

**TAMILNADU WATER SUPPLY AND DRIANAGE BOARD  
PERCENTAGE TENDER SYSTEM  
TENDER DOCUMENTS  
FOR RWS WORKS ON TURNKEY BASIS**

1. Tender Notice No. : T.N.No. 39 /F.MGR NAGAR /JDO2/ 2010/  
Dt. : 30.07.2010
2. Name of Work : CWSS to MGR NAGAR & 3 other Habitations in Narasingapuram and Mukundarayapuram Panchayat in Walaja Union , (1.MGR Nagar, 2.Malaimedu East of Narasingapuram Panchayat and 3) Malaimedu East ,4) Malaimedu West in Muguntharayapuram Panchayat ) , Vellore District. Construction of Pump Room 2 Nos ,,Erection of Submersible Pumpset , -2 Nos Connecting Main, including Anchorage Arrangements ,Pumping main and allied Civil works etc complete., under Turnkey system including Maintenance of the Schemes for TWO Months.
3. Eligible class of contractor ;Class III & above Contractor registered in TWAD Board / any other State or Central Govt. / Dept. / Undertakings.
4. Amount of EMD : Rs. \_20,000/- in favour of Executive Engineer, TWAD Board, RWS Division, Vellore.6.
5. Last Date for submission of tender : Upto 3.00 PM on .17.08.2010.
6. Date & time opening of tender : 3.30 PM on 17.08.2010
7. Tender should be valid for 90 days :From the date of opening tender

Receipt & Date

Issued to Thiru.

**CONTRACTOR**

**EXECUTIVE ENGINEER**

## **LETTER OF CONSENT**

I agree to abide by all the detailed specifications, terms and conditions stipulated in the TWAD Board manual for Rural Water Supply Scheme – which I have read and understood.

**Signature of Contractor**

**CONTRACTOR**

**EXECUTIVE ENGINEER**

**TAMILNADU WATER SUPPLY AND DRAINAGE BOARD**

**LETTER OF TENDER**

**Date :**

To

The Executive Engineer, TWAD Board,  
RWS Division, Vellore.

Sir,

1. I / We do hereby tender and if this tender be accepted undertake to execute the works covered by this tender as shown in the drawing and described in the specifications deposited in the office of the Executive Engineer, R.W.S. Division, TWAD Board, Vellore with such variations by way of alterations or additions to and omission from the said works and in accordance with the Detailed standard specifications and General conditions of Contract stipulated in the TWAD Board Manual for Rural Water Supply Scheme at \_\_\_\_\_ % Excess / Less over the departmental value of Rs. \_\_\_\_\_ (Rupees \_\_\_\_\_) of such other sum as may be arrived at under the clause of the contract terms and conditions of TWAD Board relating to payment by final measurements at unit prices.
2. I // We have also quoted the tender Excess / Less percentage in the Bill of quantities (Abstract of BOQ 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 of the contract.
3. I / We do hereby distinctly and expressly declare and acknowledge that before the submission of my / our tender . I / We have carefully followed the instruction, in the tender and have read, the Tamil Nadu Building practice, the general conditions to contract therein and the TWAD Board Manual for Rural Water Supply Schemes that I / we have made such examination of the contract documents and of the plan, 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 under stand the intention of same and the requirements, covenants, stipulations and restrictions contained in the contract and the said plans and specifications and distinctly agree that I / We will not thereafter make any claim or demand upon the TWAD Board upon or arising out of any alleged misunderstanding or misconception of mistake on my / our own part of the said requirements, covenants, stipulations, restrictions and conditions.
4. I / We enclose an Income Tax Verification Certificate and Sales Tax clearance certificate.
5. \*\*\*\*\* a. I / We enclose \_\_\_\_\_ the sum of Rs. \_\_\_\_\_ (Rupees \_\_\_\_\_) in the form of \_\_\_\_\_ as prescribed in the Tender Notice towards Bid Security (Earnest Money Deposit) which will no carry any interest.

**CONTRACTOR**

**EXECUTIVE ENGINEER**

\*\*\*\*\* b. I / We hereby enclose the proof of authority vide payment of Bid Security \_\_\_\_\_ exempting me / us from the payment of Bid security :-

Note : \*\* to be scored out if not applicable

6. If my / our tender is not accepted, the Bid security shall be returned to me / us on my / our application when intimation is sent to me / us of rejection. If my / our tender is accepted I we do hereby agree to produce the Performance Security (security Deposit) in the manner and form prescribed under clause 23 of the instructions to the bidders for the due fulfillment of contract. If upon intimation being given to me / us by the tender accepting authority of acceptance of tender I / We fail to make the Performance security in the prescribed form, then, I / We agree to the forfeiture of the Bid security. Any notice, required to be served on me / us by post to (Registered or ordinary) or left at my / our address given herein, such notice shall, if send by post be deemed to have been served on me / us at the time when in due course or 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 TWAD Board represented by the officer accepting agreement and TWAD Board Manual for Rural Water Supply Schemes – Detailed standard Specifications and General conditions of contract and the Tender documents issued by the Board, i.e. Tender Notice, Tender with schedules, General conditions to the contract and special conditions of the tender, negotiation letters, 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 of the tender notice, provided that, it will be open to the acceptance authority to insist on execution of any written agreement by tenderer, if administratively considered necessary or expedient.

8. I / We have also carefully examined the TWAD Board Manual for Rural Water Supply Schemes – Detailed Standard specification and General conditions of Contract and Tamilnadu Building practice in acknowledgement of being bound by all conditions of the clauses of the TWAD Board Manual for Rural Water Supply Schemes – Detailed standard specifications and General conditions of contract and all specifications for items of works described by specification number in Bill of Quantities (Schedule-A).

9. In consideration of the payment of Rs. \_\_\_\_\_ (Rs. \_\_\_\_\_) or such other sum as may be arrived at under the clause of the General conditions to the contract relating to payment by final measurement at unit prices /. I / We agree subject to said conditions to executive and complete the works shown upon the said drawing serially from No. 1 to \_\_\_\_\_ Inclusive (Schedule B) and described in the Technical specification for works and materials and to the extent of probable quantities shown (Schedule-A) with such variations by way of addition to or alteration, deductions from the said works and method of payment there after as are provided in the said conditions.

10. I / We agree that time shall be considered as the essence of this contract and commence the works as soon as this tender is accepted by the competent authority and to show progress as defined in the tabular statement (Schedule-C) "Rate of Progress:" subject nevertheless to the provisions for extension of time contained in clause 55 of the General conditions to the contract.

