

Bharat Heavy Electricals Limited
High Pressure Boiler Plant
Tiruchirappalli – 620 014. India
Civil Engineering Department (Township)

TENDER DOCUMENT (QUALIFICATION BID)

Name of work : Replacement of pumping main with HDPE pipe from Vengur to Tiruverumbur along kallanai road at left out portions and from Tiruverumbur kallanai road junction (via kakkan colony and Bharathipuram) to Equalizing reservoir, BHEL Trichy.

Value of work : Rs.38.08 Lakhs + Applicable service tax

Tender Notice No. : CT: TN: 009 / 16 - 17

Tender Schedule No. : CT: TS: 025 / 16 - 17

Period of Contract : 9 (Nine) Months

Issued to :

**BHARAT HEAVY ELECTRICALS LIMITED
TIRUCHIRAPPALLI – 620 014**

CIVIL ENGINEERING DEPARTMENT (TOWNSHIP)

BHE: P: C: T: 09:

Dt. 17.08.2016

To

The Tenderer

Dear Sirs,

Sub: **Replacement of pumping main with HDPE pipe from Vengur to Tiruverumbur along kallanai road at left out portions and from Tiruverumbur kallanai road junction (via kakkan colony and Bharathipuram) to Equalizing reservoir, BHEL Trichy.**

Ref: 1. Tender Notice No. **CT: TN: 009 / 16 - 17**
2. Tender Schedule No. **CT: TS: 025 / 16 - 17**

Please find enclosed / attached non-transferable tender document containing

- i) Qualification bid consisting of Preamble, Specifications, General Conditions of Contract, Norms for Qualification and Qualification Pro forma.
- ii) Price bid consisting of Preamble, Bill of Quantities to offer your most competitive rates for all the items.

Tender for the work should be submitted in a sealed cover consisting of three inner sealed covers such as

- i) **Qualification bid cover,**
 - ii) **Price bid cover,**
 - iii) **EMD cover and**
 - iv) **Cover with DD towards cost of Tender document (if the document is downloaded as described in 2nd para in Sl. No.1 below) all super scribing the name of work, tender schedule number, the contents etc.**
- 1) **EMD cover shall contain requisite EMD in the form of DD.** Tenderers who had already remitted one time EMD should furnish the details of cash receipt No. _____ dt. _____, on the top of EMD cover. **Tender without EMD / without reference to one time EMD will be summarily rejected and the respective qualification bid shall not be opened.**

In case of tender documents downloaded from website, tender shall accompany the tender cost of Rs. 750/- (Rs. 825/- per document if required by post) in the form of Demand Draft (separate cover) in addition to the EMD amount in the form of Demand Draft. **Tender without Tender cost will be summarily rejected.**

All Demand Draft shall be drawn in favour of **BHEL, Trichy** payable at Tiruchirappalli.

- 2) Qualification bid cover shall contain duly filled in qualification bid document signed by the tenderer in all the pages with documentary evidences for pre-qualification such as experience, value of work executed in the similar nature of work, etc. Any bid without proper documentary evidence for pre-qualification shall not be considered for further evaluation.

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- 3) The Price Bid cover shall contain price bid document duly filled in and signed by the tenderer in all pages. **The tenderer has to quote most competitive rates for all the items in the Bill of Quantities from page No. 18 to 29 of Price Bid.**

The completed qualification bid and price bid along with requisite EMD of **Rs.1,00,000/-** for the work in the form of Demand Draft in favour of **BHEL, Trichy** shall reach the office of the undersigned on or before **15.09.2016 at 14.00 hrs.** Tenderers who had already remitted one time EMD should furnish the details of cash receipt No. _____ dt. _____, on the top of EMD cover. EMD in any other form will not be accepted. The qualification bid will be opened on the **same day at 14.00 hrs.** In case of opening day falls on holiday or happened to be declared as a holiday, the receipt and opening of the tender shall automatically fall on the same timing of the next working day. Date and time of opening of the Price Bid shall be intimated only to the bidders those who have qualified after evaluation of the qualification bid. You / your authorized representative may participate in the tender opening with authorization letter for Tender opening.

The tenderers who are desirous of sending their tender documents through your authorized representative / by post / by courier are advised to send the same well in advance so as to reach the office of **DGM / Civil / Planning (F&T), Bldg. 53, BHEL, Trichy - 620014, Tamil Nadu** on or before **15.09.2016 at 14.00 hrs.**

The late tenders received after the tender submission / opening time will be summarily rejected and will not be considered for any reason.

Clarification if any, can be obtained contacting following phone No. 0431-257 5347 / 257 1727 / 257 4658. Fax No. : 0431 – 2520710.

Email Id: shamalam@bheltry.co.in / thiyaguvj@bheltry.co.in / devapurush@bheltry.co.in

Kindly acknowledge the receipt of the entire set of tender document.

Thanking you,

Yours faithfully
For and on behalf of
BHARAT HEAVY ELECTRICALS LIMITED,

DGM / CIVIL / PLANNING (F&T)

**BHARAT HEAVY ELECTRICALS LIMITED
TIRUCHIRAPPALLI – 620 014
CIVIL ENGINEERING DEPARTMENT (TOWNSHIP)**

PREAMBLE

01. The scope of work includes **Replacement of pumping main with HDPE pipe from Vengur to Tiruverumbur along kallanai road at left out portions and from Tiruverumbur kallanai road junction (via kakkan colony and Bharathipuram) to Equalizing reservoir, BHEL Trichy.** The scope also includes excavation of trenches, laying of HDPE pipes, specials, CI Pipes and CI Specials including aligning, jointing, testing, construction of valve chambers, dismantling of existing pipelines, refilling, etc., complete.
02. Time is the essence of the contract. Being a time bound improvement works the contractor should make all efforts to complete the work in time. Even though the overall completion period is indicated as **9 (Nine) months**, the pipe line laid for individual projects shall be completed progressively and handed over as per agreed split up schedule.
03. The tender value excludes cost of Cast iron pipes & specials, HDPE pipes & specials, cement, reinforcement steel, structural steel which will be supplied by BHEL at Stores at free of cost as indicated in Schedule B of the Tender document.
04. Tender Value is only approximate and liable for variation without entitling the tenderer to any compensation, till the total value of contract vary by $\pm 20\%$ (twenty percentage).
05. **Quoted rate for all items shall be firm throughout the contract period of 9 (Nine) months including extended period if any and no cost escalation is allowed on any account.**
06. Some changes are likely in the quantities furnished as well as in the layout, design and specifications of the work. The rates quoted shall be deemed to be inclusive of all such contingencies.
07. Rate quoted shall include all royalties, terminal taxes, Octroi duties, Central or Provincial Excise Tax, Sales Tax and any other taxes leviable under the State or Central Government rules. The Bharat Heavy Electricals Ltd., will not entertain any claim whatever in this respect.
The item rate offered is for finished item of works and shall provide for the complete cost towards fuel, tools, tackles, plant & machinery, temporary works, labour, materials, levies, taxes, transport, lay-out, repairs, rectifications, maintenance till handing over, supervision, labour colonies, establishment, services, roads, revenue expenses, overheads, profits & all other incidentals etc., complete.
The rate quoted shall not include service tax. However the service tax as applicable for this contract work can be claimed from BHEL along with their monthly bills for further payment to be made to the authorities concerned. The contractor has to submit the service tax payment challan as a documentary proof of having paid the service tax for the previous bill for which he has received the service tax payment along with the subsequent bill for which payment has to be processed.
The L1 position based on the quoted values (subject to calculations) excluding service tax, will not necessarily mean L1 for a vendor, but the net liability to BHEL, after considering the service tax criteria for the vendors who had participated in the tender. In case of exemption from the payment of service tax, the contractor has to submit a declaration along with necessary documents to substantiate the declaration
08. The tenderers are advised to visit BHEL, Tiruchirappalli and get themselves acquainted with the site conditions before submitting the offer.
09. Usually, working hours are limited to day time only. In emergency cases to carryout works during nights, it may be done so with the specific prior permission of BHEL. In such case, it is to be carried out in the presence of BHEL officials or their authorized persons.
10. The tentative/expected percentage breakup for various nature of works to be executed are indicated below for guide lines. However this will not be a binding one and this may vary according to the necessity

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at the time of execution. Any claim by the contractor will not be entertained on this aspect on any account.

