible and only the sanitary workers has to enter the main hole and that too with necessary safety gadgets for blocking the sewer temporarily.
- III. For the removal of submersible pump sets fixed at the bottom of the suction wells , which goes out of order, for which the sanitary workers has to enter the well again with necessary safety gadgets after emptying the sewage from the well in order to enter remove the pump set. It is made clear that before allowing any sanitary workers to enter on such occasions, steps should be taken to see that the sewage is totally emptied and thereby further ensure that no poisonous gas remains in the sewage line.
- IV. For the reconstruction of the man hole or covers / sewer line when the sewage pipe line gets blocked or gets obstructed, which results in the system getting surcharges. Here again, before allowing any sanitary worker to enter the sewer line, it is essential that sewage line is emptied by blocking the man holes In the system on either side of the sinking man holes / damaged man holes.

Even in the above four instances, the contractor should allow the workers to enter only with adequate safety gadgets and under the supervision of a qualified staff and only after duly observing all safety precautions including testing for the presence of toxic gases with a gas detector. Naked flame method of testing the presence of poisonous gases is hazardous and should be strictly avoided.

- Even in the non-exceptional circumstances, consideration of safety of the workers shall be paramount and the contractor shall ensure the same.

- The contractor should indemnify the employer for any loss or damage caused by his negligence or by his non-observance / violations of any labour laws.
- The contractor should take out insurance policies under the Workmen's Compensation Act, 1923 for all the workers engaged by him and a photocopy of the insurance policy should be furnished to the employer. The policy should be kept alive till completion of the contract.
- The contractor should impart safety education to all his workers and train them in the use of safety gadgets.

3. Employer's and Contractor's Risks

The Employer carries the risks which this Contract states are Employer's risks, and the Contractor carries the risks which this Contract states are Contractor's risks.

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

4. Contractor's Risks

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

5. Insurance

- 5.1** The Contractor shall provide, in the joint names of the Employer and the Contractor, insurance cover from the Start Date to the end of the Defects Liability Period, in the amounts and deductibles stated in the Contract Data for the following events which are due to the Contractor's risks:
- (a) loss of or damage to the Works, Plant and Materials;
 - (b) loss of or damage to Equipment;
 - (c) loss of or damage of property (except the Works, Plant, Materials and Equipment) in connection with the Contract; and
 - (d) personal injury or death.
- 5.2** Policies and certificates for insurance shall be delivered by the Contractor to the Engineer for the Engineer's approval before the Start Date. All such insurance shall provide for compensation to be payable in the types and proportions of currencies required to rectify the loss or damage incurred.
- 5.3** If the Contractor does not provide any of the policies and certificates required, the Employer may effect the insurance which the Contractor should have provided and recover the premiums the Employer has paid from payments otherwise due to the Contractor or, if no payment is due, the payment of the premiums shall be a debt due.

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

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

6. Site Investigation Reports

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

7. Queries about the Contract Data

The Engineer will clarify queries on the Contract Data.

8. Contractor to Construct the Works

8.1 The Contractor shall design (if applicable), construct and install the Works in accordance with the Specification and Drawings.

8.2 The basic centerlines, reference points and benchmarks will be fixed by Employer.

8.3 The Contractor shall establish at his cost, at suitable points, additional reference lines, benchmarks as may be necessary. The Contractor shall remain responsible for the sufficiency and accuracy of all his benchmarks and reference lines. He shall take precautions to see that the lines, points and benchmarks fixed by Employer are not disturbed by his work and shall make good any such damage.

9. The Works to Be Completed by the Intended Completion Date

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

10. Approval by the Engineer

10.1 The Contractor shall submit Specifications and Drawings showing the proposed Temporary Works to the Engineer, who is to approve them if they comply with the Specifications and Drawings.

10.2 The Contractor shall be responsible for design of Temporary Works.

10.3 The Engineer's approval shall not alter the Contractor's responsibility for design of the Temporary Works.

10.4 The Contractor shall obtain approval of third parties to the design of the Temporary Works where required.

10.5 All Drawings prepared by the Contractor for the execution of the temporary or permanent Works, are subject to prior approval by the Engineer before their use.

11. Safety

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

12. Discoveries

- 12.1 Anything of historical or other interest or of significant value unexpectedly discovered on the Site is the property of the Employer. The Contractor is to notify the Engineer of such discoveries and carry out the Engineer's instructions for dealing with them.

13. Possession of the Site

- 13.1 The Employer will give possession of all parts of the Site to the Contractor. However, if possession of a part is not given by the date stated in the Contract Data it cannot be taken as a reason for delay in start of the relevant activities and it will not be considered a Compensation Event.

**PENALTY CLAUSE AS PER G.O.Ms.NO.2559, Public Works Department,
DATED 25.12.1970.**

Extract from the Tamil Nadu Buildings Practice Volume II:

56. Delays in commencement or progress or neglect of work or suspension of work by the contractor and forfeiture of Earnest Money Security Deposit and withheld amounts.
- 57.1. Time shall be considered as the essence of the contract. If at any time, the Superintending Engineer i/c shall be of the opinion that the contractor is delaying commencement of the work, neglecting or delaying the progress of work as defined in the tabular statement "Rate of progress: in the Article of Agreement or the contractor fails to maintain the rate of progress in the Article of Agreement plus any extension of time or the contractor shall suspend the works or sublet the work or a portion thereof without the sanction of the Superintending Engineer i/c or violates any of the provisions of the contract, the Superintending Engineer i/c shall so advise the contractor and at the same time demand compliance. If the contractor neglects to comply with such demand within seven days after receipt of such notice, it shall then or at any time be lawful for the Superintending Engineer i/c to impose a penalty or forfeiture on the contractor from the deposit or to determine the contract.
- 57.2. The Penalty or forfeiture referred to in Clause 57.1 shall not exceed 5% of the value of the contract value and is imposed in cases where the contractor is allowed to proceed with the whole or part and complete the whole or such part of works. The penalty or forfeiture imposed by the Superintending Engineer i/c under this Clause is however subject to modification or waiver at the absolute discretion of any authority higher in rank than the Superintending Engineer i/c. Penalty will be imposed for delay in progress of work i.e., 0.05% of value of work per day.
- 57.3. It shall be a further right of the Superintending Engineer i/c to give any part of the work to any other contractor at his discretion or have it done departmentally in order to maintain the rate of progress and the contract shall then be determined for only that portion of the work given to other contractor or done departmentally. The forfeiture under Clause 57.2 will in these circumstances be applied and any expenditure incurred on this account shall be recovered from the original contractor.
- 57.4. Determination of the contractor referred to in Clause 57.1 shall carry with it the forfeiture of the Security Deposit. After determining the contract, the Superintending Engineer i/c shall have the right to give any part of work to any other contractor in the unexecuted portion of the contract in which case any expenses which may be incurred in excess of such amount which 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 may be deducted from any money due to him by the Government under this contract or any other account whatsoever. Provided, also that if the expenses incurred by the Government are less than the amount payable to the contractor at his agreement rates, the difference will not be paid to the contractor.

- 57.5 In the event of any one of the above Clauses being adopted by the Superintending Engineer i/c, the contractor shall have no compensation for any loss sustained by him by reason of his having purchased or processed any materials or entered into any engagement or made any advance on account or with a view to the execution of the work or the performance of contract and in case action is taken under any of the provisions aforesaid and the contractor shall not be entitled to be paid any sum for any work actually performed under the contract unless and until the Superintending Engineer i/c has certified 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.
- 57.6. In the event of the Superintending Engineer i/c putting in force all or any of the powers vested in him under the Clause 57.4, he may, if he so desires, after giving a notice in writing to the contractor, take possession of the works and site and all such plant and materials thereon (or any ground contingencies thereof) and all such plant and materials as above mentioned shall thereupon be at the disposal of Government absolutely for the purpose of completing the work after such notices shall have been given, the contractor shall not be at liberty to remove from the site of work or from the ground contiguous there to any plant or materials belonging to him which shall have been placed thereon for the purpose of the above work. Government shall not be able to make any payment to the contractor or account of use of such plant for the completion of the works, under the provision herein before contained. On taking possession of the materials and stores belonging to the contractor or procured by the contractor and intended to be used for the execution of the work or any part thereof, the contractor shall be paid for the same in account, at the contract rates to be certified thereof shall be final, otherwise the Government may give notice in writing to the contractor to remove any of his plant or materials from the site and not required for the completion of the works. If such plants or materials are not removed within 14 days after notice shall have been so given, the Government may remove and sell the same, holding the proceeds less the cost of removal and sale, to the credit of the contractor. The certificate of the Superintending Engineer i/c as the expense of any such removal and sale shall be final and binding on the contractor.

ADDITIONAL GENERAL CONDITIONS TO CONTRACT

1) Security Deposit:

In case of L.S. Contracts for building works, water supply sanitary works except road works the security deposit (ie 2% of the value of contract minus the EMD already remitted) will be recovered in three equal instalments from the first three consecutive bills. In case of road work the Security Deposit at 2% of the value of contract, less the EMD already remitted, should be remitted in one lumpsum for the due fulfillment of the contract.