**CONTRACTOR**

**EXECUTIVE ENGINEER**

11. I / We agree that upon the terms and conditions of this contract being fulfilled and performed to the satisfaction of the Executive Engineer, the security deposited by me / us herein before recited or such portion thereof as I/ We may be entitled to under the said conditions be paid back to me / us provided in clause 8 of the Special conditions of contract.

12. The term Executive Engineer in the said condition shall mean the Executive Engineer, TWAD Board in charge of the Division having jurisdiction for the time being over the work, who shall be competent to exercise all the powers and privileges reserved herein favour of the TWAD Board who has been duly authorised by the TWAD Board.

13. I am / We are professionally qualified and my / our qualifications are follows \_\_\_\_\_

I / We in pursuance of Schedule E 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 work as may require special attention.

e.g Reinforced Cement concrete etc.,

Sl. No.	Name of Technical Staff proposed to be employed	Qualification	Experience
1.			
2.			

14. I / We agree in the event of any dispute arising between the parties hereto in respect of any of the matter comprised in this contract, the same shall be settled by a competent court having jurisdiction, over the place where the contract is awarded and agreement is concluded and by no other court.

15. I / We undertake to assume full responsibility for the stability and soundness of the works / structures that will executed by me / us as per this contract.

16. I / We undertake and agree that I / We not withdraw this tender during the period of validity of my / our tender as indicated in my / our tender and also during such extended period as agreed to by me / us such period to date from the last date by which tenders are due to be submitted and if / we do so withdraw. I / we agree to forfeit the Bid Security to the TWAD Board.

**CONTRACTOR**

**EXECUTIVE ENGINEER**

17. I / We understand that the Board is not bound to accept the lowest or any tender the Board may receive. Dated this \_\_\_\_\_  
Day of \_\_\_\_\_

Signature of the Tenderer Address

**CONTRACTOR**

**EXECUTIVE ENGINEER**

**CONTRACTOR**

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**EXECUTIVE ENGINEER**

## **INSTRUCTION OF BIDDERS**

### **1. Description of works**

Execution of turnkey basis, commissioning and maintenance of providing Water supply to .....

2. The tendered is required to examine carefully all instructions, conditions, forms, terms, specifications and drawing in the tender documents and in the TWAD Board Manual for Rural I Water Supply Schemes – Detailed Standard Specifications and General Conditions of Contract. Failure to comply with the requirements of bid will be at tenders own risk. Tenders which are not responsive to the requirements of the tender documents are liable to be rejected.

### **3. Qualification Criteria.**

The Bidder should have registered as class II & ABOVE\_ Contractor in TWAD Board / Any other State / Central Government Department / Undertaking. The Bidder who is not registered in the TWAD Board should get Registered his name in the appropriate class of registration before conclusion of Agreement in the event of his tender is accepted.

### **4. Method of Tendering.**

If the tender is made by an individual, the tender documents shall be signed by the individual with his name and address.

If the tender is made by a registered firm, it shall be signed by the Managing Partner with his name of the firm and address.

If the tender 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 tender in which case a certified copy of the power of attorney shall accompany the tender. Such limited company or corporation may be required to furnish satisfactory evidence of its existence before the contract is awarded.

5. The bids from the contractors / firms shall be accompanied by an attested copy of the valid Income Tax Clearance Certificate and latest Sales Tax verification Certificate. If the firm / Contractor is not liable to the Sales Tax Department, the firm / Contractor is not liable to the Sales Tax Department , the firm / contractor should produce a valid certificate issued by the competent authority to this effect.

6. The Bidder is expected to examine carefully all instruction, conditions, forms, Terms, specifications and drawing in the bidding documents. Failure to comply with the requirements of bid submission will be at bidder's own risk. Bids which are not substantively responsive to the requirements of bid submission will be at bidder's own risk. Bids which are not substantively responsive to the requirements of the bidding documents are liable to be rejected.

### **7, Amendment of Bidding Documents.**

At any time prior to the deadline for submission of bids, the Employer may, for any reason, whether at his own initiative or response to a clarification requested by a prospective bidder, modify the bidding documents by the issuance of an Addendum / Corrigendum.

The Addendum / Corrigendum will be sent in writing or by cable to all prospective bidders who have purchased the bidding documents and will be binding upon them. Prospective bidders shall prompt acknowledge the receipt of the communication thereof the Employer.

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In order to afford prospective bidders reasonable time in which to taken an addendum / corrigendum into account in preparing their bids, the Employer may at his discretion, extend the deadline for the submission of the bids.

#### **8. Language of Bid.**

The Bid prepared by the bidder and all correspondence and documents relating to the bid exchanged the bidder and the employer shall be written in English / Tamil Language.

#### **9. Document Comprising the Bid.**

The bid to be prepared by the bidder shall comprise the entire documents in full, say the Tender documents and Appendix there to the Bid security, the Bill of quantities and the rates thereof, the schedules of supplementary information, the information on eligibility criteria supported by relevant documentary evidence and any other material required to be completed and submitted in accordance with the instructions of Bidders embodies in these bidding documents. The forms, Bill of quantities and Schedules shall be used without exception subject to extension of the Schedules in the same format.

#### **10. Prices**

The price offered by the contractor shall remain firm for the entire project period and no variation in price shall be allowed on any cost.

#### **11. Bid Validity**

The bids shall remain valid and open for acceptance for a period of 90 days after the date of opening of the bids. In exceptional circumstance prior to expiry of the original validity period, the employer request the bidder for a specified extension of the period of validity. The request and responses thereto shall be made in writing or by cable. A bidder may refuse the request without forfeiting his bid security. The bidder agreeing to the request will not be required not permitted to modify his bid but will be required to extend the validity of his bid security accordingly. The provisions regarding discharge and forfeiture of bid security shall continue to apply during the extended period of bid validity.

#### **12. Bid Security (Earnest Money Deposit)**

The bidder shall furnish as part of his bid, the Bid Security (Earnest Money Deposit) of Rs.20000 (Rupees Twenty Thousand Only ) in any one of the following forms duly pledged or drawing in favour of the Executive Engineer, TWAD Board, RWS Division, Vellore.