Civil works (including maintenance nature of work)	10 %
HDPE Pipe line work	90 %

11. The work shall be carried out as per drawings released then and there, AWS / BIS specifications, standard code of practice and as per the instructions of Engineer-in-charge. The brief description of items of work is given in the bill of quantities provided in the Price Bid. **Tenderer has to quote rates both in figures and in words for all the items given in the Bill of Quantities provided. (From page No. 18 to 29).**
12. For any item of work not covered in Bill of Quantities, the rate will be arrived at based on the conditions given in BHEL General Conditions of Contract in force.
13. The rate offered is for finished item of works and shall provide for the complete cost towards fuel, tools, tackles, plant & machinery, temporary works, labour, levies, taxes, transport, lay-out, repairs, rectifications, maintenance till handing over, supervision, labour colony, Establishment, services, revenue expenses, overheads, profits & all other incidentals etc., complete.
14. **New Taxes / Levies**
In case the Government imposes any new levy / tax on the output service / goods / work after award of the contract, the same shall be reimbursed by BHEL at actual. In case any new tax / levy / duty etc. becomes applicable after the date of Bidder's offer, the Bidder / Contractor must convey its impact on his price duly substantiated by documentary evidence in support of the same **before opening of Price Bid**. Claim for any such impact after opening the Price Bid will not be considered by BHEL for reimbursement of tax or reassessment of offer.
15. After award of work the contractor has to furnish the security deposit, as per Clause 13 of Tender Notice, attached in the Tender Document. Also it is to be noted that after award of work the contractor has to furnish 50 % of security deposit before the commencement of work.
16. For any clarification on the tender document, the bidder may seek the same in writing or through email, as per specified format, within the scheduled date for seeking clarification, from the office of the undersigned. BHEL shall not be responsible for receipt of queries after due date of seeking clarification due to postal delay or any other delays. Any clarification / query received after last date for seeking clarification may not be normally entertained by BHEL and no time extension will be given.
17. The contractor should bring the construction earth moving machineries like Excavator, Paver, Road Roller, JCB etc., as and when required for the work without any delay. Also required number of the following tools & Plants / instruments shall be kept at site for the works always.
 - a) Precise Leveling instruments and theodolite.
 - b) Full load mixture machine along with weigh batcher
 - c) Petrol / Kerosene driven vibrator/ mechanical vibrator
 - d) Cube moulds
 - e) Inter carting vehicle (tractor, hand trolley etc)
 - f) Welding machine etc.(Automatic butt fusion welding machine)
 - g) Steel shuttering
 - h) Pipe scaffolding
18. The contractor has to arrange sufficient number of lorries to collect & transport the surplus earth, construction debris generated, etc. at site. Otherwise BHEL would clear the debris at the contractor's risk and cost.
19. In the event of any conflict between requirement of any clause of this specification/documents/drawings/ data sheets etc. or requirements of different codes/standards specified, the same to be brought to the knowledge of BHEL in writing for clarification before due date of seeking clarification (whichever is

applicable), otherwise, interpretation by BHEL shall prevail. Any typing error / missing pages / other clerical errors in the tender documents, noticed must be pointed out before submission of offer, else BHEL's interpretation shall prevail.

20. **Order of Precedence**

In the event of any ambiguity or conflict between the Tender Documents, the order of precedence shall be in the order below:

- a. Amendments / Clarifications / Corrigenda / Errata etc issued in respect of the tender documents by BHEL
- b. Notice Inviting Tender (NIT)
- c. Price Bid
- d. Qualification Bid
- e. General Conditions of Contract

21. The decision of Engineer-in-charge shall be final and binding on the contractor regarding clarification of items in this tender schedule.

22. **The following eligibility criteria shall be complied to fulfill the Qualification Bid**

1. **Separate Registration for EPF, ESI, PAN & Service Tax and IT returns acknowledged by IT Office, Profit & Loss Account and Balance Sheet certified by the auditor for the last three financial years (2012-13, 2013-14, 2014-15).**
2. **Average annual turnover of similar works in the last 3 (three) years (2013-14, 2014-20, 2015-16) ending 31st March shall be atleast for a value of Rs. 11.42 Lakhs.**
3. **During last 7 (seven) years (01.08.2009 to 31.07.2016) should have successfully completed works either.**
 - i. **Three similar works each not less than Rs. 15.23 Lakhs (or)**
 - ii. **Two similar works each not less than Rs. 19.04 Lakhs (or)**
 - iii. **One similar work not less than Rs. 30.46 Lakhs**
4. **Latest Solvency Certificate (obtained within 6 months) from Nationalized / Schedule Bank shall be at least for a value of Rs. 15.23 Lakhs.**

Note: The qualified contractors will be enlisted with BHEL, Trichy Civil Department as registered Contractors according the category & value of work on approval from competent authority.

23. Exclusive lorries to be deployed on daily basis to clear the debris generated and on no account the debris can be left for more than three days. Otherwise BHEL would clear the debris at the contractor's risk and cost.

24. The contractor may be required to undertake works at remote places and in such cases the contractor should make own arrangement for safety of BHEL materials, water required for the work and power etc without extra claim from BHEL.

25. The contractor has to execute any item of work irrespective of the quantity available in the tender without any reservation till the contract value does not vary more than 20%.

26. The decision of Engineer-in-charge shall be final and binding on the contractor regarding clarification of items in this tender schedule.

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27. **Documentary evidences (Xerox copies - attested) for turnover on similar works, works experience, P.F, ESI, Service Tax, PAN Registration etc., all as indicated & required in the tender document should be furnished without which it will not be taken into account. All the above mentioned documents are to be attested by a Gazetted Officer and self-attested by the authorized signatory of the vendor.**
28. The tenderer may have to produce original document for verification if so decided by BHEL.
29. The works executed in the own name of the tenderer only will be considered for eligibility criteria. **The nominated committee may also visit the works executed by the contractor / tenderer to ascertain the nature of work relating to similar works before qualifying.**
30. The contractor shall strictly adhere to various labour laws in force.
31. **The tenderer has to ensure payment of Minimum Wages as per Tamil Nadu State Minimum Wages as applicable under law from time to time.**

The labourers engaged in this contract shall be paid additional payment as mentioned below in addition to the payment of Minimum wages as stated above.

- | | |
|--------------------------------|--------------------|
| a) Unskilled Worker | Rs. 3200 per month |
| b) Semi-skilled Worker | Rs. 3700 per month |
| c) Skilled Worker / Supervisor | Rs. 4100 per month |

Also the labourers shall be paid a minimum bonus which shall be 8.33% as per the payment of Bonus Act 1965 for the total wages paid (i.e) Payment of minimum wages and additional payment as mentioned above.

The Contractor shall have to remit EPF & ESI contributions at the rates applicable under law to the authorities concerned for the total wages paid (i.e) Payment of minimum wages and additional payment as mentioned above.

At present the Tamil Nadu State Government Minimum wages declared is enclosed for your reference (Ref. Page No. 11) Normally the revision will be with effect from 1st April of every year. Tenderers are requested to quote their offer after taking into account of the above factor also.

32. The contractor shall follow norms of BHEL security system for movement of men including bio-metric system & materials within the complex.
33. The offers of the tenderer / bidders who are on the banned list and also the offer of the bidders who engage the services of the banned firms, shall be rejected. The list of banned firms is available on BHEL web site (www.bhel.com, Tender Notification - List of Banned Firms)
34. Since the responsibility for the quality, workmanship and accuracy of any work being carried out under this contract lies with the contractor, the contractor should ensure that no work is done without the presence of contractor's representative at the work spot. The contract should arrange for surveying construction site wherever required at his own cost.
35. BHEL reserves its right to reject the tender on account of unsatisfactory past performance by the present tenderer / his group / group of companies / any member in the consortium in case of consortium in another project / sister unit awarded under different enquiry. The tenderer has to declare the facts of performance with his customers and their contact details with phone & e-mail ids in his letter head.
36. Bank Guarantee format and the list of consortium banks are enclosed for BG submission against Security Deposit.
37. Tenderers are requested to furnish the duly filled in E format (attached as separate in the Qualification Bid) along with a cancelled cheque leaf to accept Electronic Fund Transfer / R T G S transfer for any payment from BHEL, Trichy.

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38. The contractor has to submit the organization chart of their set up for the works and any change thereafter in the organization set up shall have the prior approval of BHEL.
39. The contractor should submit the programme for the completion of work and the list of machineries and site personnel to be deployed for the work along with tender.
40. Statement of completed works with detailed measurements along with material reconciliation statements shall be submitted by the contractor in the last week of every month for processing bill.
41. The contractor should establish his own site office, labour colony, fabrication yard, handling facility, storage facility to stock about 20 MT of cement etc., for which vacant land will be allotted on specific request for which the rent will not be collected.
42. The contractor is required to carry out construction activities as directed by the department officials. It is required to engage certain minimum strength of staff for effective supervision of works as indicated below:

Site in-charge / Construction Manager	-	1 No.
Planning Engineer and coordinator	-	1 No.
Supervisor/Engineer (Diploma Holder)	-	NIL.

In addition to the above, qualified Safety Engineer should be deployed at site to ensure the working safety at site.
43. Adequate number of Quality Engineer and qualified Safety Engineer should be deployed at site. Experienced Engineers / Supervisors are to be engaged in Railway and water supply works.
44. The tenderer has to deploy adequate labour of required categories such as Unskilled, Skilled, Mason, Carpenter, Plumber, Welder, Fitter, Mistry, Technically experienced, etc. so as to execute the works simultaneously in all areas of work. The Technical persons with experience shall have to produce valid certificate for verification.
45. Exclusive Stores personnel should be engaged who would coordinate with department official for clearance and collection of BHEL supplied materials required for works.
46. Separate non-technical persons should be engaged for arranging daily gate passes for labours and vehicles entry in all the gates of Factory Complex.
47. The tenderer shall carry out health performance test at his cost for all the workmen engaged in the work through a registered medical practitioner and produce certificate on demand.
48. It shall be the responsibility of the contractor to see that the workmen do not utilize the departmental canteen facilities. Contractor has to make his own arrangements to provide refreshment for the workmen.
49. All the works shall be executed as per the standard specifications as provided in TNBP / BIS and special specifications of manufacturer of HDPE pipes & specials.
50. The works contract to be entered into with the successful tenderer will be governed by the BHEL Revised General Conditions of Contract in force.
51. All the materials to be used in the work and the nature of work shall conform to the respective TNBP & BIS and National Building Organization, Standard Specifications forming part of "ALL INDIA STANDARD SCHEDULE OF RATES" specifications and shall be got approved by the Engineer-in-charge before actual incorporation in the work.
52. The contractor should maintain proper accounts for cement, reinforcement steel and structural steel sections and other materials if any supplied by this organization and these should be available at the site of work for verification and check by the Officials of this Organization at any time.