2) GST:

The tender invited excluding GST. At the time of acceptance of the tender and signing of agreement, the applicable GST of 18% will be included for this work.

3) Risk Insurance:

The work executed by the Contractor under this contract shall be maintained at the contractor's risk until the work is taken over by the Superintending Engineer i/c. The contractor shall accordingly arrange his own insurance against all natural calamities, fire and other acts of God during such period and SIDCO shall not be liable for any loss or damage.

4) Standard Specification:

For detailed description of various items of work to be executed in addition to the brief description given in the Schedule-A and for the rights and obligations of the contractors etc., the attention of the contractors is invited to the TNBP which should be followed in all respects both in letter and spirit. The materials used, the workmanship, the mode of execution of the work etc., should confirm to relevant specification of TNBP or National Building Code for Indian Standard specifications as may be specified.

5) Safety Code:

The safety measures and all amenities for the labour shall be made by the contractor at his cost as indicated in the safety code vide appendix to General Conditions to contract, and clause 34, 35 and 42-1 to 42-6 of General conditions to contract.

6) Retention of 2.5% for one year:

In case of contracts for this work, a sum equivalent to 2.5% of the value of work done will be retained with SIDCO for a period of one year reckoned from the date of completion of the work in order to enable SIDCO officers to watch the effect of all seasons on the work done by the contractor. The amount to be retained with SIDCO will be refunded only on expiry of one year period referred to above and on execution of indemnity bond by the contractor for a further period of **one** year. The contractor shall be liable to set right all defects arising out of his faulty execution or sub-standard work noticed during the above **four** years period at his cost.

7) Employees Provident Fund:

All rates quoted in the tender shall be inclusive of EPF contribution payable towards the labour engaged by the contractor for execution of work and the contractor should remit the EPF contribution on every month as specified by the EPF authorities.

8) **Recovery of dues under Revenue Recovery Act:**

Any amount fallen due from the contractor on account of his contract even after recovering from the bills for this work and any other contract awarded to the contractor, then the amount is liable to be recovered under the provisions of Revenue Recovery Act.

9) **Arbitration:**

Dispute if any arise related to the contract, will be tried to be settled amicably by the Managing Director of SIDCO. If it is not settled amicably within 30 days from the date of dispute communicated, then the matters will be settled through arbitration. The arbitration will be carried out in accordance with Arbitration act 1996 & its amendments if any and place of arbitration will be at Chennai only. **A Panel of Arbitrators will be nominated** by the Managing Director of the **SIDCO** on receipt of such request from either party, after signing of the Agreement. Matters to be arbitrated upon shall be referred to a Sole Arbitrator. **SIDCO** shall provide three Arbitrators which may also include **Officers of the SIDCO not less than the rank of Executive Engineer unconnected with the subject contract. The Contractor shall not be entitled to raise any objection to any such arbitrator on the ground that the arbitrator is an officer of the SIDCO.** The Contractor shall have to choose the Arbitrator from this panel of three Arbitrators for selection of Sole Arbitrator.

10) **Fraud and Corrupt Practices:**

10.1 The Applicants and their respective officers, employees, agents and advisers shall observe the highest standard of ethics during the Bidding Process and subsequent to the issue of the Letter of Acceptance (LOA) and during the subsistence of the Concession Agreement. Notwithstanding anything to the contrary contained herein, or in the LOA or the Concession Agreement, the SIDCO may reject a Bid, withdraw the LOA, or terminate the Concession Agreement, as the case may be, without being liable in any manner whatsoever to the Applicant or Tenderer, as the case may be, if it determines that the Applicant or Tenderer, as the case may be, has, directly or indirectly or through an agent, engaged in corrupt practice, fraudulent practice, coercive practice, undesirable practice or restrictive practice in the Bidding Process. In such an event, the SIDCO shall be entitled to forfeit and appropriate the EMD or Performance Security, as the case may be, as Damages, without prejudice to any other right or remedy that may be available to the SIDCO under the Tender document and/ or the Concession Agreement, or otherwise.

10.2.1 Without prejudice to the rights of the SIDCO hereinabove and the rights and remedies which the SIDCO may have under the LOA or the Concession Agreement, or otherwise if an Applicant or Tenderer, as the case may be, is found by the SIDCO to have directly or indirectly or through an agent, engaged or indulged in any corrupt practice, fraudulent practice, coercive practice, undesirable practice or restrictive practice during the Bidding Process, or after the issue of the LOA or the execution of the Concession Agreement, such Applicant or Tenderer shall not be eligible to participate in any Tender or Tender document issued by the SIDCO during a period of 2 (two) years from the date such Applicant or Tenderer, as the case may be, is found by the SIDCO to have directly or indirectly or through an agent, engaged or indulged in any corrupt practice, fraudulent practice, coercive practice, undesirable practice or restrictive practices, as the case may be.

10.2.2 An Applicant shall be liable for disqualification and forfeiture of Earnest Money Deposit if any legal, financial or technical adviser of the SIDCO in relation to the Project is engaged by the Applicant, its Members or any Associate thereof, as the case may be, in any manner for matters related to or incidental to the Project during the Bidding Process or subsequent to the (i) issue of the Letter of Acceptance or (ii) execution of the Concession Agreement. In the event any such adviser is engaged by the Preferred Applicant or Tenderer, as the case may be, after issue of the work order/concession agreement to Project, then notwithstanding anything to the contrary contained herein or in the Letter of Acceptance or the Concession Agreement and without prejudice to any other right or remedy of the SIDCO, including the forfeiture and appropriation of the Earnest Money Deposit or Performance Security, as the case may be, which the SIDCO may have there under or otherwise, the Letter of Acceptance or the Concession Agreement, as the case may be, shall be liable to be terminated without the SIDCO being liable in any manner whatsoever to the Preferred Applicant or Tenderer for the same. For the avoidance of doubt, this disqualification shall not apply where such adviser was engaged by the Applicant, its Member or Associate in the past but its assignment expired or was terminated prior to the Application Due Date. Nor will this disqualification apply where such adviser is engaged after a period of 3 (three) months from the date of commercial operation of the project

10.3 For the purposes of this Clause 10, the following terms shall have the meaning hereinafter respectively assigned to them:

- i. **“corrupt practice”** means (i) the offering, giving, receiving, or soliciting, directly or indirectly, of anything of value to influence the actions of any person connected with the Bidding Process (for avoidance of doubt, offering of employment to or employing or engaging in any manner whatsoever, directly or indirectly, any official of the SIDCO who is or has been associated in any manner, directly or indirectly, with the Bidding Process or the LOA or has dealt with matters concerning the Concession Agreement or arising there from, before or after the execution thereof, at any time prior to the expiry of one year from the date such official resigns or retires from or otherwise ceases to be in the service of the SIDCO, shall be deemed to constitute influencing the actions of a person connected with the Bidding Process); or (ii) save and except as permitted under the Clause 10.2a of this Tender document, engaging in any manner whatsoever, whether during the Bidding Process or after the issue of the LOA or after the execution of the Concession Agreement, as the case may be, any person in respect of any matter relating to the Project or the LOA or the Concession Agreement, who at any time has been or is a legal, financial or technical adviser of the SIDCO in relation to any matter concerning the Project;
- ii. **“fraudulent practice”** means a misrepresentation or omission of facts or suppression of facts or disclosure of incomplete facts, in order to influence the Bidding Process;
- iii. **“coercive practice”** means impairing or harming, or threatening to impair or harm, directly or indirectly, any person or property to influence any person’s participation or action in the Bidding Process;

- iv. **“undesirable practice”** means (i) establishing contact with any person connected with or employed or engaged by the SIDCO with the objective of canvassing, lobbying or in any manner influencing or attempting to influence the Bidding Process; or (ii) having a Conflict of Interest; and
- v. **“restrictive practice”** means forming a cartel or arriving at any understanding or arrangement among Applicants with the objective of restricting or manipulating a full and fair competition in the Bidding Process.

11) **Miscellaneous:**

11.1 **Jurisdiction of Court**

The Bidding Process shall be governed by, and construed in accordance with, the laws of India. The courts at Chennai shall have the exclusive jurisdiction over all disputes arising under, pursuant to and/ or in connection with the Bidding Process.

11.2 **Right of Decision Making with SIDCO**

The SIDCO, in its sole discretion and without incurring any obligation or liability, reserves the right, at any time, to;

- i. suspend and/ or cancel the Bidding Process and/ or amend and/ or supplement the Bidding Process or modify the dates or other terms and conditions relating thereto;
- ii. consult with any Applicant in order to receive clarification or further information;
- iii. retain any information and/ or evidence submitted to the SIDCO by, on behalf of, and/ or in relation to any Applicant; and/ or
- iv. independently verify, disqualify, reject and/ or accept any and all submissions or other information and/ or evidence submitted by or on behalf of any Applicant.