- (1) Demand draft drawn in a Nationalised Bank in favour of the Executive Engineer concerned.
- (2) Deposits at call receipt of scheduled banks pledged in favour of the Executive Engineer concerned.
- (3) Government Security and National Savings Certificate pledged in favour of the Executive Engineer concerned (purchased within the State of Tamilnadu).
- (4) Post office savings Bank Deposits pledged in favour of the Executive Engineer concerned (purchased within the State of Tamilnadu).
- (5) Fixed deposit receipts from Scheduled Bank pledged in favour of the Executive Engineer concerned.

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Any bid not accompanied by an acceptable form of Bid security will be rejected by the Engineers as non responsive.

The Bid Security of unsuccessful bidders will be returned without any interest within 1 days after a decision is taken on the tender.

#### **Signing of Bids.**

The original bid shall be filled by typing or by writing in indelible ink and shall be signed by the authorised signatory to bind the bidder to the contract. Proof of authorisation shall be furnished in the form of power of Attorney duly signed, executed and this should accompany the bid. All pages of the bid shall be signed and wherever entries or amendments as directed by the employer are made, they should be properly attested by the signatory to the bid.

The completed bid shall be free of alterations, interlineations or erasures except those that were instructed to be carried out by the Employer. In case, necessity arose to correct the errors committed by the bidder, in the abstract of BOQ the same shall be properly attested by the signatory to the Bid.

Each bidder is entitled to submit only one bid. No bidder will have the option of participating more than one bid for this contract.

#### **14. Deadline for submission of Bids.**

The tender shall be received by the Executive Engineer, at his office RWS Division, Vellore not later than 3 P.M on 07.11.2008. The Engineer may, at his discretion, extend the deadline for submission of bids by issuing an amendment in accordance with clause 7 above, in which case all rights and obligations of the Engineer and the Bidders previously subject to the original deadline shall thereafter be subject to the new deadline as extended.

#### **15. Mode of submission of Bid Documents.**

The Bid documents are to be dropped in the Tender Box or sent by registered mail in the following address before the expiry of the deadline fixed for submission of bid documents. The Executive Engineer, TWAD Board, RWS Division, Vellore TWAD Board, under no circumstances shall be responsible for the delay or loss or damage to the Bid documents in transit.

#### **16. Late Bids.**

Any bids received by the Executive Engineer, after the deadline for submission of bids prescribed in accordance with clause 14 above will not be considered and the same will be returned to the Bidder unopened.

#### **17. Bid opening**

The tender will be opened by the Executive Engineer at 3.30 P.M on 07.11.2008 in the premises of the office of the Executive Engineer, RWS Division, Vellore the bidders or their authorised representative desirous of attending opening of the bids may do so with proper authorisation to represent.

The Engineer will examine the bids to determine whether the documents are complete, whether the requisite Bid Security has been remitted to the required value and in the manner prescribed whether the documents have been properly signed / attested and ascertained whether the bids are generally in order.

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During the opening of bids, the Engineer will announce the names of the bidders, written notification of bid modifications if any, the compliance with reference to their remittance of Bid Security and such other details as the Employer may consider appropriate.

**18. Clarification of Bids.**

For any clarifications in the bid and for negotiations the bidder shall attend the office of the Executive Engineer, TWAD Board, RWS Division, Vellore whenever he is called upon to do so.

**19. Responsiveness of the Bids.**

The bids shall be treated as substantively responsive based on the satisfaction of the required capacity, capability and financial resources. For this purpose, the bid should conform to all terms, conditions and specification of the bidding documents without materials deviation or reservation.

The Executive Engineer reserves the right to determine and evaluate the bids with regard to their response substantively.

If a bid in the opinion of the Executive Engineer is found to be substantially not responsive, the Executive Engineer reserves the right to reject that bid any may not subsequently be made responsive by the bidder by carrying out correction or with drawal of the non-conforming deviation or reservation. However, the decision of the employer shall be final and binding in all these matters.

**20. Evaluation and Comparison of Bids.**

The Executive Engineer will evaluate and compare only the bids which are determined to be substantively responsive with reference to the requirements and parameters fixed for qualification. The value based on the excess / less percentage quoted in the bid will only be taken into account for deciding the successful bidder.

**21. Right to Accept or Reject the Bids.**

The Executive Engineer reserves the right to accept or reject any or all the bids without assigning any reasons therefor. Under such circumstances, the Engineer will neither be under any obligation to inform the bidder or the bidders of the grounds for the action of the Engineer not will be responsible for any liability incurred by the bidder on this account.

**22. Notification of Award.**

The Engineer will promptly inform the successful bidder of the contract before the expiry of the validity period and in the case of extended periods, before the expiry of the extended periods. The award of contract will be in writing and in the event of award of contract being informed through cable, the same shall be confirmed through a written communication by the Engineer. The award of contract shall be in the form of work order and shall notify the total value at which the Engineer has accepted the works to be executed. The notification of the award will constitute the formation of the contract.

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**23. Performance Security (Security Deposit and Agreement)**

The successful bidder on getting the work order from the Engineer shall remit the Performance Security at 2% of the value of contract in the form of NSC / Post Office Savings Deposit A/c., pledged in favour of the Executive Engineer TWAD Board within 15 days from the date of work order and promptly enter into an Agreement with the Executive Engineer in the form specified for this purpose. The agreement should be executed within 15 days from the date of work order in the non judicial stamp paper of value not less than Rs.22.50 purpose, in the name of the contractor at his cost. The remittance of the required Security Deposit in the proper form and the conclusion of Agreement shall constitute formal fulfillment of the contract.

**24. Forfeiture of Bid Security (Earnest Money Deposit)**

In the event of the successful bidder, upon receipt of work order should respond with the remittance of performance security and execution of the Agreement within a maximum of 30 days from the date of work order, failure of which will be liable for the forfeiture of the Bid Security remitted by the bidder along with the bid documents.

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**PRICE BID**

- (1) Bill of quantities shall be read in conjunction with the instructions to bidders and TWAD Board Manual for Rural Water Supply Schemes – Detailed standard specification and General conditions of contract and drawings.
- (2) The quantities given in the bill of quantities are estimated and provisional and are given to provide a common basis for bidding. The basis of payment will be actual quantities of work ordered and carried out, as measured by the Engineer and agreed by the contractor and valued at the rate and prices and price tendered in the priced bill of quantities, where applicable, and otherwise at such rates and price as the Engineer may fix within the terms of the contract.
- (3) The rates and prices tendered in the priced bill of quantities shall, except in so far as it is otherwise provided under the contract, include all constructional plant, labour supervision, materials, erection, maintenance, insurance profit, taxes and duties together with all general risks, liabilities and obligations set out or implied in the contract.
- (4) All pages in the BOQ should be signed without omission.
- (5) All corrections / over writing should be properly attested by the bidder.
- (6) The total amount arrived based on the excess / less quoted on the “Abstract of BOQ” will only be taken as final value for comparison and finalisation of the tender.
- (7) If there is any variation in the percentage quoted in words and figures, the lesser of the two will only be taken into consideration.
- (8) The percentage quoted in the bid should be up to two decimal only.
- (9) If the tender failed to score out the word either “Excess” or Less the word less along will be taken into consideration.