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53. All materials brought by the Contractor for incorporation in the work shall be got inspected and approved by the Engineer-in-charge before they are incorporated in the work.
54. All the structural works including fabrication, erection etc., are subjected to inspection and clearance by Third Party Agency fixed by BHEL.
55. All tools and plants including jack hammer with silencer & bits, rock drilling machine, etc., required for all the works covered under this contract will have to be brought by the contractor. Compressed air alone will be provided at viable locations at free of cost by BHEL. From that point the contractor has to provide further arrangements for site works.
56. All safety measures are to be followed during execution of work, particularly during blasting and only licensed blaster should be engaged for this purpose. Sufficient care shall be taken by the contractor during excavation to avoid damages to the buried pipe lines, cables and other infrastructure like railway lines if any etc. Controlled blasting including muffling can be carried out with prior permission from safety department.
57. **The contractor should use only the materials of brand and quality as approved by BHEL.**
58. All materials and consumables brought by the contractor should have manufacturer's certificate.
59. Contractor's materials and tools & plants shall have to be brought inside factory with proper invoice / voucher and make necessary entry in the security gate. They should maintain proper record for tools and plats, materials, etc., brought inside the factory complex.
60. The contractor should extend full co-operation to the other contractors who may be doing other works in the same areas to enable them to execute their portions of work without any delay or difficulty.
61. The contractor should extend fullest co-operation with the third party agencies engaged, if any by BHEL to adhere the Quality Control Procedures ensuring quality.
62. With regard to specifications not covered by the General and Special Conditions of Contract, those contained in the Tamil Nadu Building Practice Standard Specifications or other specifications approved by Bharat Heavy Electricals Limited, shall apply.
63. On the written request from the contractor **Water required for the work may be provided by this organization at only one point at the site of the work at free of cost.** In case of failure of water supply, the Contractor will have to make his own arrangements for water without any extra claims until supply is restored. BHEL does not accept any liability whatsoever for non-supply or delay in the supply of water under any circumstances. The contractor shall ensure that there is no wastage of water otherwise supply of water is liable to be stopped at contractor's risk and cost.
64. **Bank Guarantee format can be obtained after award of work by the successful tenderer.**
65. No advance / mobilization advance will be given and the part-payment or advance for raw materials brought by the successful tenderer will not be paid. The payment for the finished items of works only will be paid after incorporating the required raw materials into the work, if any.
66. LD/Penalty clause is applicable as per General Conditions of Contract. All the terms & conditions in the documents are binding on the tenderers.
67. BHEL reserves its right to reject a tender due to unsatisfactory past performance in the execution of any contract at another project / Unit awarded against a different enquiry.
68. In all matters of dispute, the decision of General Manager, BHEL, Tiruchirappalli – 620 014 is final and binding on the successful tenderer. Any claim or dispute arising from the tender stage, till/after completion of the work under the terms and conditions stipulated in the tender document/contract agreement shall only be enforced or settled in the courts at Tiruchirappalli, TamilNadu only.

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69. **Force Majeure clause:** If at any time during the continuance of this contract the performance in whole or in part by either party of any obligations under this contract shall be prevented or delayed by reason, of any war, hostilities, acts of the public enemy, civil commotion, sabotage, fires, explosions, epidemics, quarantine, restrictions or acts of GOD (hereinafter referred to as events) then provided notice of happening of any such events is given by either party to other within twenty one days from the date of occurrence thereof neither party shall reason of such events be entitled to terminate this contract nor shall either party have any such non performance and delay is resumed as soon as practicable after such events has come to an end or ceased to exist. If the performance in whole or part of any obligation under this contract is prevented or delayed by reason or any such event claims for extension of time shall be granted for period considered reasonable by BHEL subject to prompt notification by the tenderer to BHEL of the particulars of the events and supply to the BHEL if required of any supporting evidence. Any waiver of time in respect of partial installment shall not be deemed to be a waiver of time in respect of remaining deliveries.
70. The correspondence exchanged against the tender from both tenderer and BHEL through email are considered as valid document legally though it is not signed. It is treated as valid confirmations made on behalf of the respective company and very much comes under the legal ambit of the business transaction and hence it is binding on both the parties to the business.
71. Any transaction pertaining to the tender from both the parties of business done round the clock irrespective of the office or business hours of the companies, are valid legally and binding on both the parties. This applies to the extent only in such cases where deadline time for transaction is not specifically declared by either or both the patties to the business.
72. In case Letter of Intent (LOI) is issued through email, the PC generated time and date of mail shall be construed as the official time and date of release of LOI. In as much as this date is within the last date of validity given by the bidder the LOI is said to have been issued within the validity period and shall be binding on both the parties to the business.
73. Tenderers participating in the tender should declare in their technical bid that whether they have been black-listed / kept on hold for a specified period / given Business holiday for a specified period by any Public sector undertaking or Government departments. The reasons for such action with details and the current status of such hold shall be clearly furnished to BHEL. If no such details are mentioned in the offer then it will be construed that the subject bidder is not under any such hold. But at a later date if it comes to the notice of BHEL about any such hold under enforcement on the subject bidder, BHEL will have every right to reject the offer of such vendors at any point of time and also under any stage of the finalisation of the subject tender irrespective of the status of the subject bidder in that tender. Such bidders will not be permitted to participate in the further tender proceedings and will be communicated suitably. They will not be also considered for any ongoing tenders even if participated till the hold is officially lifted and confirmed in writing.



BHARAT HEAVY ELECTRICALS LIMITED
TIRUCHIRAPPALLI - 14
HUMAN RESOURCE MANAGEMENT

CIRCULAR

No. BHEL: HR: WEL: MW

Date: 31.03.2016

ALL CONTRACT EXECUTING/AWARDING OFFICIALS

- Sub. : Minimum Wages Act 1948 – Fixation of Minimum rates of wages for the employment in “General Engg. and Fabrication Industry” – Revision of DA – Reg.
Ref. : Notification No. Z3/9329/2016 dated 24.03.2016 from the Commissioner of Labour, Chennai.600 006

Consequent upon the increase in Dearness Allowance payable under the Minimum Wages Act from Rs. 4575.00 to Rs.5196.00 per month to those employed in “General Engineering and Fabrication Industry”, the Minimum Wages payable by the Contractors to their workmen engaged in the following categories would be as follows with effect from 01/04/2016:

Sl. No.	Category	Minimum Basic Wages per day	Minimum DA per day	Total Minimum Wages per day	Minimum Basic Wages per month	Minimum DA per month	Total Minimum Wages per month
1	Unskilled Worker	Rs.123.00	Rs.200.00	Rs.323.00	Rs.3690.00	Rs.5196.00	Rs.8886.00
2	Semi-Skilled Worker	Rs.133.00	Rs.200.00	Rs.333.00	Rs.3990.00	Rs.5196.00	Rs.9186.00
3	Skilled Worker	Rs.139.00	Rs.200.00	Rs.339.00	Rs.4170.00	Rs.5196.00	Rs.9366.00
4	Supervisor				Rs.3956.00	Rs.5196.00	Rs.9152.00

Contract Awarding / Executing Executives are requested to ensure that the contractors make payment to their workers not less than Minimum Wages as stated above.

SDGM (HR-Welfare and Recruitment)

Cc:

All HR Executives
Sr.Manager/HR/PC/Chennai
Sr.Manager/HR/PPPU/Thirumayam
AGM/Finance
GM/Finance
AGM/HR
GM/HR

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BHARAT HEAVY ELECTRICALS LIMITED
(A Government of India Undertaking)
Unit : TIRUVERUMBUR, BOILER PROJECT, P.O.
TIRUCHIRAPALLI - 620 014.

CIVIL ENGINEERING DEPARTMENT

NOTICE INVITING TENDER

01. Name of work : **Replacement of pumping main with HDPE pipe from Vengur to Tiruverumbur along kallanai road at left out portions and from Tiruverumbur kallanai road junction (via kakkan colony and Bharathipuram) to Equalizing reservoir, BHEL Trichy.**
02. Estimated Cost : **Rs. 38.08 Lakhs**
03. Earnest Money Deposit : **Rs. 1,00,000/-**
04. Completion Time : **09 (Nine) Months**
(From the date of commencement of the work which will be reckoned from the date of handing over to the Contractor)
05. Cost of Tender Document : **Rs.750** (including Sales Tax) in DD form
This amount will not be refunded under any circumstances
06. Last Date for Receipt of Tenders : **14.00 Hrs. on 15.09.2016**
07. Date of Tender Opening : **14.00 Hrs. on 15.09.2016**
08. Maintenance Period : **6 (Six Months from the date of actual completion of the entire work and handing over to Bharat Heavy Electricals Limited)**

Tender document contains **123** pages in Qualification Bid and **35** pages in Price Bid including Bill of Quantities, Drawing etc.