11.3 **Claims and Liability Clause**

It shall be deemed that by submitting the Bid, the Applicant agrees and releases the SIDCO, its employees, agents and advisers, irrevocably, unconditionally, fully and finally from any and all liability for claims, losses, damages, costs, expenses or liabilities in any way related to or arising from the exercise of any rights and/ or performance of any obligations hereunder, pursuant hereto and/ or in connection with the Bidding Process and waives, to the fullest extent permitted by applicable laws, any and all rights and/ or claims it may have in this respect, whether actual or contingent, whether present or in future.

11.4 **No nuisance clause**

The Applicant shall take all necessary precautions to prevent any nuisance or inconvenience to the owners, tenants or occupiers of adjacent properties during execution of work.

11.5 Applicable Law(s)

The Tenderer has to follow all the applicable statutes, laws, bye-laws, rules, regulations, orders, ordinances, protocols, codes, guidelines, policies, notices, directions, judgments, decrees or other requirements or official directive of any government authority or court or other law, rule or regulation approval from the relevant governmental authority, government resolution, directive, or other government restriction or any similar form of decision of, or determination by, or any interpretation or adjudication having the force of law in India as amended from time to time while providing these services.

11.6 Integrity Pact

The Applicant shall submit a duly signed integrity pact as per Annexure-4 along with its proposal as per the Tender document.

11.7 Non Transferability of Tender document

This Tender document is non-transferable

11.8 Loss and Theft of Property

The Tenderer shall be responsible for the up keeping of all the assets created and any loss and damage thereof shall be made good by him immediately at his own cost to continue the services under the scope of Tender document available for use. If Tenderer fails to create new assets which are damaged by theft or any other reason and Services are affected then the penalties will be levied for not meeting the desired level of SLA. If the level of services goes below the minimum level as prescribed in the SLA then SIDCO will get it done at risk and cost of the Tenderer or take any suitable action including termination of Concession Agreement.

11.9 Severability

If for any reason whatsoever any provision of this Agreement is or becomes invalid, illegal or unenforceable or is declared by any court of competent jurisdiction or any other instrumentality to be invalid, illegal or unenforceable, the validity, legality or enforceability of the remaining provisions shall not be affected in any manner, and the Parties shall negotiate in good faith with a view to agreeing upon one or more provisions which may be substituted for such invalid, unenforceable or illegal provisions, as nearly as is practicable. Provided failure to agree upon any such provisions shall not be subject to dispute resolution under this Agreement or otherwise.

- 12) Without prejudice to any other right or remedy which the SIDCO may have in respect thereof under this Tender document, upon the occurrence of an Event of Default, the SIDCO shall be entitled to terminate this Agreement as hereinafter provided.

12.1. If SIDCO decides to terminate this Agreement pursuant to preceding clause 12.2 it shall in the first instance issue Preliminary Notice to the Tenderer. Within 30 days of receipt of the Preliminary Notice, the Tenderer shall submit to SIDCO in sufficient detail, the manner in which it proposes to cure the underlying Event of Default (the "Tenderer's Proposal to Rectify"). In case of non-submission of the Tenderer's Proposal to Rectify within the said period of 30 days, SIDCO shall be entitled to terminate this Agreement by issuing Termination Notice, and to appropriate the Performance Security.

12.2. The Tenderer's Proposal to Rectify is submitted within the period stipulated therefore, the Tenderer shall have further period of 30 days to remedy / cure the underlying Event of Default (Cure Period). If, however the Tenderer fails to remedy/cure the underlying Event of Default within such further period allowed, SIDCO shall be entitled to terminate this Agreement by issue of Termination Notice and to appropriate the Performance Security (PBG) if subsisting.

12.3. Termination Notice

If SIDCO, having become entitled to do so decides to terminate this Agreement pursuant to the preceding clause 12.3, it shall issue Termination Notice setting out:

- i. in sufficient detail the underlying Event of Default
- ii. the Termination Date which shall be a date occurring not earlier than 30 days from the date of Termination Notice
- iii. the estimated Termination Payment including the details of computation thereof and
- iv. any other relevant information.

12.4. Obligation of Parties

Following issue of Termination Notice by SIDCO in accordance with clause, the Parties (i.e. the Tenderer and the SIDCO) shall promptly take all such steps as may be necessary or required to ensure that:

- i. until Termination the Parties shall, to the fullest extent possible, discharge their respective obligations so as to maintain the continuity of service to the users of the Project Facilities,
- ii. the Termination Payment, if any, payable by the Tenderer is paid to the SIDCO before the Termination Date; and
- iii. the Project Facilities are handed over to SIDCO by the Tenderer on the Termination Date, free from any Encumbrance, under this Agreement.

12.5. Withdrawal of Termination Notice

Notwithstanding anything inconsistent contained in this Tender document, if the Tenderer cures the underlying Event of Default to the satisfaction of the SIDCO at any time before the Termination occurs, the Termination Notice may be withdrawn by the SIDCO, provided that the Tenderer shall compensate the SIDCO for any direct costs/consequences occasioned by the Event of Default which caused the issue of Termination Notice.

- 13) In the event of work being transferred to any other Division / Sub division, the Superintending Engineer i/c / Executive Engineer who is incharge of Division / Subdivision having jurisdiction over the work shall be competent to exercise all powers and privileges reserved in favour of SIDCO.

1. CEMENT:

The Contractor has to make his own arrangements for the procurement of Cement to the required specifications for the work subject to the followings:

- (A) The Contractor shall procure cement required for the works only from reputed cement factories (Main producer or their authorized agents) manufacturing cement to ISI standard acceptable to the Engineer-in-Charge. The Contractor shall be required to furnish to the Engineer-in-Charge bills of payment and cost Certificate issued by the manufacturers, or their authorized agents to authenticate procurement of quality cement from the approved cement factory. The Contractor shall make his own arrangement for safe haulage and adequate storage of cement.
- (B) The Contractor shall procure cement in Standard packing of 50 kg per bag from the authorised manufacturers. The Contractor shall make necessary arrangements at his own cost to the satisfaction of Engineer-in-Charge for actual weighment of random sample from the available stock and shall conform with the specification laid down by the Indian Standards Institution or other Standard foreign Institution as the case may be. Cement shall be got tested for all the tests and as directed by the Engineer-in-Charge atleast one month in advance before the use of cement bags brought and kept at site godown.
- (C) The employer will furnish air retraining agents and admixtures required to the contractor free of cost at the employer stores. The use of such admixtures and agents shall be made as per the instructions of the Engineer-in-Charge. The cost of cartage / storage handling, batching, mixing shall be borne by the tenderer for concrete.
- (D) The contractor should store the cement of 60 days requirement atleast one month in advance to ensure the quality of cement is brought to site and shall not remove the same without the written permission of Engineer-in-Charge. The Contractor shall forthwith remove from the work area, the Cement that the Engineer-in-charge may disallow for use, on account of failure to meet with required quality and standards.
- (E) The Contractor will have to construct sheds for storing Cement having capacity not less than the cement required for 90 days use at approved locations. The Engineer-in-Charge or the representative shall have free access to such store at all times.
- (F) The Contractor shall further at all times satisfy the Engineer-in-Charge on demand by production of records and text books or by submission of returns and other proofs as directed, that the cement is being used as tested and approved by Engineer-in-Charge for the purpose and the contractor shall at all times, keep this record upto date to enable the Engineer-in-Charge to apply such checks as he may desire.

(G) Cement which has been unduly long in storage with the Contractor or alternatively has deteriorated due to inadequate storage and thus become unfit for use on the works will be rejected by SIDCO and no claim will be entertained. The contractor shall forth with remove from the work area any cement, the Engineer-in-Charge may disallow for use on work and replace it by cement complying with the relevant Indian Standards.

2. STEEL:

The contractor shall provide mild steel (MS) reinforcement bars, High Yield strength deformed (HYSD) bars, rods and structural steel etc required for the works, only from the main and secondary producers manufacturing steel or other authorised agents to the prescribed specifications, Bureau of Indian standards requirements and licensed to affixing ISI test certificate issued by the Government approved laboratory certification marks and acceptable to the Engineer-in-Charge. Necessary **ISI** test certification is to be produced to Engineer-in-Charge before use on works.