**CONTRACTOR**

**EXECUTIVE ENGINEER**

**SCHEDULE A**  
**GENERAL ABSTRACT OF BOQ**

**Name of work : Providing W.S.S. to**  
**in** **union.**

Sl. No	Qty	Name of Component	Ref. to Manual	Departmental value (Rs.)		
				Rate	Per	Amount
1		Separately Enclosed.				

**SCHEDULE – B**  
**LIST OF DRAWINGS**

**Name of work : Providing W.S.S. to**  
**in** **union.**

Sl. No.	Drawing No.	Description
	- As per TWAD Board RWS Manual -	

Note :- All drawings to be signed by the contractors as well as by officers entering in to contract.

**CONTRACTOR**

**EXECUTIVE ENGINEER**

## SCHEDULE –C

### RATE OF PROGRESS

The fifteenth day from the date of issue of work order shall be reckoned as the start date of contract period.

The Date of acceptance of agreement \_\_\_\_\_

The Date of handing over of site \_\_\_\_\_

The entire project must be completed in all respects within 3 Months

The rate of progress for each component covered in the contract shall be as in the following schedule.

Name of component	Period from commencement	Completion in Term of % age
Pump room	Months	100 %
Pumping main	Months	100 %
Connecting main	Months	100 %
Pump set	Months	100 %
SUMP	Months	100 %

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## **SCHEDULED –D MATERIALS**

All the materials required for the work should be arranged by the contractor himself at his cost. He shall be responsible for transport of all materials to site of work, storing properly at site of work and for the safe custody of all materials including all incidental and handling charges.

The contractor shall ensure that the materials procured conform to the relevant BIS specification set out in the bid documents and also of good quality. If the material is not covered by BIS they should conform to the departmental specifications and departmental requirements.

The contractor shall arrange at his cost for the inspection of the materials at the manufacturing place or at other places by the departmental officer wherever necessary. The contractor shall provide all the assistance necessary including instruments, machinery and materials that are normally required for carrying out the testing / measuring the quality / quantity of the materials and workmen ship. Any materials rejected after testing by the Engineer in-charge or his representative should not be used on the works.

The Engineer in charge shall have the right to order the removal of such materials which in his opinion are substandard stipulating a time limit for the removal of the same and replacement with quality material.

### **SUPPLY BY BAORD**

If in case any of the materials required for the work are available with the Board the Executive Engineer in charge of the work shall have the discretion to issue such materials to the contractor for use in the work and such of these under the agreement shall be treated as authorised omission from the scope of the contract.

## SCHEDULE E

### TECHNICAL STAFF TO BE EMPLOYED

The contractor shall employ the following technical staff as per the prescribed rules

Name of the member of Technical

Staff to be employed :

Qualifications :

The details of value, scale and minimum qualification prescribed for the employment of technical staff, the rate of penalty for the failure on the part of the contractor to employ the technical staff for the work etc., are as follows.

Sl. No.	Value of contract	Scale & minimum qualification prescribed for the employment of technical staff	Rate of penalty
1	Above Rs.1.00 lakh & up to Rs.5.00 lakhs	One Engineer with Diploma in Civil / Mech Engg.	Rs.2000/- per month
2	Above Rs.5.00 lakhs & up to Rs.10.00 lakhs	One Engineer with Diploma in Civil / Mech Engg. Engg. with minimum 1 year experience	Rs.5000/- per month
3	Above Rs.10.00 lakhs & up to Rs.25.00 lakhs	One Engineer with Degree in Civil / Mech Engg. with 3 years experience	Rs.6000/- per month
4	Above Rs.25.00 lakhs	One Engineer with Degree in Civil / Mech Engg. with 3 years experience Add one Engineer with Diploma (Degree : in Civil / Mech. Engg. Rs. 6000/- Diploma : Rs.2000/-)	Rs.8000/- per month

If the contractor fails to employ the technical staff to the departmental requirements, the contractor is liable to pay the penalty as indicated above during the period of such non employment of technical staff.

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**SCHEDULE –F**

**PAYMENT SCHEDULE.**

<b>1</b>	<p><b>Infiltration Well</b>                  After casting curb                  After sinking of well upto 50% of the required depth                  After completion of entire works                  After completion of the maintenance period of the scheme as whole</p>	<p>Up to 15%                  Up to 50%                  Up to 95%                  Balance 5%</p>
<b>2</b>	<p><b>Open Well</b>                  (Applicable only if the diameter of the well is atleast 5 meters)                  After completion up to average G.L                  After completion of the entire works.                  After completion of the maintenance period of the scheme as a whole</p>	<p>Up to 50%                  Up to 95%                  Balance 5%</p>
<b>3</b>	<p><b>Pumping main</b>                  After supplying, laying, jointing and testing of pipe line for every one Km and part thereof of entire length whichever is less                   After satisfactory commissioning of the entire length of main                  After completion of the maintenance period of the scheme as a whole</p>	<p>Up to 70% of the value of work done                   Up to 95%                  Balance 5%</p>
<b>4</b>	<p><b>Sump</b>                  After completion up to floor slab                  After completion up to floor slab                  After Completion of the entire work including pipe connection etc.,                  After completion of the maintenance period of the scheme as a whole</p>	<p>Up to 35%                  Up to 70%                  Up to 95%                   Balance 55%</p>
<b>5</b>	<p><b>Service Reservoir</b>                  After completion of work up to average G.L                  After completion floor slab                  After completion of the entire works including pipe connection etc., and issued of water tightness Certificate by the Engineer in charge                  After completion of the maintenance period of the scheme as a whole</p>	<p>Up to 95%                  Balance 5%                   Up to 95%                  Balance 5%</p>
<b>6</b>	<p><b>Distribution System</b>                  After supplying, laying, jointing and testing of pipe line for every one Km and part thereof or either length whichever is less                  After satisfactory commissioning of the entire length of main                  After Completion of the maintenance period of the scheme as a whole</p>	<p>Up to 70% of the value of work done                   Up to 95%                  Balance 5%</p>
<b>7</b>	<p><b>Valve pits and Public Fountains.</b>                  After completion of the entire work                  After completion of the maintenance period of the scheme as a whole</p>	<p>Up to 95%                  Balance 5%</p>