Issued to Messrs. / Thiru :

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INSTRUCTIONS TO TENDERERS

1. The tender is open to all Contractors. The Contractors not borne on the approved list of contractors of this Organization must submit the following testimonials simultaneously with their tenders.
 - i. A Certificate to establish that the tenderer is an independent contractor working on his own
 - ii. At least two certificates from responsible Officers of Government of Firms of repute, regarding the tenderer's capacity to undertake to undertake and carryout the work tendered for or similar work satisfactorily

NOTE :

- a) Copies of testimonials unless attested a Gazetted Officer will not be accepted
 - b) Non – Submission of the above testimonials simultaneously with the tenders may result in the tender being rejected
2. The tenders should be accompanied by a list of contracts already held by the contractor at the time of submitting the tender and giving the following particulars
 - a) Value of each contract
 - b) The balance value of work to be done on the same
 3. The tenderer is advised to obtain the tender documents in person or by a messenger duly authorized to do so. The BHARAT HEAVY ELECTRICALS LIMITED will not under any circumstances accept responsibility for the non – receipt of delay in the receipt of the tender documents by the tender.
 4. Rate for each item of the tender schedule should be quoted in FIGURES and in WORDS. In case of any difference in the rates quoted in figures and in words, the lower of the two rates will be taken as the tendered rate. Unit rate quoted shall be the basis for arriving the total value of the tender. The total amount for every item shall be arrived by multiplying the unit rate with the quantity indicated for that item. In case of any arithmetic deviation is noticed in the total amount, the same will be corrected and evaluated by taking unit rate as basis and multiplying with the quantity indicated.
 5. Rate quoted shall include all royalties, terminal taxes, Octroi duties, Central or Provincial Excise Tax, Sales Tax and any other taxes leviable under the State or Central Government rules. The Bharat Heavy Electricals Ltd., will not entertain any claim whatever in this respect. The item rate offered is for finished item of works and shall provide for the complete cost towards fuel, tools, tackles, plant & machinery, temporary works, labour, materials, levies, taxes, transport, lay-out, repairs, rectifications, maintenance till handing over, supervision, labour colonies, establishment, services, roads, revenue expenses, overheads, profits & all other incidentals etc., complete.
The rate quoted shall not include service tax. However the service tax as applicable for this contract work can be claimed from BHEL along with their monthly bills for further payment to be made to the authorities concerned. The contractor has to submit the service tax payment challan as a documentary proof of having paid the service tax for the previous bill for which he has received the service tax payment along with the subsequent bill for which payment has to be processed.
The L1 position based on the quoted values (subject to calculations) excluding service tax, will not necessarily mean L1 for a vendor, but the net liability to BHEL, after considering the service tax criteria for the vendors who had participated in the tender. In case of exemption from the payment of service tax, the contractor has to submit a declaration along with necessary documents to substantiate the declaration
 6. Tender Value is only approximate and liable for variation without entitling the tenderer to any compensation, till the total value of contract vary by (\pm) **20%** (Twenty Percentage).
 7. Quoted rate shall be firm throughout the contract period of **9 (NINE) months** and no cost escalation is allowed on any account including extended period if any.
 8. The works contract to be entered in to with the contractor will be governed by the BHEL Revised General Conditions of contract in force.

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9. Should a tender find discrepancies or omissions in the drawings or any of the tender documents or should be in doubt as to their meaning, he should at once address the authority inviting the tender for clarification. Every Endeavour is made to avoid any error which can materially affect the basis of the tender but the successful tenderer shall take upon himself to provide for the risk of any error which may be subsequently by discovered and shall make no subsequent claim on account thereof.
10. Tenders submitted by post should be sent "Registered Post with Acknowledgement due". These should be posted with due allowance for any delay in postal delivery. Tenders received after the due date and time of opening, tenders are liable to be rejected.
11. Where the tender called for covers only the building work and excludes internal services such as sanitary and water supply installations, electrification etc., the building contractor will have to leave pockets, holes, etc., as required for other works and will have to phase his work to ensure smooth progress of the work of the other agencies also as directed by the Engineer – in – charge.
12. Where the tender schedule contains special items of work such special floor finishes, foam concrete for insulation, special water proofing treatment to roofs etc., it will be entirely at the discretion of the Project Authorities to allot these items of work to other contractors specialized in these works. In such cases, the main building Contractor will have to tender all necessary co-operation to the agencies involved so as to ensure the smooth progress of all work.
13. The contractor's responsibility under this shall commence from the date of receipt of the contract order of acceptance of his tender. The scheduled period of completion for this work will be as mentioned in page No. 12, and the Contractor will have to plan his work accordingly.
14. Generally, the maintenance period for any work under BHEL Organization will be Six (6) months .
15. **Earnest Money Deposit:**

Earnest Money is to be paid by each tenderer to ensure that the tenderer does not refuse to execute the work after it is awarded to him. EMD be furnished only in the form of Pay Order or Demand Draft in favour of BHEL, Trichy, EMD in any other form will not be accepted. The rate of earnest money deposit shall be as under:

Works costing up to Rs. 2 lakhs	NIL
Works costing more than Rs.2 lakh and up to Rs. 5 lakhs	Rs. 10000/-
Works costing more than Rs.5 lakhs and up to Rs.10 lakhs	Rs. 20000/-
Works costing more than Rs.10 lakhs and up to Rs.20 lakhs	Rs. 40,000/-
Works costing more than Rs.20 lakhs and up to Rs.30 lakhs	Rs. 60,000/-
Works costing more than Rs.30 lakhs and up to Rs.50 lakhs	Rs. 1,00,000/-
Works costing more than Rs.50 lakhs and up to Rs.100 lakhs	Rs. 1,50,000/-
Works costing more than Rs.100 lakhs	Rs. 2,00,000/-

One time EMD will also be Rs.2.00 lakhs.

EMD by the Tenderer will be forfeited as per tender Documents if:

- i) After opening the tender, the tenderer revokes his tender within the validity period or increases his earlier quoted rates,
 - ii) The tenderer does not commence the work within the period as per LOI / Contract. In case the LOI / contract is silent in this regard then within 15 days after award of contract.
 - iii) EMD given by all unsuccessful tenderers shall be refunded normally within fifteen days of acceptance of award of work by the successful tenderer.
 - iv) EMD shall not carry any interest.
16. Should a tenderer or a contractor on the list of approved Contractors have a relative, or in the case or a firm or Company of contractors any of its shareholders or shareholder's relative, employed in a gazetted capacity in the Engineering Department of the Bharat Heavy Electricals Limited, the authority inviting

tenders shall be informed of this fact at the time of submission of the tender, failing which tender, may be disqualified or if such fact subsequently comes to light, the contract may be rescinded in accordance with the relevant provisions in the General Conditions of Contract.

17. If tenderer expires after the submission of his tender or after the acceptance of his tender the BHEL may, at their discretion, cancels such tender. If a partner of a firm expires after submission of tender or after the acceptance of the Tender, BHEL may cancel such Tender at their discretion unless the firm retain its character.
18. The Bharat Heavy Electricals Limited will not be bound by any power of attorney granted by the tenderer or by changes in the composition of firm made subsequent to the execution of the contract. They may however recognize such power of attorney and changes after obtaining proper legal advice the cost of which will be chargeable to the contract concerned.
19. If the tenderer deliberately gives wrong information in his tender or creates conditions favorable for the acceptance of his tender, the Bharat heavy Electricals Limited, reserves the right to reject such tender at any stage.
20. Words importing the singular number shall also be deemed to include the plural number and vice versa where the context so requires.
21. The expenses for competing and stamping the agreement shall be paid by the contractor.
22. The General and special conditions are complementary to each other and where they are conflict the Special Conditions shall prevail. In regard to matters not covered by the General and Special Conditions of Contract, those contained, those contained in the Tamil Nadu Building Practice Standard Specifications or other specifications approved by the Bharat Heavy Limited, Shall apply.
23. Tenderers shall not increase their quoted rates in case the Bharat Heavy Electricals Limited, negotiates for negotiation for reduction of rates. Such negotiation shall not amount to cancellation or withdrawal of the original offer and the rates originally quoted shall be binding on the tenderes for a period of three months from the date of opening of tenders.
24. Canvassing in any form in connection with tenders is strictly prohibited and the tenders submitted by the contractors who resort to canvassing will be liable to rejection
25. All contractors will have to produce Income tax Clearance Certificate from the Income Tax- Officer concerned along with their tenders. Those Contractors whose income is not taxable will be required to give an affidavit of their income on the prescribed form. If the successful tenderer fails to produce the Income – tax clearance certificate within the stated period the Earnest Money Deposit and Security Deposit of the tenderer may be forfeited and the contract terminated.

TENDER NOTICE

NAME OF WORK: Replacement of pumping main with HDPE pipe from Vengur to Tiruverumbur along kallanai road at left out portions and from Tiruverumbur kallanai road junction (via kakkan colony and Bharathipuram) to Equalizing reservoir, BHEL Trichy.