The diameters and weight of steel should be as follows :

S.No.	Diameter of Rod	Sectional Weight in Kg per running metres both for plain & HYSD Steel
1.	6 Millimetres	0.22
2.	8 Millimetres	0.39
3.	10 Millimetres	0.62
4.	12 Millimetres	0.89
5.	14 Millimetres	1.21
6.	16 Millimetres	1.58
7.	18 Millimetres	2.00
8.	20 Millimetres	2.47
9.	22 Millimetres	2.98
10.	25 Millimetres	3.85
11.	28 Millimetres	4.83
12.	32 Millimetres	6.31

Note:

If any rods other than those specified above are used the weight shall be as per standard steel tables

**OFFICE OF THE ENGINEER-IN-CHIEF (BUILDINGS), CHIEF ENGINEER
(BUILDINGS) CHENNAI REGION AND CHIEF ENGINEER (GENERAL), PWD.,
CHEPAUK, CHENNAI – 5**

Technical Circular No. AEE / T10 / 57017 , dated 12.07.2017

1. In recent years, considerable emphasis has been made by the experts in the construction industry to use Manufactured Sand (M-Sand) as River Sand resources are exhausting very rapidly. It has also been proved that Good quality M-sand can be used as an alternative construction material to River sand.
2. Though the definition of Manufacturing Sand (M-Sand) as per IS 383:2016 code refers to processed fine aggregates, the Crushed Stone Sand is commercially called as M-sand in the Market.
3. IS 383:2016 code under clause 3.1.2 defines the crushed sand as, (1) Crushed stone sand - Fine aggregate produced by crushing hard stone. (2) Manufacturing fine aggregate (Manufactured Sand) - Fine aggregate manufactured from other than natural sources, by processing materials, using thermal or other process such as separation, washing, crushing and scrubbing.
4. In the reference circular cited, PWD permitted to use Crushed Stone Sand hereafter called "**CS-Sand**" in the construction work as an alternate material to Natural Sand with the condition that it should comply with all the requirements as stipulated by relevant codes of Bureau of Indian Standards.
5. However, there has been general reluctance to use the CS-Sand in construction works mainly due to lack of supply of good quality CS-Sand. It has been noticed that Quarry Dust which contains Flaky particles and higher percentage of Micro fines (particles less than 75 micron) is being supplied in the name of CS-Sand and these properties affect the quality of concrete and other works.
6. Hence, in continuation of earlier circular instructions issued, to bring awareness about the use of good quality CS-Sand and to promote the use of the CS-Sand an alternate to River Sand, the following further circular instruction are issued in respect of quality checks to be carried out on CS-Sand and the manufacturing process of good quality CS-Sand.

7. Quality Checks on Crushed Stone Sand:

Following aspects help to assess the quality of CS-Sand.

- Carrying out Simple field tests for certain parameters.
- Testing at the Laboratories shall be in accordance with IS Bureau of Indian Standards.
- Inspection of CS-Sand production unit to ensure that the unit has the five stage processes established and practiced.

8. Field Tests on Crushed Stone Sand:

Keeping in hand the Crushed Stone Sand taken from a heap and just by visual observation and rubbing it in between fingers, excess presence of quarry dust, flakiness, gradation, texture of crushed stone sand etc., is verified and quality can be ensured based on the experience.

9. Shape Test by Visual Observation

Particles retained on 4.75mm and 2.36 mm can be verified visually for the particle shape. Additionally, an image taken with the help of Mobile camera that has resolution of 8 MP and more can be zoomed to verify the shape.

10. Particle Size Distribution by Sieve Analysis

Sieve Analysis can be carried out at site with the set of sieves as stipulated by BIS to find out the particle size distribution of CS-Sand across various size fractions.

11. Particles less than 75 Micron (Micro fines)

This test is done by "Wet Sieving" CS-Sand sample through 75 micron sieve through which the presence of Micro fines can be measured. Though IS 383:2016 accepts 15% as upper limit for presence of Micro fines, according to Industry experts it is advisable to limit this upper value to 7%.

12. Cube Test for Compressive Strength:

After the use of CS-Sand, to test the compressive strength of concrete, the specimen of required numbers of standard cube of (150 mm x 150 mm x 150 mm) have to be casted and cured in water and tested for 3, 7 and 28 days and test results should comply the stipulated requirements of Bureau Indian Standards.

13. Laboratory Tests on CS-Sand:

CS-Sand should adhere to the highest standards and must undergo the following quality tests

1. Sieve analysis
2. Specific gravity
3. Water absorption
4. Bulk density (loose and compact)
5. Alkali aggregate reaction
6. Soundness
7. Deleterious materials
8. Organic impurities
9. Micro fines content
10. Chloride and Sulphate Content
11. Petro graphical Analysis if Manufacturer does not possess.
12. Tests for Silt and clay

14. List of few labs for conducting test on CS-Sand are furnished below :

- National Test House, Government of India, Taramani, Chennai
- ICOMAT- The IIT incubated lab, Perungudi, Chennai
- Soil Mechanics and Research Lab, PWD, Taramani, Chennai
- Tamilaga Arasu Building Research Station, Taramani, Chennai
- Labs of various Engineering Colleges all over Tamilnadu

15. Plastering:

The specialized CS-Sand of particular gradation (as called Puuchchu Manal) should alone be used for plastering with addition of super plasticiser at the rate of 100ml per bag of cement for better bonding and achieving the required strength of plaster.

16. Caution:

By-products during crushing of rocks are not Crushed Stone Sand. A Crusher Dust (or Quarry Dust) produced from fine screening of quarry crushing cannot be called Crushed Stone Sand.

The fine particles obtained, as by-products during crushing of rocks to produce coarse aggregates (by jaw crusher and/or cone crusher) are known as Quarry Rock Fines / Quarry Dust / Crusher Dust. These by-products are not suitable for concrete or mortar as they contain higher percentage of dusty, flaky particles of un-controlled sizes with high water absorbent property. If the crusher dust is flaky and angular in shape, the workability will be very difficult. There is no plasticity in the concrete and mortar which makes it even difficult for the mason to work, whereas if it is cubical in shape with grounded edge, superior gradation and good plasticity to concrete will be obtained.

17. Crushed Stone Sand (CS-Sand) Manufacturing Process:

- Quarrying Good Stones
- Jaw Crushers
- Cone Crushers
- Vertical Shaft Impactor
- Screening
- Washing
- Crushed Stone Sand

18. Vertical Shaft Impact (VSI) Crusher:

This involves an important stage of using Tertiary crusher called Vertical Shaft Impact (VSI) Crusher which carries out a combined process of reducing coarser particles into finer particles and shaping the fine particles by removing the flaky and weak edges

19. Conclusion:

Adhering to the above mentioned technical aspects and based on various studies conducted by Industry experts and also examination made by TNPWD, Use of Good quality Crushed stone Sand with distinctive properties, manufactured following the above mentioned processes can be permitted in PWD for construction works as alternate material to River Sand

Further it is informed that, Good Quality C.S-Sand provides greater durability and required strength to concrete by overcoming deficiencies like segregation, honey combing, voids and capillary action

Hence, through this circular memorandum, it is instructed that all the officials of PWD are requested to use CS-Sand in construction activities as alternate to River Sand without any reluctance by adhering to all the above instructions

FOR CONTRACTORS SPECIAL ATTENTION

1. Clean **M Sand** shall be used in all cases.
2. Only clean fresh water shall be used on the work. The Contractor shall make his own arrangements for water and shall meet all charges there for. The special attention of the contractor is drawn to clause 36 of General conditions of contract regarding water and lighting.
3. The broken stone for concrete and RCC work should be of granite and passed by the Superintending Engineer i/c.
4. All iron work or steel work of every kind except such as to be embedded in concrete shall immediately on arrival at the site be properly scrapped and wire brushed and given a priming coat of approved lead painting without claim for extra.
5. The iron hold fasts shall be built up in walls with cement mortar 1:3 for that portion of fixing at the time of construction of walls. No extra claim shall be due for the same wherever hold fasts are to be provided to 9" thick walls. Those should be fixed with cement concrete 1: 3 : 6 using 20 mm gauge broken granite stone jelly for proper anchorage and proper binding. No separate rate for such pockets of concrete filling at holdfast points will be allowed and this will be measured as masonry along with adjacent masonry.
6. The teakwood shall be of best Indian teakwood only and shall be subject to inspection and approval by the Superintending Engineer i/c before use on the work. Country wood where specified shall be of Karimarudu or Kongu for scantling and Aiyini for planks as may be specified and approved by the Superintending Engineer i/c.
7. Holes for electric wiring, water supply and drainage etc. shall be provided as directed during progress of work without any claim for extra.
8. The work will be carried out without hindrance to the adjoining building and the contractor will be responsible for any damages, caused to the existing fixtures electric fittings etc., in the course of execution and the contractor shall make good any damage without any claim for extra.
9. Concrete Works: All exposed concrete surface will be required to be finished by cement plaster as detailed in Schedule 'A'
10. Plastering: All external corners, edges of beams, edges of doors and window openings etc, shall be finished sharp using richer mortar and also finished truly vertical or horizontal as the case may be. The rate for plastering shall include the cost of finishing as above and no separate extra for the corners, edges, beams, etc, shall be paid.
11. If rates are not separately called for, for similar items of works in different floors, the contractor should note that one rate is applicable for all floors indicated in the detailed plans. Any claim for extra for such items, floor war will not be entertained under any circumstances.
12. The Superintending Engineer i/c reserves the right, to split up the work and entrust the main work, internal water supply and sanitary arrangements to different contractors without assigning any reason therefore.
13. The projection if any to the masonry will be measured under the relevant items and no extra will be paid for finishing the same.