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<b>8</b>	<b>Pumping plant</b> After receipt of pump, motor, valves, cable, control panel transformer at site After erection of pump, motor and accessories After commissioning of the pumping plant and testing. After completion of the maintenance period of the scheme as a whole	Up to 75% Up to 85% Up to 95% Balance 5%
<b>9</b>	<b>Pump room</b> After completion up to plinth level After completion up to roof slab After completion of the entire work After completion of the maintenance period of the scheme as whole	Up to 35% Up to 70% Up to 90 % Balance 5%
<b>10</b>	<b>Other item of work</b> On completion if the entire job After completion of the maintenance period of the scheme as a whole	Up to 95% Balance 5%

### **11. EB connection and power supply**

The power supply connection from the TNEB has to be obtained by the contractor himself and the charge thereon shall be borne by the contractor. However these charges shall be reimbursed to the contractor on submission of necessary receipts in original issued by EB.

### **12. Maintenance charges cost.**

**Free**

**Note :**

#### **Maintenance of the scheme**

- |  |   |  |
|--|---|--|
| (1) Individual power pump schemes /<br>Mini power pump schemes           | - | One month, from the date of commissioning. |
| (2) CWSS schemes up to a value of Rs.25.00 lakhs                         | - | 2 Months from the date of commissioning    |
| (3) CWSS schemes of value more than Rs.25.00 lakhs & up to Rs.50. lakhs. | - | 6 Months form the date of Commissioning    |

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During the maintenance period if any defect either on material or work is noticed the same should be attended to free of cost by the contractor. No extra payment on this account will be made as separate item for maintenance of the scheme for the specified period included in the Schedule A. During the maintenance period. TWAD Board will bear the Electricity Charges, Charges such as repairs and renewals if any, consumable like oil for filling transformer, starters, alum / bleaching power, diesel etc., have to be borne by the contractor. During the maintenance period, the contractor at his cost has to train the staff to be employed by the Board.

**Note :**

- The percentage of payment mentioned above are with reference to the total value of each component as per the agreement entered into by the firm / Contractor except pumping main and Distribution system.
- The payment shall be made for each component as per the actual measurements upto the percentage mentioned above for the stage of progress of each component.
- Payments shall become eligible only for finished items of works in all respects.

**Deduction from Bills**

- 5% of the value of every running bill shall be retained by the Board as additional performance security (WHA).
- Deduction of income tax shall be made at the prevailing rates as may be specified by the income tax department from the bills from time to time.
- Deduction at source towards sales tax shall be made at 2% for civil works contract and 4% for all other works contract as per Tamilnadu General Tax (Fifth Amendment) Act (Act. No. 15 of 1999)

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## **SPECIAL CONDITIONS OF CONTRACT**

### **1. Royalty charges**

Except where otherwise stated, the contractor shall pay all seignorage and other royalties rent and other payments or compensation, if any, for getting stone, sand gravel clay or other materials required for the works. The contractor is not eligible for any payment in this regard from the Board.

### **2. Earth work Excavation**

The bidder should carefully inspect the site to access the prevalence of differing soil classifications and quote his rate for trench excavations that likely to be encountered and no extra rate will be paid for trench excavations that are likely to be encountered and no extra rate will be paid for excavation of trench on account of any variations in the classification of soil met with during actual execution.

### **3. Penalty for the slow progress.**

If the contractor fails to maintain the rate of progress of the work as stipulated in Schedule C the Engineer shall have the power to impose as penalty of such amount as he may deemed fit for every day that the work remains un commenced or unfinished. However total amount of penalty imposed during the stipulated period of completion of the work shall not exceed 5% of the contract value.

The programme schedule drawn for the project entrusted on turn key basis, should be kept up by the firm / contractor without any slippage. The Executive Engineer concerned shall monitor properly the execution of the work with reference to the programme schedule stipulated. The Executive Engineer on identification of any defective construction or any slippage on the programme schedule in any of the components shall issue a show cause notice either by RPAD or through personal service to the firm / Contractor for rectification of the defective construction / slippage in the programme schedule giving 15 days time for furnishing the reasons therefor by the firm / Contractor. In case where the reasons adduced by the firm / Contractor are no convincing the penalty contemplated in the agreement condition shall be invoked.

If the delay is due to reasons beyond the control of the contractor, penalty need not be levied.

The penalty levied on the firm / Contractor is however subject to modification as the discretion of the next higher authority for valid reasons which are to be recorded.

### **4. Liquidated damages.**

If the contractor fails to complete the work or part there of within the stipulated completion period, he shall be liable to pay liquidated damages at Rs.500 per day of delay for each in complete part till the date of completion and handing over to the department. The amount of liquidated damages shall however be restricted to maximum of 5% of the contract value. This is without prejudice to the right of the Engineer to terminate the contract treating time as essence of contract.

For imposing liquidated damages detailed show cause notice, shall be served on the defaulting firm / contractor either by RPAD or thro' personal service. The first notice shall be served allowing 15 days time, from the date of first notice, the second notice shall be served allowing 7 days time to the firm / contractor for furnishing the reply by them. On expiry of 7 days time from the date of second notice, third notice shall be served allowing 3 days time to them to firm / contractor for furnishing the reply by them.

On receipt of the reply, it shall be verified by the Engineer in charge and the liquidated damages clause shall be invoked by issuing an explicit speaking order to the firm/ contractor. Similar the non receipt of any reply from the firm / contractor shall attract imposition of the liquidated damages clause automatically and in this case also, the liquidated damages shall be imposed by issuing an explicit speaking order to the firm / contractor.

**5. Execution of work by the contractor**

The contractor shall execute the whole and every part of the work in the most substantial and work man like manner and both as regards materials and every other respect in strict accordance with specification. The contractor shall also confirm exactly fully and faithfully to the designs drawing and instructions in charge. And completion of the entire work as per the specifications, drawing, terms and conditions of the contract and to the satisfaction of the Engineer in charge, the contractor shall obtain the completion certificate from the Executive Engineer.