ESTIMATED COST : Rs 38.08 LAKHS

1. SEALED TENDERS for the above noted work are hereby invited from contractor experienced in works of similar kind and magnitude. Tenders will be received by **DGM / CIVIL / PLANNING (F&T)** Bharat Heavy Electricals Limited, Tiruchirappalli – 620 014. Up to **14.00 Hrs. on 15.09.2016** and will be opened on the same day at **14.00 Hrs.** at the **Office of the DGM / CIVIL / PLANNING (F&T)**.
2. TENDER FORMS and other particulars regarding the proposed work can be obtained on any working day from 8.00 A.M. to 4.30 P.M. up to **14.09.2016** on payment of the prescribed sum of Rs. **750/-** per set (including Sales Tax) in the form of Demand Draft Amount nor refundable.
3. TENDERS must be submitted in sealed covers and should be addressed to the with full name and address of the tenderer and the name of work being noted on the cover.
4. All entries in the tender documents should be in the one ink. Erasers and over writings are not permitted. All cancellations and insertions should be duly signed by the tenderer concerned.
5. TENDERERS should fill in all the required particulars in the blank spaces provided for this purpose in the tender documents and also sign each and every page of Tender Documents including the drawings attach there to before submitting their tender.
6. UNIT rate should be quoted in figures as well as in words with reference to each item and for all the items shown in the attached schedule. These rates shall be for the finished work in site. Amount of each item and the total page by page and also the grand total amount of the whole contract should be filled in by the tenderers. Unit rate quoted shall be the basis for arriving the total value of the tender. The total amount for every item shall be arrived by multiplying the unit rate with the quantity indicated for that item. In case of any arithmetic deviation is noticed in the total amount, the same will be corrected and evaluated by taking unit rate as basis and multiplying with the quantity indicated.
7. QUANTITIES shown in the attached schedule are only approximate and are liable to variation without entitling the Contractors to any compensation, provided the total value of the Contract does not vary by more than 20% (twenty percent).
8. In quoting their rates, the tenderers are advised to take account all factors including any fluctuations in the market rates etc. No claim will be entertained on this account after acceptance of the tender or during the currency of the contract.
9. Before tendering, the tenderers are advised to inspect the site of work and its environments and be well acquainted with the actual working and other Prevalent conditions position of materials and labour, General and Special Conditions of Contract. Instructions to tenders, drawings and Specifications and all other documents which form part of the Agreements to be entered into.
10. The rates quoted in the tender shall remain valid for a period THREE MONTHS from the date of opening of tenders.
11. In the event of tender being submitted by firm the tender must be signed separately and legibly by each partner or member of the firm or in their absence, by the person holding the power of attorney on behalf of the firm concerned in the latter case a copy of the power of attorney duly attested by a Gazetted Officer must accompany the tender.

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12. Every tender must be accompanied with EMD for the amount as specified in Page No. 14 in any of the form mentioned in Para 15 of the "Instruction to Tenderers". This Earnest Money will be refunded to the unsuccessful tenderers within fifteen days of finalization of the award of work. In case of the successful tenderer, the Earnest Money will be retained as part of the Security Deposit for satisfactory completion of the work in accordance with Clause 16 of the General Conditions of Contract

NOTE: Cheques, Currency Notes and Money Orders will not be accepted in lieu of the deposit receipt referred to above

13. **Security Deposit**

- 13.1 Security Deposit should be collected from the successful tenderer. The rate of Security Deposit will be as below:

Up to Rs. 10 lakhs	:	10%
Above Rs. 10 lakhs up to Rs.50 lakhs	:	Rs. 1 Lakh + 7.5% of the amount exceeding Rs. 10 lakhs.
Above Rs. 50 lakhs	:	Rs.4 lakhs + 5% of the amount exceeding Rs. 50 lakhs.

Note: The security Deposit has to be furnished by the contractor before commencement of the work. Failing which the recovery of interest will be made at prime lending rate of SBI plus 2% for the period of default.

- a. Security Deposit may be furnished in any one of the following forms
- Cash (as permissible under the Income Tax Act).
 - Pay Order, Demand Draft in favour of BHEL.
 - Local cheques of scheduled banks, subject to realization.
 - Securities available from Post Offices such as National Savings Certificates, Kisan Vikas Patras etc. (Certificates should be held in the name of Contractor furnishing the security and duly pledged in favour of BHEL and discharged on the back).
 - Bank Guarantee from Scheduled Banks / Public Financial Institutions as defined in the Companies Act. The Bank Guarantee format should have the approval of BHEL.
 - Fixed Deposit Receipt issued by Scheduled Banks / Public Financial Institutions as defined in the Companies Act. The FDR should be in the name of the contractor, A/C BHEL, duly discharged on the back.
 - Security deposit can also be recovered at the rate of 10% from the running bills. However in such cases at least 50% of the Security Deposit should be collected before start of the work and the balance 50% may be recovered from the running bills.
 - EMD of the successful tenderer shall be converted and adjusted against the security deposit.
 - The security deposit shall not carry any interest.

NOTE: Acceptance of Security Deposit against Sl. No. (iv) and (vi) above will be subject to hypothecation or endorsement on the documents in favour of BHEL. However, BHEL will not be liable or responsible in any manner for the collection of interest or renewal of the documents or in any other matter connected therewith.

14. Unless the contractor whose tender is accepted signs the Contract Agreements and makes the necessary security deposit specified in Para 13 above within Seven days of the date of the order directing him to do so the amount of Earnest Money Deposit already deposited by him will be forfeited and acceptance of his tender withdrawn.
15. If after opening of tenderer revokes his tender or increases his earlier quoted rates or after acceptance of his tender does not commence the work in accordance with the instruction of the Engineer-in-charge, the

Earnest Money deposited by him will be forfeited and acceptance of his tender withdrawn. If only a part of the work included in the tender had been awarded to the tenderer, the amount of Earnest Money to be forfeited will be based on the value of the contract so awarded.

16. The Bharat Heavy Electricals Limited reserve the right to reject any or all the received or accept any tender or part there of without assigning any reason thereof. In the case acceptance of part of tender, time for completion may also be reduced to the extent considered appropriate by the Accepting Authority.
17. Conditional and Unwitnessed tenders, tender containing absurd rates and amounts tenders which are incomplete or otherwise considered defective and tenders not in accordance with the tender conditions laid down by the Accepting Officer are liable to be rejected.
18. Tenders not submitted on the prescribed form are liable to be rejected.
19. The work must be completed within a period as mentioned in Page No.- **12**
20. The Chairman / General Manger / Deputy General Manager / Deputy Manager / Senior Engineer shall be Accepting Officer, herein after referred to as such for the purpose of this contract.
21. This tender notice shall be deemed to form an integral part of the contract to be entered into for this work.
22. The tenderers are advised to go through the condition stipulated in Tender document & code of conduct for 'Health & Safety of Contract Labourer' in details. Any violation thereof will invite punitive action being taken against them. While quoting the rate all the above factors are to be taken into account.

(TO BE STAMPED IN ACCORDANCE WITH STAMP ACT)
BANK GUARANTEE FOR SECURITY DEPOSIT

1. THIS DEED OF GUARANTEE made this..... day of(month).....(year) By(Bank 's full address) in favour of M/s Bharat Heavy Electricals Limited, Unit : Thiruverumbur, Tiruchirapalli 620 014, having its Registered Head Office at BHEL House, Siri Fort , New Delhi 110049.
2. **WHEREAS M/s Bharat Heavy Electricals Limited (hereinafter called the "COMPANY")** have placed work order(s) which are pending as on date and also proposes to place further work order(s)) (hereinafter called the "CONTRACT") upto..... (Date) for fabrications/ for machining/supply of pressure and non – pressure parts with M/s.....(CONTRACTOR'S Full address) (hereinafter called the "CONTRACTOR /SUPPLIER") and as per the terms of the contract, the company has issued / proposes to issue raw materials to the contractor to enable them to complete the work.
3. AND WHEREAS one of the conditions for placing such contract(s) is that the Contractor/ Supplier shall provide the Company a Bank Guarantee for Rs.in lieu of cash and towards the security deposit for the raw materials supplied and to be supplied, in pursuance of the contract(s) already placed but pending as on date and the contract(s) to be placed from time to time upto (Date) and also for the satisfactory performance and completion of work/supply as per the terms and conditions of the said contract(s).
4. AND WHEREAS the Contractor/ Supplier..... approached the (Bank) and at their request and in consideration of the arrangement arrived at between the said Contractor / Supplier and the said Bank,
5. We(indicate the name of the bank with full address), do hereby undertake to pay the amounts due and payable under this guarantee without any demur, merely on a demand from the Company stating that the amount claimed is due by way of loss or damage caused to or would be caused to or suffered by the Company by reason of breach by the said Contractor(s) of any of the terms and conditions contained in the said Agreement or by the reason of the contractor(s) 'failure to perform' the said agreement. Any such demand made on the Bank shall be conclusive as regards the amount due and payable by the Bank under this guarantee. However, our liability under this guarantee shall be restricted to an amount not exceeding Rs._____.
6. We..... (Bank) , further assure that the Contractor/ Supplier shall be responsible for the safe custody and protection of the raw materials that have been supplied/and to be supplied by BHEL under the contract(s) already placed but pending as on date and to be placed upto(date) against all risks till they are delivered back as finished products to BHEL as per the terms and conditions of the Contract or as they may direct and until such time, the Contractor/ Supplier shall hold the raw materials in trust for BHEL and shall not alienate the same in any manner whatsoever by way of sale or mortgage or charge or hypothecation etc. in favour of any one else including the bank herein or any other banks /financial institutions etc.