Signature of the
Contractor/Tenderer

Superintending Engineer i/c
TANSIDCO, Chennai-32

14. The arrangement of M.S. rods for all RCC works shall be in accordance with the working drawing supplied.
15. i) The planks for forms and centering for RCC works shall be of well seasoned timber approved by the Superintending Engineer i/c according to TNBP. They must be made smooth and perfectly level at top so as to give smooth and even finish to the RC ceilings. Alternatively, the contractor may use steel sheets over wooden forms provided the required finish to the underside of the slab is obtained. Mango planks shall not be used under any circumstances. Centering and form work shall be provided to the extent and area ordered by the Superintending Engineer i/c during execution.
- ii) Payments for centering works for all RCC items shall be made only after the concrete is laid, even though separate items for centering works are included in the schedule.
- iii) All cement concrete for RC works shall be machine mixed and vibrated.
- iv) All lime mortar shall be ground in mortar well as per TNBP.
16. No royalty shall be charged where due for materials quarried from the Public Works Department or District Board or other Government quarries. Necessary assistance will be given to the contractor by SIDCO to obtain access to quarries approved by Superintending Engineer i/c. No plot rent shall be charged for materials stacked on SIDCO land during the course of construction provided all such materials are removed within a month after the work is completed.
17. Royalty or charges due for use of private quarries and private land shall be paid by the contractor.
18. The contractor shall form his own approach road to the work site for which no extra will be due to him. On completion of work, the contractor shall not be permitted to remove the materials laid for formation road. If the contractor is allowed to use the existing roads, he shall maintain them in good condition at his own cost throughout the period of the contract.
19. Any surplus material remaining at the site, will not generally be taken over by SIDCO whether before or after the completion or determination of contract. Such materials either which were originally produced by the contractors or were issued to them by SIDCO and charged to their accounts, are the property of the contractors and can however be taken over by SIDCO if required, for use on other works which are in progress only by special arrangements and at the prevailing market rates viz, the rates at which the articles of a similar description can be procured at a given time at the stores, godown from Public Market suitable to the division for obtaining supply thereof.

If the materials were originally used by SIDCO, the price allowed to the Contractor on re-acquisition shall not exceed the amount charged to the contractor excluding the element of storage Charge at 5% on the cost of the material. The surplus materials which were originally issued to the contractor by SIDCO for use on the work shall not be removed from the site of work without getting the written permission of the Superintending Engineer i/c.
20. The contractor's special attention is invited to clause 35 and 36 of the General condition to contract of T.N.B.P. and he is requested to provided at his own expenses, shed, latrine and urinal for his workman.

Signature of the
Contractor/Tenderer

Superintending Engineer i/c
TANSIDCO, Chennai-32

21. If night work is required to fulfill the agreed rate of progress, all arrangements shall be made by the contractors inclusive of lighting without any claim for extra.
22. The contractor shall not employ the labour below the age of **14 years** and shall also note that he must offer employment to ex-servicemen, Ex-toddy tappers and unemployed agricultural laborers as far as possible.
23. Any of the items in the schedule may be committed or radically altered. No variations in rate shall become payable to contractors on account of such omissions or variations in quantities.
24. The construction of the building will be deemed to be complete only if all the items of works including finishing items contemplated herein are executed.
25. The contractor shall abide by the contractor's labour regulation of the PW framed by the Tamil Nadu Government.
26. The contractor shall at his own expense provide arrangements for the provisions of footwear for any labour doing cement mixing work and all other similar type of work involving the use of tar, mortar etc., to the satisfaction of the Engineer-in-charge and on his failure to do so, SIDCO shall be entitled to provide same and rec'over the cost from the contractor.
27. When there are complaints of nonpayment of wages to the labour, bills of the contractor may be withheld pending a clearance certificate from the Labour Department.

RULES OF THE PROVISIONS OF HEALTH AND SANITARY ARRANGEMENTS FOR WORKERS EMPLOYED BY SIDCO AND ITS CONTRACTORS

The contractor's special attention is invited to clause 35,36,37 and 48 of the General Conditions of contract and he is requested to provide at his own expense, the following amenities to the satisfaction of the Superintending Engineer i/c.

1. First Aid:

At the work site, there shall be maintained in readily accessible place, first aid appliances and medicines including adequate supply of sterilised cotton wool. The appliances shall be kept in a good order. They shall be placed under the charge of a responsible person who shall be readily available during working hours.

2. Drinking Water:

- a) Water of good quality fit for drinking purpose shall be provided for the work people on a scale of not less than three gallon per head per day.
- b) Where drinking water is obtained from an intermittent public water supply, each work place shall be provided with storage tank where such drinking water shall be stored.
- c) Every water supply and storage shall be at a distance not less than 15 m from any latrine drain or other existing well which is within such proximity of latrine, drain or any other source of pollution, the well shall be properly closed if water is drawn from it for drinking. All such wells shall be entirely closed and be provided with a trap door which shall be dust and water proof.

3. Washing and Bathing Places:

Adequate washing and bathing places shall be provided separately for men and women. Such places shall be kept in clear and drained condition bathing or washing should not be allowed in or near the drinking water well.

4. Latrines and Urinals:

These shall be provided within the premises of every work place, latrines and urinals in an accessible place and the accommodations separately for each of them, shall be on the following scale or on the scale so directed by the Superintending Engineer i/c in any particular case.

- | | | |
|------|--|-----------|
| i) | Where the number of persons employed does not exceed 50 - | 2 seats |
| ii) | Where the number of persons employed exceed 50 but does not exceed 100 | - 3 seats |
| iii) | For every additional 100 persons | - 3 seats |

If women are employed, separate latrines and urinals screened from those for men shall be provided on the same scale. Except in work places provided with water flushed latrines connected with a water borne sewage system, all latrines shall be provided with acceptable dry earth system which will be cleared atleast four times daily and atleast twice during working hours and kept in a strictly sanitary condition. The Latrine and Urinals shall be tarred inside atleast once a year.

The excrete from the latrines shall be disposed off at the contractor's expenses, in outside pits approved by the Local Public Health Authority. The contractor shall also employ adequate number of scavengers, conservancy staff to keep the latrines and urinals in clean condition.

5. Shelters During Rest:

At the work site, there shall be provided at free of cost, two suitable sheds one for meals and another for rest for the use of labourers.

6. Creches:

At every work place at which 25 or more women are working there shall be provided two huts of suitable size for the use of children under the age of 6 years belonging to such women. One hut shall be used for infants, games and play and the other as their bed, room. The huts shall not be constructed on a lower standard than the following.

- i. Thatched roofs.
- ii. Mud floors and walls.
- iii. Planks spread over the mud floor and covered with matting.

The size of the crèche or crèches should vary according to the number of women workers. The crèches should be properly maintained and necessary equipment like toys etc, should be provided and huts shall be provided with suitable and sufficient sweepers to keep the place clean. There shall be two ayahs in attendance. Sanitary utensils shall be provided to the satisfaction of the Health Officer of the area concerned. The number of the huts shall be restricted to children, their attendants and attendants of the children.

7. Canteen:

A cooked food canteen on a moderate scale shall be provided for benefits of the workers if it is considered expedient.

8. Ambulance facility:

Where large work places are situated in cities, towns or their suburbs and no beds are considered necessary owing to the proximity of city or town hospitals suitable transport shall be provided to facilitate removal of urgency cases to these hospitals. At other work places some conveyance facilities such as a car shall be kept readily available to take injured person or persons suddenly taken seriously ill, to the nearest hospitals.

9. Sheds for workmen:

The contractor should provide at his own expense, shed for housing the workmen. The sheds shall be on a standard not less than the cheap shelter type to live in which the work pertaining to locality are accustomed to. A floor area of about 6' x 5' for 2 persons shall be provided. The sheds are to be in row with 5' clear space between sheds and 80' clear space between row if conditions permit. The work people's camp shall be laid out in units of 400 persons each. Each unit to have clear space of 48' around.

**Safety provision in the building industry - conditions in addition to clause 34 of
General conditions of contract**

Scaffoldings:

1. Suitable scaffolds shall be provided for workmen for all work that cannot be safely done from a ladder or by other means.
2. A scaffold shall not be constructed, taken down or subsequently altered except.
 - a) under the supervision of a competent and responsible person and
 - b) by competent workers possessing adequate experience in this kind of work.
3. Scaffolds shall be so constructed that no part thereof can be displaced in consequence of normal use.
4. Scaffolds shall not be over loaded so far as practicable and shall be evenly distributed.
5. Before installing lifting gear on scaffolds special precautions shall be taken to ensure the strength and stability of the scaffolds.
6. Scaffolds shall be periodically inspected by a competent person.
7. Before allowing a scaffold to be used by his workmen every employee shall, satisfy as to whether the scaffold has been erected by his workmen or not he should take steps to ensure that it functions fully with the requirements of this article.