**6. Alteration to specification and Design.**

(6(a) The Engineer in charge shall have the power to make any alteration or additions to the original specification, drawing, design and instruction that may appear to his to be necessary during the progress of work and the contractor shall bound to carry out the work in accordance with the instruction in this connection which may be given to him in writing signed by the Engineer in charge and such alteration shall not invalidate the contract and such work shall be carried out by the contractor on the same condition in all respects on which he agreed to do the a main work. The rates for such additional works will be fixed by the Executive Engineer as per rules in force.

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(6 (b) ) The contractor firm shall be responsible for the defect liability period for 3 years no sooner the projects are commissioned / completed.

**7. Contractor liability.**

During the period of 12 months from the date of completion as certified by the Executive Engineer the said work is found to be defective in any manner what so ever, the contractor shall forthwith, on receipt of notice in that behalf from the Executive Engineer duly commence execution and completely carry out at his cost in every respect all the work that may be necessary for rectifying and setting right the defect specified there in strictly in accordance and in the manner prescribed and under supervision of the Engineer in-charge. In the event of the contractor failing on neglecting to carry out the rectification work within the period prescribed therefor, in the said notice, the Engineer in charge will get the same executed and carried out departmentally or by any other agency at the risk and cost of the contractor. The contractor shall forth with on demand, pay to the Board the amount of such costs, charges and expenses sustained or incurred by the Board of which the certificate of the Executive Engineer shall be final and binding on the contractor. If the contractor fails to pay the same on demand, the Board shall be entitled to deduct the same from any amount which may then be payable or become payable by the Board to the contractor, either in respect of the said work or any other work whatsoever or from the amount of security deposit

**8. With held amount the running bills.**

In addition to the initial security, an amount of 5% of the total value of each bill will be recovered as additional security deposit. The security deposit less any amount due to the Board and 2 ½% out of the with held amount shall be released in final bill which shall be prepared after the works are completed in all respect and after completion of the maintenance period.

## **PAYMENTS AND RETENTION.**

- (a) In respect of pipe laying works and for work where water tightness and soundness are not watched for more than 6 months, payments will be made to the contractor under the certificates to be issued at reasonably frequent intervals by the Engineer of a sum equal to 95% of the value of the finished work done by the contractor as so certified and the balance of 5% will be withheld and retained as security of the due fulfillment of the contract. Under the certificate to be issued by the Engineer on the completion of entire work, the contractor will receive the final payment of all the money due or payable to him under or by virtue of contract except performance security and the retention amount equal to 2 ½% of the total value of work done provided there is no recovery from or forfeiture by the contractor to be made. The amount withheld from the final bill will be retained under "Deposits" and paid to the contractor together with security deposit after six months reckoned from the date of completion of work or as soon after the expiration of such period of six months as all defects shall have been made good according to true intent and meaning hereof whichever shall last happen. In the event the final bill remains unpaid even after the period of six months aforesaid the Engineer shall refund the security deposit and also the withheld amount on a separate bill if requested for by the contractor in writing. No. certificate of Engineer shall be considered conclusive evidence as to the sufficiency of any work or materials or correctness of measurements to which it relates not shall it relieve the contractor from his liability to make good defects as provided by the contract. The contractor when applying for a certificate shall prepare a sufficient detailed bill based on the original figures of quantities and rates in the contract schedule to the satisfaction of the Engineer to enable the Engineer to check the claims and issue the certificate. The certificate as to such of the claims mentioned in the application as are allowed by the Engineer shall be issued within (14) fourteen days of the application for a certificate shall be made within (14) fourteen days of previous application. The amount to be withheld in each bill is 5%.
- (b) In respect of building works RCC reservoir and other works where water tightness and soundness are to be watched for more than 6 months notwithstanding the above clause, the retention amount of 2 ½% from the final bill in respect of contract for original construction or original building works, construction of RCC reservoir work etc., will be retained by the Engineer and paid to the contractor after a period of 24 months as all defects shall have been made good according to the true intent and the meaning hereof which ever shall be later and on production of an indemnity bond for the above amount for a further period of three years beyond the above said two years to ensure structural stability.
- (c) In addition to the withheld amount 40% of the amount of each bill of the contract shall be deducted and will be retained till the date of receipt of certificate of water tightness from the Executive Engineer, TWAD Board. The whole of the above sum together with any recovery from the payments already made to the contractor as may be assessed by the Executive Engineer shall be forfeited to the TWAD Board if the RCC reservoir develops structural defects or leaks. The above recovery shall be exclusive of the amount deposited towards security deposit. The fact of carrying out water tightness test should be recorded in M.Book. The last part bill should be passed only after above certificate is issued. Further, the certificate of structural soundness is to be issued by the Executive Engineer after 6 months from the date of water tightness certificate

for settlement of final bill. However the contractor shall be permitted to execute an indemnity bond in lieu of the recovery of 40% in each bill in prescribed form in stamp paper for a value of Rs.22.50 towards water tightness and structural stability of the reservoir / water retaining structure. The period of guarantee required by the contract shall be two years from the date of completion and handing over (with filling of water up to maximum water level in the case of service reservoir / OHT). If defects are noticed within the stipulated period of 24 months of satisfactory performance, the defects should be rectified by the completion of the rectification of defects by the contractor, in the case of service reservoir / over head tanks and other water retaining structures during this period, structure under full working head of water shall show no sign of leakage. The test for water tightness should be arranged to be carried out and completed within 30 days from the date of intimation by the Engineer. The testing of the service reservoir / OHT and other water retaining structures should be done by the contractor at his own cost inclusive of all necessary equipment water etc., complete. The tender shall be solely responsible for the accuracy of the design and the details of the structure. The test for water tightness of the structure as well as materials of construction used shall be conducted in conformity with the standard specifications as per I.S. 3370 (part I) 1965 as amended from time to time and the other specifications as mentioned in the technical specifications schedule.

- (d) Income tax shall be deducted at two (2) percent of the gross amount of each bill or at the ruling rates fixed by the Government of India from time to time.
- (e) In the event of the death of insanity or insolvency or imprisonment of the contractor or where the contractor being a partnership firm becomes dissolved or being a corporation goes in to liquidation voluntary or otherwise, the contractor may at the option the Engineer, be terminated by notice in writing pasted at the site of the works and all and accepted and acceptable works shall forthwith be measured up and paid for at the rates schedule of rate approved by the competent authority to the person or person entitled to receive and give a discharge for the payment.