The raw materials shall always remain the property of BHEL and the Bank shall indemnify BHEL against the loss, damage or deterioration whatsoever in respect of the said raw materials while in the possession of the Contractor/Supplier. The raw materials of BHEL shall always be open for inspection by any Officer authorised by BHEL. The liability under this Guarantee is a continuing one covering all contracts already placed but pending as on date and to be placed up to.....(date) and should any loss or damage occur on account of the breach of the terms and conditions of the said contract(s) by the Contractor/ Supplier or should any surplus raw materials become due to the Company under the Contract(s) and remains undelivered by the Company, the Bank shall indemnify the Company for the loss /damage for the value of raw materials for Rs...../- (RupeesOnly) and this is without prejudice to any other remedies which may be otherwise available to the Company by deduction from any sum due or any sum which at any time hereinafter become due from the Contractor/ Supplier under this or any other Contract(s).

7. We undertake to pay unconditionally to the Company any money so demanded notwithstanding any dispute(s) raised by the Contractor in any suit, or proceedings pending before any Court or Tribunal or

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Arbitration or before any other authority relating thereto our liability under this present being absolute and unequivocal. The payment under this guarantee would not wait till the disputes have been decided by any Court or Tribunal or in the arbitration proceedings or by any other authority. The payment so made by us under this Bond shall be a valid discharge of liability for payment thereunder and the Contractor(s) shall have no claim against us for making such payment.

8. We.....(indicate the name of Bank), further agree that the guarantee herein contained shall remain in full force and effect during the period that would be taken for the performance of the said Agreement and that it shall continue to be enforceable till all the dues of the Company under or by virtue of the said Agreement have been fully paid and its claims satisfied or discharged or till _____Office / Department/ Division of the Company certifies that the terms and conditions of the said Agreement have been fully and properly carried out by the said Contractor(s) and accordingly discharges this guarantee.
9. (i) Unless a demand or claim under this guarantee is made on us in writing on or before the _____we shall be discharged from all the liability under this guarantee thereafter. But where such claim or demand has been preferred by the Company with the Bank before the expiry of the said date, the claim shall be enforceable notwithstanding the fact that the said enforcement is effected after the said date.

(ii) For the purpose of this clause, any letter making demand on the Bank by M/s. BHEL dispatched by Registered Post with Ack.Due or by Telegram or by any Electronic media addressed to the above mentioned address of the Bank shall be deemed to be the claim / demand in writing referred to above irrespective of the fact as to whether and when the said letter reaches the Bank, as also any letter containing the said demand or claim is lodged with the bank personally.
10. We(indicate the name of Bank), further agree with the company that the Company shall have the fullest liberty without our consent and without affecting in any manner our obligations hereunder to vary any of the terms and conditions of the said agreement or to extend time of performance by the said Contractor (s) from time to time or to postpone for any time or from time to time any of the powers exercisable by the Company against the said Contractor(s) and to forbear or enforce any of the terms and conditions relating to the said agreement and we shall not be relieved from our liability by any reason of any such variation or extension being granted to the said Contractor(s) or for any forbearance, act or omission on the part of the company or any indulgence by the company to the said Contractor(s) or by any such matter or thing whatsoever which under the law relating would but for this provision have effect of not so relieving us.
11. This guarantee will not be discharged due to the change in the constitution of the Bank or the Contractor(s).
12. It shall not be necessary for the company to proceed against the contractor before proceeding against the guarantor-bank and the guarantee herein contained shall be enforceable against them notwithstanding any security, which the company may have obtained or obtain from the Contractor shall, at the time when proceedings are taken against the guarantor hereunder be outstanding or unrealised.
13. Any claim or dispute arising under the terms of this document shall only be enforced or settled in the Courts at Tiruchirapalli.
14. The guarantor hereby declare that it has power to execute this guarantee and the executant has full powers to do so on its behalf under the proper authorities granted to him/them by the the guarantor.
15. We(indicate the name of Bank) lastly undertake not to revoke this guarantee during its currency except with the previous consent of the company in writing.
In witness whereof we....., (indicate the name of Bank) have hereunto setout Bank Seal the _____day _____month 201

Bank Phone No.
Bank e-mail ID
Bank FAX No

The Bank Guarantee bonds (BG) are to be submitted on non-judicial stamp paper of Rs. 100/- and should be only from any one of the below mentioned Banks in India.

LIST OF CONSORTIUM BANKS IN INDIA

(as on 15.12.2011)

List of Consortium Bank			
	Nationalised Bank		Nationalised Bank
1	Allahabad bank	19	Vijaya Bank
2	Andhra bank		Public Sector Banks
3	Bank of Baroda	20	IDBI
4	Canara Bank		Foreign bank
5	Corporation bank	21	CITI Bank N.A
6	Central bank	22	Deutsche Bank AG
7	Indian Bank	23	The Hong Kong and Shanghai Banking Corporation Limited
8	Indian Oversea Bank	24	Standard Chartered Bank
9	Oriental bank of Commerce	25	The Royal Bank of Scotland N.V.
10	Punjab National Bank	26	J P Morgan
11	Punjab & Sindh Bank		Private bank
12	State Bank of India	27	Axis Bank
13	State Bank of Hyderabad	28	The Federal Bank Limited
14	Syndicate Bank	29	HDFC
15	State Bank of Travancore	30	Kotak Mahindra Bank
16	UCO Bank	31	ICICI
17	Union Bank of India	32	Indusind Bank
18	United Bank of India	33	Yes Bank

- (1) It should be typed in the **Rs. 100 value of stamp paper.**
- (2) It should be **signed by TWO bank officials** with Rubber stamp containing names & employee numbers of bank officials.
- (3) It should be submitted with bank covering letter with sign and seal of the bank official.

REVERSE AUCTION

BHEL reserves the right to go for a Reverse Auction (RA) instead of Opening the submitted sealed bid, which will be decided after technical evaluation. Information and general terms and conditions governing RA are given below.

GENERAL TERMS AND CONDITIONS OF RA

Against this enquiry for the subject item/ system with detailed scope of supply as per enquiry specifications, BHEL may resort to “REVERSE AUCTION PROCEDURE” i.e., ON LINE BIDDING (THROUGH A SERVICE PROVIDER). The philosophy followed for reverse auction shall be English Reverse (No ties).

1. For the proposed reverse auction, technically and commercially acceptable bidders only shall be eligible to participate.
2. Those bidders who have given their acceptance for Reverse Auction (quoted against this tender enquiry) will have to necessarily submit „online sealed bid“ in the Reverse Auction. Non-submission of „online sealed bid“ by the bidder for any of the eligible items for which techno-commercially qualified, will be considered as tampering of the tender process and will invite action by BHEL as per extant guidelines in vogue.
3. BHEL will engage the services of a service provider who will provide all necessary training and assistance before commencement of on line bidding on internet.
4. In case of reverse auction, BHEL will inform the bidders the details of Service Provider to enable them to contact & get trained.
5. Business rules like event date, time, bid decrement, extension etc. also will be communicated through service provider for compliance.
6. Bidders have to fax the Compliance form (annexure IV) before start of Reverse auction. Without this, the bidder will not be eligible to participate in the event.
7. In line with the NIT terms, BHEL will provide the calculation sheet (e.g., EXCEL sheet) which will help to arrive at “Total Cost to BHEL” like Packing & forwarding charges, Taxes and Duties, Freight charges, Insurance, Service Tax for Services and loading factors (for non-compliance to BHEL standard Commercial terms & conditions) for each of the bidder to enable them to fill-in the price and keep it ready for keying in during the Auction.
8. Reverse auction will be conducted on scheduled date & time.
9. At the end of Reverse Auction event, the lowest bidder value will be known on auction portal.
10. The lowest bidder has to fax/e-mail the duly signed and filled-in prescribed format for price breakup including that of line items, if required, (Annexure VII) as provided on case-to-case basis to Service provider within two working days of Auction without fail.
11. In case BHEL decides not to go for Reverse Auction procedure for this tender enquiry, the Price bids and price impacts, if any, already submitted and available with BHEL shall be opened as per BHEL’s standard practice.
12. Bidders shall be required to read the “Terms and Conditions” section of the auctions site of Service provider, using the Login IDs and passwords given to them by the service provider before reverse auction event. Bidders should acquaint themselves of the „Business Rules of Reverse Auction“, which will be communicated before the Reverse Auction.