Working Platform, Gangways and Staircase:

1. Working platforms, gangways and staircase shall be so constructed that no part thereof can sag unduly or unequally.
 - a) be so constructed and maintained to obviate from risks of person tripping or slipping and
 - b) be kept free from any unnecessary obstruction.
 - c) Every working platform gangway working place and stair case shall be suitably reinforced.
2.
 - a) Every opening in the floor of a building or in a working platform shall except for the time and to the extent required to allow the excess of persons or the transport or shifting of materials be provided with suitable means to prevent the fall of persons or materials.
 - b) When persons are employed on a roof where there is danger of falling from height exceeding that to be prescribed by national laws or regulations, suitable precautions shall be taken to prevent the fall of persons or materials.
 - c) Suitable precautions shall be taken to prevent persons being struck by articles which might fall from scaffolds or other working places.
3.
 - a) Safe means of access shall be provided to all working platforms and other working places.

- b) Every ladder shall be securely fixed and of such length as to provide secure handhold and foothold at every position at which it is used.
- c) Every place where work is carried on and means of approach there to shall be adequately lighted.
- d) Adequate precautions shall be taken to prevent danger from electrical equipment.
- e) No material on the site shall be so attached or placed as to cause danger to any person.

SAFETY EQUIPMENT AND FIRST AID

1. All necessary personal safety equipment shall be kept available for the use of the persons employed on the site and be maintained in a condition suitable for immediate use.
2. The workers shall be required to use the equipment thus provided and the employer shall take adequate steps to ensure proper use of the equipment by those concerned.
3. When work is carried on in proximity to any place where there is a risk of drawing, all necessary equipment shall be provided and kept ready for use and all necessary steps shall be taken for the prompt rescue of any persons in danger.
4. Adequate provision shall be made for prompt first aid treatment of all injuries likely to be sustained during the course of the work.

GUIDE LINES FOR ADOPTION OF STRENGTH GRADENING OF CONCRETE

Plain and reinforced concrete have been graded according to the cube compressive strength and designated as M 100, M 150, M 200, M 250, M 300, M 350 and M 400. In the designation of concrete the letter "M" refers to the mix and the 'Number' to the specified 28 day work cube compressive strength of that mix expressed in kg. per sq cm.

Approximately the M 100, M 150, M 200, M 250 grades of concrete corresponds to 1 : 3 : 6, 1 : 2 : 4, 1 : 1½ : 3 and 1 : 1 : 2 nominal mixes of ordinary concrete currently used. The National Building code gives necessary specification for strength gradening of concrete, proportionately and works control and the same may be followed the extract of the same is enclosed.

The proportion of aggregates, cement and water to be used for controlled 'Concrete shall be designed by preliminary tests of the materials to be actually used to obtain the specified strength with the use of maximum quantity of cement. However, the maximum total quantity of aggregate by weight per 50 kg. of cement shall not normally exceed 450 kg.

For any particular item compressive strength required to be obtained by the concrete at 28 days in the preliminary and work tests on the 15 cm cubes, minimum cement content required to be used and the approximate proportions on approved fine and coarse aggregates shall be specified in the tender schedule. These particulars will be only for the guidance of the contractor for quoting rates. Immediately upon the receipt of the award of contract, the contractor shall inform the Superintending Engineer i/c the exact location of the sources of the materials which he propose to use and get the materials approved. The mix with the actual approved materials to be used shall be got designed in an approved laboratory by the contractor with minimum quantity of cement to give the specified strength in the preliminary tests and the proportions got approved from the Superintending Engineer i/c in writing. These proportions shall be used so long as the materials continue to be of the same quality and the same sources subject only to slight changes in the relative qualities of fine and coarse aggregate for the purpose of promoting workability, provided the works tests also show the required strengths.

If during the progress of work, the contractor wishes to change the materials, the proportions shall be fixed on the basis of fresh preliminary tests to give the required strength after the Superintending Engineer i/c is satisfied that the materials satisfy the specification. No adjustments of cost shall be made for change of proportions of cement fixed in the original preliminary tests.

Proportioning of Mix:

Each batch of mix shall be proportioned by weight of cement fine aggregate and course aggregate. Water for each batch shall be added in quantity measured by volume or by weight. Where weight of cement determined by accepting the maker weight per bag, reasonable number of bag shall be weighed separately to check the net weight. Where the cement is weighed on the site and not in bags, it shall be weighed separately from the aggregate. All the weighing equipments shall be maintained in a clean and serviceable condition and their accuracy checked periodically.

Mixing:

Mixing shall be done only by mechanical mixers. The quantities of fine aggregate shall be adjusted duly in the field, to compensate for bulkage due to the quantity of moisture present in fine aggregate and free water in the coarse aggregate at the time of use.

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Tests:

Tests shall be done in an approved laboratory, at the cost of the contractor.

A. Preliminary Test:

If concrete mixes are specified by its strength then the mix needs be designed and preliminary test should be carried out.

A preliminary test is conducted in a laboratory on the trial mix of concrete produced in the laboratory with the object of:

- a. Designing a concrete mix before the actual concrete operation starts.
- b. Determining the adjustments required in the designed mix when there is a change in the materials used during the execution of works or.
- c. Verifying the strength of cement mix.

B. Works Tests:

The tests shall be conducted either in the field or in a laboratory on the samples made on the work spot of the concrete used on the works.

The samples shall be spread as evenly as possible throughout the day then wide changes of weather conditions occur during concreting additional sample may be taken as desired by the Superintending Engineer i/c.

All expenses on the tests shall be borne by the contractor. Nothing extra shall be paid to contractor for carrying out the tests.

All samples or tests shall be taken in the presence of the Assistant Engineer concerned and the contractor or his authorised agent.

All mix design and test data and results shall be maintained as part of the record for the contract and shall be signed by the Assistant Superintending Engineer i/c and the contractor.

A register of cement concrete cubes cast and tested giving the following particulars shall be maintained at the site.

1. Name of work and reference to agreement.
2. Serial No.
3. Date and time of sample taken
4. Sample No.
5. No. of cube
6. Identification marks
7. Proportions of mix
8. Description of the portion of work represented by the sample and quantity of concrete represented by the sample.

9. Initials of Assistant Superintending Engineer i/c and contractor's authorised agent in whose presence the sample is taken.
10. Result of 7 day test.
11. Result of 28 day test.
12. Review and remarks by Superintending Engineer i/c.

Extract of :

(NATIONAL BUILDING CODE OF INDIA 1970)

PART VI-SECTION 5A : PLAIN AND REINFORCED CONCRETE :

4.2 Grades of concrete

- 4.2.1** Plain and reinforced concrete shall be in seven grades designed as M100, M150, M200, M250, M300, M350 and M400.

Note: In the designation of a concrete mix, letter 'M' refers to the mix and the number of the specified 28 days works cube compressive strength of that mix expressed in kg/sq/cm.

- 4.2.2.1** Where ordinary Portland cement or Portland blast furnace slag cement conforming to accepted standards VI-5 (2)* is used. The compressive strength requirements for various grades of concrete shall be given in TABLE 1. Where rapid-hardening Portland cement is used, the 28 day compressive strength requirements specified in Table 1 shall be met at 7 days, Where other cements are used, the Engineer-in-charge shall specify the corresponding requirements preferably on the basis of preliminary tests.

* IS 269/1967 - Specification for ordinary, rapid hardening and low heat portland cement.

IS-455/1967 - Specification for portland and blast furnace slag cement.

- 4.2.2.2** The strength requirements specified in Table 1 shall apply to both controlled concrete and ordinary concrete (Sec 4.3.1) Preliminary tests need not, however, be made in the case of ordinary concrete :

- a) In order to get a relatively quicker idea of the quality of concrete, optional works tests on beams for modulus of rupture at 72 ± 2 hours or at 7 days, or compressive strength tests at days may be carried out in addition to 28 compressive strength tests. In all cases the 28 day compressive strength specified in table 1, shall alone be the criterion for acceptance or rejection of the concrete. If however from tests carried out in a particular job over reasonably long period, it has been established to the satisfaction of the Engineer-in-charge that a suitable ratio between the 28 day compressive strength and the modulus of rupture at 72 ± 2 hours or at 7 days or compressive strength at 7 days may be accepted. The Engineer-in-charge may suitably relax the frequency of 28 day compressive strength test specified in Table 5 provided the expected strength values at the specified early age are consistently met. For this purpose the values given in Table 2 may be taken for general guidance in the case of concrete made with ordinary cement.

- b) Where the strength of a concrete mix, as indicated by tests lies between the strengths for any two grades specified in Table 1, such concrete shall be classified for all purposes a concrete belonging to the lower of the two grades between which its strength lies.

4.3 Proportioning and works control :

4.3.1 Methods of proportioning - The determination of the proportions of cement aggregates and water to attain the required strength shall be made by one of the following.