(f)

#### **9. Recovery of money payable to the TWAD Board**

All losses, costs damages and expenses and other money payable to the Board by the contractor under any stipulation in the contract, may be retained out of any money due or which may subsequently become due from the Board to the contractor under any or contract or otherwise howsoever and in case such money then due to become due to the contractor by the Board shall be insufficient to pay such loses, case, damages and other money payable to the TWAD Board by the contractor. It shall be lawful for the Engineer without any further consent on the part of the contractor, to sell or dispose of or any or all the Government promissory notes for the securities deposited in the Board by the contractor as aforesaid and with and out of the proceeds of such sale, after payment of all expenses connected therewith or reimburse and pay to the Board all such losses, case, damages and expenses and other money payable to the contractor, and in case such proceeds of sale of the said government promissory notes or securities shall be insufficient for such purpose then and in that case it shall be lawful for the Board to recover the residue there of if necessary by legal proceedings and or by resorting to revenue recovery act against the contractor.

#### **10. Foreclosure of works.**

After the award of contract, of at any time the Engineer for the reason whatsoever does not require the whole or any part of the works to be carried out, shall give notice on this effect to the contractor. The contractor shall not have any claim towards compensation or whatsoever, on account of any profit or advantage which he might have derived from the execution of such works.

#### **11. Risk Insurance**

The contractor may take risk insurance at his cost against loss or damages to the construction against unprecedented floods and other acts of god. The contractor will not be eligible for any payment by the Board on this account.

#### **12. Forfeiture of Bid Security (EMD)**

The Bid security shall be forfeited on the following grounds.

- In the case of bidder with drawing or modifying his bid during the period of validity.
- In case of a successful bidder failing to furnish the prescribed performance security deposit within the stipulated time.
- In the case of a successful bidder failing to enter into agreement within the stipulated time.
- In the case of bidder severing the conditions after intimation of the acceptance of the bid.

#### **13. Forfeiture of performance security (Security Deposit)**

In the case of contractor, after award of work, failing to carry out the work in accordance with the specification, terms and conditions of the contract leading to termination of contract, the performance security will be forfeited to the Board.

#### **14. Jurisdiction of Court.**

In the event of any dispute arising between parties here to in respect of any of the matter comprised in this contract, the same shall be settled by a competent court having jurisdiction over the place where contract is awarded and agreements concluded and by no other court.

#### **15. Excise Duty**

(i) The works with out treatment plant.

The rates provided are inclusive of excise duty and the exemption if any availed should be passed on TWAD Board

(ii) The works with treatment plant :

The rates adopted by the department for machinery and other materials which are required for setting up of water treatment plants and also for the pipes needed for delivery of water from the sources to the plant and from there to the storage facility are exclusive of excise duty and no claim towards excise duty will be permitted on this account.

## **16. Contribution for construction workers welfare fund**

1. 0.30 % of the contract value or total value of the works done including supplemental agreement value plus (+) value of authorised extras amount etc., whichever is higher value towards contribution to the fund constituted for benefit of manual workers employed in the construction work has to be recovered from the payment of the bill as directed by the TWAD Board vide BP Ms. No. 151 CM Wing dt : 27-8-2004.

### **1. Wet type submersible pump sets.**

(1) Motor :

Motor shall conform to IS. 9079 / 1989 and as amended from time to time. The OD of motor should not exceed 140mm dia. The motor shall be suitable for operation in 300/440 Volts.

(2) Pump :

Pump shall conform to IS 8034 / 89 and as amended from time to time with ISI marking. The OD of pump should not exceed 140mm dia.

(3) Materials of construction of pump

Should strictly in accordance with the guidelines specified in the relevant ISS.

(4) Windings .

The stator winding should be made from high conductivity annealed copper conductor, PVC insulated wires, conforming to IS 8783 / part I to IV/95 and suitable for operation on 3 phase 300/400 volts 50 cycle AC power supply. The motor winding should be suitable for DOL starting up to 5 HP and star-Delta starting above 5 HP.

(5) Submersible Cable :

The recommended size of PVC insulated and PVC sheathed 3 core flat type copper conductor cables conforming to IS 694/90 with ISI marking of reputed made with cable jointing kit, should be supplied to the required length along with each submersible pump set for erection.

### **2. Inspection and Testing.**

The pump sets shall be procured by the contractor from reputed manufacturers. The test certificate furnished by the manufacturers should be produced by the contractor. The pump sets of higher duty (i.e) above 15 HP shall be inspected by the Engineer in charge or his representative or any AEE. Mechanical of the Board. The contractor should provide all necessary arrangements for testing the pump sets at his cost. The test certificate issued by the Engineer who has conducted the inspection should be produced for acceptance.

### **SPECIFICATION OF 3 PHASE MOTOR CONTROL PANEL BOARD SUITABLE FOR SUBMERSIBLE JET AND CENTRIFUGAL MONOBLOC PUMPSETS.**

1. Wall mounting type control pannel made form M.S sheet 18 swg vermin proof box type with hinged from door and fixed sides with locking arrangements suitable for erection in pump room, complete with internal wiring provision for cable entry and twin earthing complete as per I.E rules shall be supplied with the following accessories. Two coats of grey colour enamel paint over one coat of red oxide primer shall be provided.

- (a) One number three phase ISI standard miniature circuit breaker suitable for the monot (MDS, standard, SIEMENS, S&S , Crompton Greaves Makes). IF looks after the safety of the personal opening the panel board namely the on-off knob of the MCB should be projected outside the panel board.
- (b) Power capacitor of sample capacity with ISI mark as per ranges given in Annexure.

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- (c) 0-500 V-1 No. 65mm dia volt meter confirming to relevant BIS specifications with phase selector switch for all the ranges (Make IMP, AE, MICO & SHANTI).
- (d) One number 0-15/0-30/0-60 Amps, 65mm dia Ammeter, Confirming to BIS specifications with phase selector switch (Make : AE, IMP, MICO, Shanthi). The Ammeter scale may be suitably graduated as required to record reading as per duty points as per Annexure (For higher HPs., c.t., may provided as per I.E. Rules).
- e. One number DOL starter up to and including 5 HP and fully automatic star-delta starter above 5 HP / ith 3 Nos. overload relay and under voltage protection at current setting should have a range of FLC (Make L&T Culter – Hammer, crompt Greaves, Siemens and GECALS and ABB).
- f. One number voltage sensine single phasing preventor. The preventor must not trip upto 40V line voltage unbalance but must trip between 2-10 seconds under single phasing with the rated capacity motor connected with the panel of all the ranges (Make-any reputed make)
- g. One number 5 Amps, 3 Pin – socket with pin along with plug for flush mounted emergency lighting for all the ranges.