13. If the Bidder or any of his representatives are found to be involved in Price manipulation/ cartel formation of any kind, directly or indirectly by communicating with other bidders, action as per extant BHEL guidelines, shall be initiated by BHEL and the results of the RA scrapped/ aborted.
14. The Bidder shall not divulge either his Bids or any other exclusive details of BHEL to any other party.
15. In case BHEL decides to go for reverse auction, **the H1 bidder (whose quote is highest in online sealed bid) may not be allowed to participate in further RA process.**
16. **“BHEL reserves the right to go for Reverse Auction (RA) instead of opening the sealed envelope price bid, submitted by the bidder. This will be decided after techno-commercial evaluation. All bidders to give their acceptance for participation in RA. Non-acceptance to participate in RA may result in non-consideration of their bids, in case BHEL decides to go for RA.**
17. **In case BHEL decides to go for Reverse Auction, only those bidders who have given their acceptance to participate in RA will be allowed to participate in the Reverse Auction. Those bidders who have given their acceptance to participate in Reverse Auction will have to necessarily submit „online sealed bid“ in the Reverse Auction. Non-submission of „online sealed bid“ by the bidder will be considered as tampering of the tender process and will invite action by BHEL as per extant guidelines in vogue.”**

Force Majeure clause: If at any time during the continuance of this contract the performance in whole or in part by either party of any obligations under this contract shall be prevented or delayed by reason, of any war, hostilities, acts of the public enemy, civil commotion, sabotage, fires, explosions, epidemics, quarantine, restrictions or acts of GOD (hereinafter referred to as events) then provided notice of happening of any such events is given by either party to other within twenty one days from the date of occurrence thereof neither party shall reason of such events be entitled to terminate this contract nor shall either party have any such non performance and delay is resumed as soon as practicable after such events has come to an end or ceased to exist. If the performance in whole or part of any obligation under this contract is prevented or delayed by reason or any such event claims for extension of time shall be granted for period considered reasonable by BHEL subject to prompt notification by the tenderer to BHEL of the particulars of the events and supply to the BHEL if required of any supporting evidence. Any waiver of time in respect of partial installment shall not be deemed to be a waiver of time in respect of remaining deliveries.

The correspondence exchanged against the tender from both tenderer and BHEL through email are considered as valid document legally though it is not signed. It is treated as valid confirmations made on behalf of the respective company and very much comes under the legal ambit of the business transaction and hence it is binding on both the parties to the business.

Any transaction pertaining to the tender from both the parties of business done round the clock irrespective of the office or business hours of the companies, are valid legally and binding on both the parties. This applies to the extent only in such cases where deadline time for transaction is not specifically declared by either or both the parties to the business.

In case Letter of Intent (LOI) is issued through email, the PC generated time and date of mail shall be construed as the official time and date of release of LOI. In as much as this date is within the last date of validity given by the bidder the LOI is said to have been issued within the validity period and shall be binding on both the parties to the business.

Tenderers participating in the tender should declare in their technical bid that whether they have been black-listed / kept on hold for a specified period / given Business holiday for a specified period by any Public sector undertaking or Government departments. The reasons for such action with details and the current status of such hold shall be clearly furnished to BHEL. If no such details are mentioned in the offer then it will be construed that the subject bidder is not under any such hold. But at a later date if it comes to the notice of BHEL about any such hold under enforcement on the subject bidder, BHEL will have every right to reject the offer of such vendors at any point of time and also under any stage of the finalization of the subject tender irrespective of the status of the subject bidder in that tender. Such

bidders will not be permitted to participate in the further tender proceedings and will be communicated suitably. They will not be also considered for any ongoing tenders even if participated till the hold is officially lifted and confirmed in writing.



**BHEL, TIRUCHY - 620 014
CIVIL ENGINEERING DEPARTMENT (TOWNSHIP)**

NORMS FOR QUALIFICATION

NAME OF WORK: Replacement of pumping main with HDPE pipe from Vengur to Tiruverumbur along kallanai road at left out portions and from Tiruverumbur kallanai road junction (via kakkan colony and Bharathipuram) to Equalizing reservoir, BHEL Trichy.

(Tender Notice No. CT: TN: 009 / 16 - 17 & Tender schedule No. CT: TS: 025 / 16 - 17)

Sl. No.	Thrust Area	Score	Tender value Rs.in Lakh
			38.08
	ELIGIBILITY: <ol style="list-style-type: none"> 1. Separate Registration for EPF, ESI, PAN & Service Tax, Proof of IT returns submitted and profit & Loss Account and Balance Sheet certified by the auditor for the last three years (2012-13, 2013-14 and 2014-15) 2. Average annual turnover of similar works in the last 3 (three) years (2013-14, 14-15 & 15-16) ending 31st march shall be at least for a value of Rs. 11.42 Lakhs. 3. During last 7 (Seven) years (01.08.2009 to 31.07.2016) should have successfully completed either, <ol style="list-style-type: none"> i. Three similar works each not less than Rs.15.23 Lakhs (or) ii. Two similar works each not less than Rs. 19.04 Lakhs (or) iii. One similar work not less than Rs. 30.46 Lakhs 4. Latest Solvency certificate (obtained within 6 months) from Nationalized / Schedule Bank shall be at least for a value of Rs. 15.23 Lakhs. 		
	THRUST AREA	SCORE	TENDER VALUE
			Rs. 38.08 L
I	NATURE OF COMPANY	5	
	Public Limited	5	
	Private Limited/Partnership firm	3	
	Sole Proprietor	2	
II	Similar Experience (Civil- Pipeline Laying work)	40	
	Total value of Civil - Pipeline Laying works executed in the last three years ending July -16 (Pro-rata for in between cases)	40	Rs. 68.54 Lakhs
	More than	24	Rs. 34.27 Lakhs

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Sl. No.	Thrust Area	Score	TENDER VALUE
			Rs. 38.08 L
III	Performance on previous works and the min. cost of each work during last seven financial years ending July - 16 Rs. 15.23 Lakhs	20	
	Successful completion of three major works in time.	20	
	Successful completion of two major works in time.	16	
	Successful completion of one major work in time.	12	
IV	Highest value of single work completed during last seven financial years ending July - 16	10	
	(Pro-rata for in between cases)	10	Rs. 30.46 Lakhs
	More than	6	Rs. 15.23 Lakhs
V	Equipments owned	10	
	Butt fusion welding machine, Welding & erection equipment's, crane ,etc	10	
	Butt fusion welding machine, etc	6	
VI	Qualified staff availability	5	
	Minimum of Graduate Engineers - 1 No. Minimum of Supervisors - 2 Nos.	5	
IX	Financial stability – Solvency Certificate	10	
	(Pro-rata for in between cases)	10	Rs. 30.46 Lakhs
	More than	6	Rs. 15.23 Lakhs
	TOTAL	100	

- NOTE:** i) **Minimum score required for qualification is 60 out of 100.**
- ii) **All the above financial value excludes cost of cement, steel reinforcement & structural steel and HDPE Pipes.**

Similar work means CIVIL- Water supply and other PIPELINE LAYING WORKS

12. Is the individual/sole proprietor/any partner/ directors of company:

- (a) Dismissed Government Servant Yes No
- (b) Having business banned/suspended by any government in the past Yes No
- (c) Convicted by a court of law Yes No
- (d) Retired Engineer / Official from Engineering Departments of Govt. of India within last two years Yes No
- (e) Director or partner of any other company / firm enlisted with CPWD or any other department Yes No
- (f) Member of Parliament or any State Legislative Assembly If answer to any of the above is 'Yes', furnish details on a separate sheet Yes No

13. Name of person holding power of attorney.
(Copy to be enclosed)

(a) Nationality Indian Other

(b) Liabilities

14. Name of Banker with full address
(Note: Banker's report in original preferably in sealed cover, giving the financial capacity to handle works of the required magnitude should be enclosed)
.....

15. Place of business

16. Date of commencement of business

17. Details of Income Tax paid during last three years. 1. 2014-15
2. 2013-14
3. 2012-13

18. State whether Income Tax Clearance Certificate from the appropriate authority in the prescribed form enclosed. Yes No

19. Contractor's capital in the business. (in case of partnership, please mention percentage of shares and amount)

20. Quantum of business done during last three financial years 1. 2015-16
2. 2014-15
3. 2013-14

21. Value of fixed assets of the business in the last three years 1. 2015-16
2. 2014-15
3. 2013-14

22. Guarantee limits (if any) enjoyed by the firm.

23. Over-draft limits (if any) enjoyed by the firm.

24. State whether Audited report for Profit and Loss Account & Balance Sheet for last three years enclosed. Yes No

25. Details of Technically qualified staff :-

Sl. No.	Name and Designation	Qualification	Experience and Specialization	Remarks if any

26. Whether the details of T & P, Machinery, Equipments and work shop as per Annexure – I given. Yes No

27. Whether enlisted with any other Department Yes No
 (a) If yes, give details:

- (i) Name of Department & address
- (ii) Money limit
- (iii) Enlistment No. & date
- (iv) Valid upto

28. Licence No. and validity of licence obtained from Dy. Chief Inspector of Factories / Assistant Commissioner of Labour

29. Whether the applicant has registered his workmen under Employees' State Insurance Act. If so, code number may be furnished. If applied, attested copy of application for registration acknowledged by ESI Authorities.

30. Whether the applicant has registered his workmen under Employees' Provident Funds and Miscellaneous Provisions Act ?. If so, the code number may be furnished. If applied, attested copy of application for registration with acknowledged by PF Authorities.