- a) With Preliminary tests by designing the concrete mix. Such concrete shall be called "Controlled Concrete".
- b) Without preliminary test by adopting nominal concrete mixes. Such concrete shall be "Ordinary concrete".

4.3.2 Controlled Concrete :

- 4.3.2.1 As far as practicable, controlled concrete should be used on all concrete works. Controlled concrete for use in plain and reinforced concrete structures shall be in grades M100, M150, M200, M250, M300, M350 and M400.
- 4.3.2.2 The concrete mix shall be designed to have an average strength corresponding to the values specified for preliminary tests in Table 1. The proportions chosen should be such that the concrete is of adequate workability for the conditions prevailing on the work in question, and may be properly compacted with the means available. The maximum total quantity of aggregate by weight per 50 kg of cement shall not exceed 450 kg where otherwise specifically permitted by the Engineering in-charge.
- 4.3.2.3 Except where it can be shown to the satisfaction of the Engineer-in-charge, that supply of properly graded Aggregate of Uniform quality may be maintained over the period of work, the grading of aggregate should be controlled by obtaining the coarse aggregate, in different sizes and blending them in the right proportion when required the different sizes being stacked in separate stack piles. The materials should be stack piled for several hours preferably a day before use. The grading of coarse and fine aggregate should be checked as frequently as possible, the frequency for a given job being determined by the Engineer-in-charge to ensure that the suppliers are maintaining the grading uniform with that of the samples used in the preliminary tests.
- 4.3.2.4 In proportioning concrete, the quantity of both cement and aggregate should be determined by weight. Where the weight of cement is determined by accepting the manufacturer's weight per bag, a reasonable number of bags should be weighed separately to check the net weight. Where the cement is weighed on the site and not in bags it should be weighed separately from the aggregates. Water should be either-measured by volume in calibrated tanks or weighed. All measuring conditions, and their accuracy may be periodically checked.

- 4.3.2.5 It is most important to maintain the water-cement ratio constant at its correct value. To this end, determination of moisture contents. in both fine and coarse aggregates should be made as frequently as possible, the frequency for given job being determined by the Engineer-in-charge according to weather conditions. The amount of the added water should be adjusted to compensate for any observed variations in the moisture contents. The determination of moisture content in the aggregate shall be carried out in accordance with good practice (VI-5-9) IS 2386 Part III-54J1963. To allow for the variation in weight of aggregates due to variation in their moisture content suitable adjustment in the weight of aggregate should also be made.
- 4.3.2.6 No substitution in materials used on the work or alteration in the established proportions except as permitted in 4.3.2.5. shall be made without additional tests to show that the quality and strength of concrete are satisfactory.
- 4.3.2.7 Workability of the concrete should be checked at frequent intervals.. The slump test or where facilities, exist the compacting factor test conducted in accordance with good practice (VI-5(10) may be adopted for this purpose.
- 4.3.2.8 A competent person should be employed whose first duty will be to supervise all stages in the preparation and placing of the concrete. All works test specimen should be made and site tests carried out under his direct supervision.

4.3.3. Ordinary Concrete:

- 4.3.3.1 Where it is considered not practicable to use controlled concrete, ordinary concrete may be used for concrete of grades M100, M150, M200, M250. The proportions of materials for nominal concrete mixes for ordinary concrete shall be in accordance with Table 3.
- 4.3.3.2 In proportioning concrete, the quantity of cement should be determined by weight. The quantities of fine and coarse aggregates may be determined by volume but these should also preferably be determined by weight. In the latter case, the weight should be determined from the volume specified in Table 3 and the weight per litre of dry aggregate. If fine aggregate, is moist and value batching is adopted allowance shall be made for bulking in accordance with good practice (VI-5(9))*
- 4.3.3.3 The water cement ratio shall not be more those specified in Table 3.

The cement of the mix specified in Table 3 for any nominal mix may be increased if the quantity of water in a mix has to be increased to overcome the difficulties of placement and compaction, 'so that the water cement ratio specified in Table 3 is not exceeded.

Note: 1. In the case of vibrated concrete, the limit specified may be, suitably reduced to avoid segregation.

Note: 2 The quantity of water used in the concrete mix for reinforced concrete work should be sufficient, but should not be more than what is sufficient to produce a dense concrete of adequate, workability for the purpose, which will surround and properly grip, all the reinforcement, workability of the concrete should be controlled by maintaining a water cement ratio-that is found to give a concrete which is just sufficiently wet to be placed and compacted without difficulty with the means available.

- 4.3.3.4 Workability of the concrete should be controlled by direct measurement of water content, making allowance for any surface water in the fine and coarse aggregates. The slump test may be conducted in accordance with good practice [VI-5-(10)].
- 4.3.3.5 Allowance should be made for surface water present in the aggregate when computing the water content. Surface water shall be determined by field methods in accordance with good practice (VI-5)(9)* In the absence of exact data, the amount of surface water may be estimated from the values given in Table 4.
- 4.3.3.6. If ordinary concrete made in accordance with the proportions given for a particular grade does not yield the specified strength due to proper qualities of materials not being available, such concrete shall be classified as belonging to the appropriate lower grade.

Ordinary concrete proportioned for a grade given in accordance with table 3 shall not however, be placed in higher grade on the ground that the test strengths are higher than the minimum specified. No interpolation shall be permissible.

4.4. Sample size and acceptance criteria.

4.4.1 All tests shall be carried out in accordance with good practice [VI-5(4)]

4.4.2. The number of test specimens required, the frequency of sampling and the criteria for acceptance of a concrete as conforming to the specified grade shall be in accordance with Table 5 for both ordinary concrete and controlled concrete. No preliminary tests are, however, necessary in the case of ordinary concrete.

ISI 199-1959-Methods of sampling, and analysis of concrete.

*IS 2386 (Part III) 1963 specific gravity, density, voids absorption and bulking-Methods of tests for aggregate for concrete.

*ISIS 23866-Method of test for aggregates for concrete. IS (Part III) 1963-Specific gravity, density, voids absorption and bulking.

IS-51 6-1959-Methods of test for strength of concrete.

TABLE I

STRENGTH REQUIREMENTS OF CONCRETE**(Clauses 4.2.2.1 and 4.2.2.2.)****(All Values in kg/cm²)**Compressive Strength of 15 cm cubes at 28 days after mixing,
conducted in accordance with good practice [VI-5-(4)*]

Grades of Concrete	Preliminary Min	Works Test Min
1.	2.	3.
M 100	135	100
M 150	200	150
M 200	260	200
M 250	320	250
M 300	380	300
M 350	440	350
M 400	500	400

Note 1: **Preliminary Test** : A test conducted in a laboratory on the trial mix* of concrete produced in the laboratory with the object of

- (a) Designing a concrete mix before the actual concreting operation starts.
- (b) Determining the adjustments required in the designed mix when there is a change in the materials used during the execution of work, or.
- (c) Verifying the strength of concrete mix.

Note 2 : **Works Test**: A test conducted either in the field or in laboratory on the specimens made on the works, out of the concrete being used on the works.

Note 3 : **Size of Cubes**: In the working test, with the approval of the Engineer-in charge 10 cm cubes may be used in place of 15 cm cubes provided the maximum nominal size of aggregate does not exceed 20 mm. Even the use of 15 cm cubes should normally be restricted to concretes having maximum normal size of aggregate not exceeding 40 mm. Where concrete with aggregates larger than 40 mm size is required to be tested, the size of cubes should be specified by the Engineer-in-charge, keeping in view that generally the length of side of the cube should be about four times the maximum nominal size of aggregate in the concrete constituting the cube specimen.

Note 4 : **Strength in Relation to size of the Cube** : Where 10 cms cubes are used the values obtained from tests on 10 cm cubes shall be reduced to the extent established by comparative preliminary tests with 10 and 15 cm cubes, or in the absence of such comparative tests, by 10 percent of the value determined from the tests, in order to give the equivalent strength for 15 cm cubes larger than 15 cm are adopted, generally no modification is necessary unless otherwise specified by the Engineer-in-charge.

* IS 516-1959-Methods of test for strength of concrete.

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Note 5 : Cylinder Strength - Compressive strength test may, with the approval of the Engineer-in-charge, be conducted on 15 cm diameter and 30 cm high cylinders in accordance with good practice [V15(4)*] instead of one cube, where cylinder strength figures are adopted, the compressive strength figures given above shall be modified according to the formula. Minimum cylinder compressive strength requires, 0.8 compressive strength specified for 15 cm cubes.

The Central Road Research Institute, New Delhi has carried out tests with a view of establishing a relation between water-cement ratio and the compressive strength of concrete using ordinary Portland cements manufactured in the country conforming to accepted standards [VI-5-(2)].

As a result of these, it has been considered advisable to give graphs showing the relationship between the compressive strength of concrete mixes with different water cement ratios and the 7 day compressive strength of cement tested in accordance with good practice [VI-5-(2)]. These graphs have been given in Appendix-A as they would be of some assistance in obtaining the water cement ratio for trial mixes of concrete.