#### **1. Extra Fitting for submersible pump sets only**

The above panel board should be provided with dry running preventor (Probeless type with suitable sensors) of any reputed make. For submersible pump, the single phasing preventor and dry running preventor should be one compact unit.

2. The control equipments like starter and contacts must be capable of satisfactory operation between 180V to 440V with suitable in built arrangement for boosting and sensing device. The Panel Board should work for a range of 180V to 440 V in such a way, when the voltage is in between 330V to 440V the controls should be directly fed and the operations should be smooth and when the voltage is between 180V to 300V, a booster with sensor should boost the voltage for the controls so that the control shall always be fed with a voltage of 300V to 440V irrespective of the supply voltage.

3. Inspection and testing of various components of panel boards as well as testing of complete panel boards after assemble will be done by the AEE(M) of the TWAD Board.

4. Each and every panel board must be tested stimulating actual site conditions for the overload, under voltage, single phasing, dry running.

## GENERAL EARTHING.

Proper earthing should be done in accordance with the IE rules.

The rates should include all the minor clear of civil works, if any required for installation complete.

All necessary civil works for erection of all equipments and accessories offered by the contractor under this contract should be done by the contractor.

All the materials should be supplied as per BOQ and should be of standard make.

## ANNEXURE RECOMMENDED RANGE OF COMPONENTS FOR STARTER.

Sl. No.	HP of Motor	Starter	Power	MCB	Volt Meter	Ammeter
1	Up to and inclusive of 3 HP	DOL	1 KVAR	20 AMS	0 to 500 V	0-15 AMPS
2	Above 3 HP up to and inclusive of 5 HP	DOL	3 KVAR	20 AMS	0 to 500 V	0-15 AMPS
3	Above 5 HP up to and inclusive of 7.5 HP	star Delta	4 KVAR	32 AMPS	0 to 500 V	0-30 AMPS
4	Above 7.5 HP up to and inclusive of 10HP	Star Delta	5 KVAR	40 AMPS	0 to 500 V	0-30 AMPS
5	Above 10 HP up to and inclusive of 12.5 HP	Star Delta	6 KVAR	40 AMPS	0 to 500 V	0-60 AMPS
6	Above 12.H HP up to and inclusive of 15 HP	Star Delta	7 KVAR	63 AMPS	0 to 500 V	0-65 AMPS
7	Above 15 HP up to and inclusive of 20 HP	Star Delta	10 KVAR	63 AMPS	0 to 500 V	0-65 AMPS

### Note:

1. In addition to above common components prescribed other items such as single phasing preventor, socket with plug, single phasing preventor cum dry running preventor probless type with sensors rules including internal wiring as per IE rules shall be included.

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2. The MCB ratings can be of standard rating of the manufacturers approved as per IE rules.
3. The rating of the MCBs are to be selected such that the nuisance tripping is avoided and overload protection is also provided.

**(1) COMMON SPECIFICATION FOR FOLLOWING PUMP SETS.**

- (a) Submersible pump set with IS 8034 Marking (Single Phase / 3 phase)
- (b) Monoblock pump set with IS 9079 marking.
- (c) Vertical open well type submersible pump set with IS : 14220 marking.
  - (1) Threaded joints of any kind should not be used in Motor (or) in sump.
  - (2) Motor shaft, pump shaft and pump sleeve should be made from 22 or 13 or 15 or 13 or 07 or 13 stainless steel material.
  - (3) Chemical composition of test report for the material used should be furnished during test.
  - (4) All rotors should be coated with epoxy paint.
  - (5) Thrust bearing used should be of self aligning and self swiveling mitchei type for less frictions.
  - (6) Material used for studs, bolts, nuts and screws should be made from AISI 304 or AISI 316.
  - (7) Spilling of pump sets should not drop even at 350 V, since it has to deliver the required discharge at specified head during test.
  - (8) The motor should be capable of operation even at 300 V and should not get overloaded during test.

**(11) SPECIAL CONDITIONS FOR SUBMERSIBLE PUMP SETS SUITABLE FOR 150MM BORE WELL AND OPEN WELL.**

- (9) Radial bush bearing should be fitted in each pump casing irrespective of mixed flow (or) radial flow. Material LTB 4/ Nitriler rubber.
- (10) Every pump casing should be fitted with renewable impeller wearing rings irrespective of mixed flow (or) radial flow. Material LTB 4/AISI 304 Nitrite rubber.
- (11) The impeller user should be of LTB 2 / AISI 304.

**(III) SPECIAL CONDITION FOR SUBMERSIBLE PUMP SETS FOR 150MM DIA BORE WELL INCLUDING SINGLE – PHASE PUMP SET.**

- (12) In case of single phase pump set the speed of motor should drop even at 180V since it has to deliver the required discharge at specific head during test.
- (13) The single phase pump set should be capable of operation even at 150 V.

**(V) PUMP SETS WITHOUT ISI MARKING SHOULD NOT BE PERMITTED.**

- (14) Pumps from firms not having valid IS license for the nearest department duty conditions with performance curve duly approved by BIS should not be considered.

**(ii) MINIMUM SPECIFICATIONS REQUIRED FOR FOLLOWING STARTERS.**

- (a) Panel Board suitable for D.O.L starter (3 phase).
- (b) Panel Board suitable for single phase motors.
- (c) Panel Board suitable for Star / Delta starter.
- (d) Panel Board suitable for Auto Transformer starter.
  - (1) The magnetic contactor with under voltage release. Thermal overload relay, MCB, Tubelor, Type power capacitor etc., supplied should be of reputed make and should have ISI marking.
  - (2) The panel Board should be capable of 180 Degree opening.
  - (3) Earthing arrangement should be provided for the above Board.

- (4) The Board except auto transformer type should be wall mounting type.
- (5) The doors of panel Board should have poly urethane / rubber beeding basketting against ingress of dust of water.
- (6) A minimum of 3 years warranty should be given for the components.
- (7) Auto start facility during power failure should be incorporated as per specification without fail.
- (8) Water level guard with 3 probe for two level control should be incorporated since auto start facilities is provided.
- (9) Level guard equipment with a minimum 0.5mm 2 flexible 3 core cable should be supplied with panel board.

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