TABLE 2

OPTIONAL WORKS TEST REQUIREMENTS OF CONCRETE
(Clause 4.2.2.2. (a))
(All Values in kg/cm²)

All tests shall be conducted in accordance with good practice [VI-5-(4)*]

Grade of Concrete	Compressive strength on 15 cm cubes Min. 7 days	Modulus scripture by beams test in	
		At 72± Hours	At 7 days
1.	2.	3.	4.
M 100	70	12	17
M 150	100	15	21
M 200	135	17	24
M 250	170	19	27
M 300	200	21	30
M 350	235	23	32
M 400	270	25	34

Note : Notes 3 to 5 under Table 1 are also applicable to this table.

*LS 510-1959- Methods of test for strength of concrete.

*LS 261-1967- Specification for ordinary, rapid hardening and low heat portland cement.

TABLE 3

CONCRETE MIX PROPORTIONS
(Clause 4.3.3.)
Ordinary concrete

Grade of Concrete	Total quantity of dry aggregates by volume per 50 Kg. of cement to be taken as the sum of the individual volumes of fine and coarse aggregates	Proportion of fine aggregate to coarse aggregate	Quantity of water per 50 kg. of cement Max.
1.	2	3.	4.
M 100	Max. Litres 300	- Generally 1:2 for fine aggregate to coarse aggregate by volume but subject to an upper limit of 1:1½ and a lower limit of 1:3*	Litres 3
M 150	220		32
M 200	160	-	30
M 250	100	-	27

Note : It may be noted for general guidance that M 100, M 150, M 200, and M 250 of ordinary concrete correspond approximately to 1:3:6, 1:2:4, 1:1½:3 and 1:1:2 nominal mixes of ordinary concrete currently used in the country.

* The proportions of the aggregates should be adjusted from upper limit to lower limit progressively as the grading of the fine aggregates become finer and the maximum size of coarse aggregate becomes larger. Example, For an average grading of the aggregate that is, Zone II in accordance with good practice [VI-5-(1)] the proportion shall be 1:1½, 1 : 2 and 1:3 for maximum size of aggregate 10 mm, 20 mm and 30 mm respectively.

TABLE 4

SURFACE WATER CARRIED BY AVERAGED AGGREGATE

Aggregate (1)	Approximate quantity of surface water (2) 1 m ³
Very wet and	120
Moderate wet sand	80
Moist and	40
* Moist gravel or crushed work 20 to 40	40

* Coarse aggregate, less the water it will carry

IS 383-1963 Specification for coarse and fine aggregates for natural sources for concrete.

LS. 516-1959 Specification for natural and manufactured aggregates for use in mass concrete.

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ACCEPTANCE, CRITERIA FOR CONCRETE (ALL GRADES)

PRELIMINARY TEST				WORK TEST						
Minimum No. of Specimens from each Batch (Cubes)		Minimum frequency	Criteria for acceptance	Minimum No. of specimens taken from the same day's works			Beam	Minimum frequency		Criteria for acceptance
7 day compressive strength test as an optional test if desired	28 day compressive Strength test			7 day compressive Strength test as an optional test if desired	28 day compressive Strength test	72+2 hours test as an optional test, if desired	7 day test as an optional test, if desired	In terms of the quantity of concrete	In terms of period	
1	2	3	4	5	6	7	8	9	10	11
5	5	For each batch with a minimum of three batches	Accept if average compressive strength of the specimens tested is not less than the compressive strength specified in Table (For optional tests, see Table 2) subject to the condition that only one out of five consecutive tests may give a value less than specified strength	3	3	3	3	For every 150 m ² of concrete or part thereof	At such intervals as: the Engineer-in-charge may decide However, in the case of controlled concrete, samples shall be drawn on each day for the first 4 days of concreting and there after atleast once in 7 days of concreting	Accept of Average strength of the specimens tested is not less than the strength specified in table 1 (for optional tests see table 2) Subjects to the condition that only one out of 3 consecutive tests may give a value less than the specified strength but this shall not be less than 90% of specified strength.

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1	2	3	4	5	6	7	8	9	10	11
	10	For each batch with a minimum of three batches	Accept if average compressive strength of the specimens tested is not less than the compressive strength specified in Table 1 subject to the condition that the average compressive strength shall be more than the specified compressive strength in Table 1 by at least the value of standard deviation of the series of test	5	5	5	5	For every 150 m ² of concrete or part thereof	At such intervals as: the Engineer-in-charge may decide. However, in the case of controlled concrete, samples shall be drawn on each day for the first 4 days of concreting and thereafter at least once in 7 days of concreting	Accept if Average strength of the specimens tested is not less than the strength specified in Table 1 (for optional tests see Table 2) Subject to the condition that only one out of 5 consecutive tests may give a value less than the specified strength.

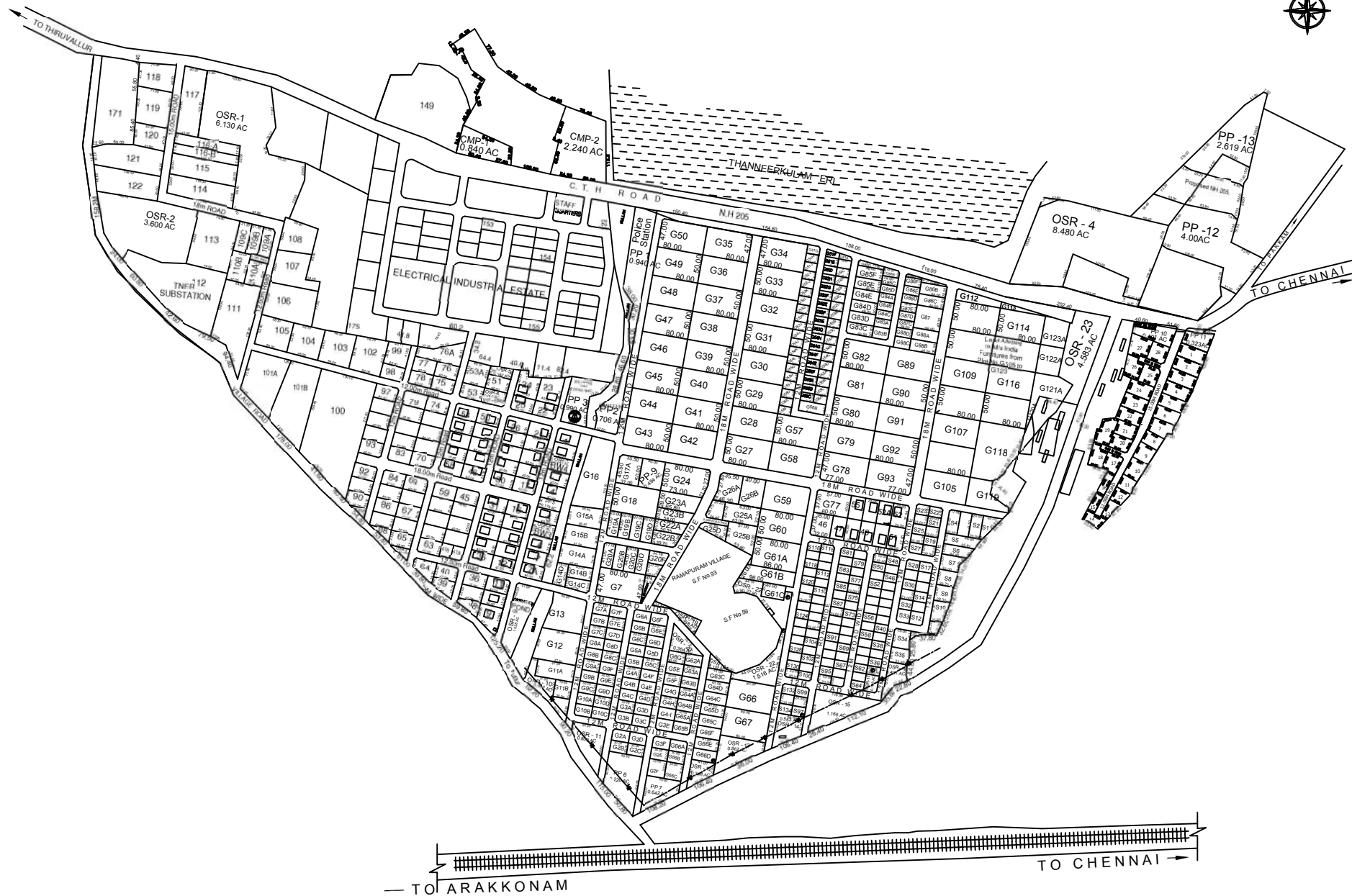
Standard deviation

$$\sqrt{\frac{\sum d^2}{n-1}}$$

When d = individual deviation from one average and n-number of specimens tested.

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CONTRACTOR

SUPERINTENDING ENGINEER i/c