31. Indicate Central / Local Sales Tax, Excise Duty code Numbers and PAN.

1.	CST
2.	LST
3.	ED
4.	PAN

32. Is any person working with the applicant as a near relative of the Officer / Official of BHEL Yes No

(a) If yes, give details

- (i) Name
- (ii) Staff No.
- (iii) Designation & Department
- (iv) Unit

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33. Details of similar works completed during the last seven years (To be submitted in separate sheet as per Annexure-II.)
34. Certificates from clients in original as per proforma given in Annexure -III for all eligible works.
35. Certificates:
 - (i) I/We (including all partners) certify that I/We have read the Preamble & Terms and conditions and shall abide by them.
 - (ii) I/We certify that the information given above is true to the best of our knowledge. I/We also understand that if any of the information is found wrong, I/We am/are liable to be debarred.
 - (iii) I/We certify that I/We will not get myself / ourselves registered as contractor(s) in BHEL under more than one name.
 - (iv)
 - (a) I certify that I did not retire as an Engineer of Gazetted rank or as any Gazetted Officer employed on Engineering or Administrative duties in any Engineering Department of the Government of India during the last two years. I also certify that I have neither such a person under my employment nor shall I employ any such person within two years of his retirement except with the prior permission of the Government. (For Individuals seeking enlistment in their own name).
 - (b) We certify that none of the partners/directors retire as an Engineer of Gazetted rank or as any Gazetted Officer employed on Engineering or Administrative duties in last two years. We also certify that we have neither under our employment any such person nor shall we employ any person within two years of his retirement except with the prior permission of the Government. (For partnership firms and limited companies).

Signature(s) of the applicant(s)	Signature	Address
Name		(Seal in case of Firm)
1.
2.
3.
4.
5.

Date:

- NOTE:** 1) All the relevant certificates, details etc. should be attached with the application.
 2) The terms that are not applicable may be scored out.

Details of documents attached:-

- 1.
- 2.
- 3.
- 4.
- 5.
- 6.
- 7.
- 8.
- 9.
- 10.

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ANNEXURE – I

DETAILS OF PLANTS AND EQUIPMENTS OWNED

Sl. No.	Name of Equipments	Nos.	Capacity or Type	Age	Remarks
	Earth moving equipments				
1.	Excavator (Various sizes)				
	Equipments for hoisting & lifting				
1	Mobile crane				
2.	Tower crane				
3.	Builder's hoist				
	Equipments for concrete works				
1.	Concrete batching plant				
2.	Concrete pump				
3.	Concrete transit mixer				
4.	Concrete mixer (diesel)				
5.	Concrete mixer (electrical)				
6.	Concrete vibrator (electrical)				
7.	Concrete vibrator (petrol)				
8.	Table vibrator (elect./petrol)				
	Equipments for building works				
1.	Block making machine				
2.	Bar bending machine				
3.	Bar cutting machine				
4.	Wood thickness planer				
5.	Drilling machine				
6.	Circular saw machine				
7.	Welding generators				
8.	Welding transformers				
9.	Cube testing machine				
10.	Steel shuttering				
11.	Steel scaffolding				
12.	Grinding/polishing machine				
	Equipments for road works				
1.	Road roller				
2.	Bitumen paver finisher				
3.	Hot mix plant				
4.	Spreaders				
5.	Earth rammers				
6.	Vibratory road roller				
	Equipments for transportation				
1.	Tipper				
2.	Truck				
	Pneumatic equipments				
1.	Air compressor (diesel)				
	Dewatering equipments				
1.	Pump (diesel)				
2.	Pump (electrical)				
	Power equipments				
1.	Diesel generator				
	Any other plants/equipments				

ANNEXURE - II

DETAILS OF SIMILAR WORKS COMPLETED DURING THE LAST SEVEN YEARS (01 08 2009 To 31 07 2016)									
Sl. No.	Name of work & Agreement No.	Date of commencement	Date of completion		Reasons for delay & compensation levied, if any	Work order Value	Gross cost of completion		Name, designation & complete address of the authority for whom the work was done
			Stipulated	Actual			Including cost of cement, steel reinforcement & strl. steel	Excluding cost of cement, steel reinforcement & strl. steel	

DETAILS OF WORK: COMPLETION CERTIFICATES, WORK ORDERS ETC. ARE TO BE FURNISHED

CLIENT'S CERTIFICATE REGARDING PERFORMANCE OF CONTRACTORS

Name & Address of the Client

.....

Details of works executed by Shri . M/s

.....

1. Name of work with brief particulars :
2. Agreement No. and date :
3. Date of commencement :
4. Stipulated date of completion :
5. Actual date of completion :
6. Details of compensation levied for delay, if any:
7. Tendered amount :
8. Gross amount of the work completed :
9. Name and address of the authority under whom work executed :
10. Whether the contractor employed qualified Engineer/Overseer during execution of work? :
11. (i) Quality of work (indicate grading) : Outstanding/V.Good/Good/Poor
 (ii) Amount of work paid on reduced rate basis, if any :
12. (i) Did the contractor go for arbitration ? :
 (ii) If yes, amount of claim :
 (iii) Amount received :
13. Comments on the capabilities of the contractor
 - (a) Technical Proficiency : Outstanding/V.Good/Good/Poor
 - (b) Financial Soundness : Outstanding/V.Good/Good/Poor
 - (c) Mobilisation of adequate T & P : Outstanding/V.Good/Good/Poor
 - (d) Mobilisation of manpower : Outstanding/V.Good/Good/Poor
 - (e) General behaviour : Outstanding/V.Good/Good/Poor

NOTE: All columns should be filled in properly.

Signature of the Certifying Officer
 with Official seal.

GENERAL AND SPECIAL CONDITIONS OF CONTRACT

GENERAL CONDITIONS

1. No night work will be permitted without the written permission of the Engineer – in – charge.
2. Bulkage test on the sand to be used on the work should be conducted periodically to arrive at the correct quantity of sand to be mixed for the different proportions as and when required.
3. Items of work other than those mentioned in the Bill of Quantities (Tender Schedule) attached hereto will be carried out at the rates to be fixed by this organization as per relevant clauses of the General Conditions of Contract.
4. **(a) On the written request from the contractor Water required for the work may be provided by this organization at only one point at the site of the work at free of cost.** In case of failure of water supply, the Contractor will have to make his own arrangements for water without any extra claims until supply is restored. BHEL does not accept any liability whatsoever for non supply or delay in the supply of water under any circumstances. The contractor shall ensure that there is no wastage of water otherwise supply of water, is liable to be stopped at contractor's risk and cost.
5. Permission for erection of temporary work sheds etc., at site will have to be obtained from BHEL in writing in advance.
6. The works contract to be entered into with the successful tenderer will be governed by the BHEL revised General Conditions of Contract in force.
7. The successful tenderer / Contractor shall observe all safety regulations and take necessary safety precaution as called for under the "BHEL General Conditions of Contract and Safety Precautions" enclosed herewith.
8. In all matters of dispute, the decision of the General Manager, Bharat Heavy Electricals Ltd., Tiruchirappalli – 620 014. shall be final and binding on the tenderer / contractor.
9. Some changes are likely in the quantities furnished as well as in the layout, design and specifications of the work. The rate quoted shall be deemed to be inclusive of all such contingencies.
10. All the materials to be used in the work and nature of work shall conform to respective TNBP, IS and National Buildings Organisation Standard Specifications and shall be got approved by the Engineer – in – charge before actual incorporation in the work

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SPECIAL CONDITIONS

1. Unless otherwise indicated in the Bill of Quantities cement, reinforcement steel (MS rods, CTD bars etc.), structural steel sections and other items (as mentioned in Schedule B) will be issued at BHEL Stores at free of cost. The Contractor's quoted rates shall therefore be inclusive of the cost of conveyance of these items from BHEL Stores to site of work including, loading, unloading and other incidental costs etc. The quantities of each items to the extent required for actual incorporation of the work will be treated as ISSUED FREE OF COST.

1. CEMENT:

Excess consumption of cement over and above the theoretical requirement as per BHEL Data upto a limit of 5% will be charged at the rate of Rs.6,668/per M.T. + applicable taxes at the time of recovery. Consumption beyond 5% will be charged at the punitive recovery rate of Rs.13,336/per M.T.. + applicable taxes at the time of recovery.

The above rates are only indicative and BHEL issue rate on date of actual issue will be applied
Gunny bags or Polythene Bags or Paper Bags in which cement is issued from BHEL Stores, need not be returned by Contractor to BHEL. The cost for each empty cement bag will be recovered from the Contractor's bills at the following rates.

i.	Empty cement gunny bag	Rs.1.25 + ST and SC / each
ii	Empty Polythene bag	Rs. 0.50 + ST and SC / each
iii	Empty paper bag	Rs. 0.25+ST and SC / each.

2. REINFORCEMENT STEEL:

All surplus reinforcement rod with the contractor shall be returned to BHEL Stores at his own cost in the form of full lengths, useful cut bits and scrap. The invisible (non-returnable) wastage should not exceed a maximum of 0.5% of the actual quantity consumed in the work.

The contractor shall return all the scrap to the disposal stores at his own cost. Bent rods will also be taken as scrap only, irrespective of their length. The maximum permissible limit of scrap without recovery is 5% of actual consumption. The recovery details for the materials are as follows:

a)	Single recovery rate for the non returned Scrap up to 5 % of actual consumption	:	Rs. 49,547/- per M.T + applicable taxes at the time of recovery
b)	The punitive recovery rate for steel qty. Not accounted and extra scrap generated Beyond 5% of actual consumption	:	Rs. 99,095/- per M.T + Applicable taxes at the time of recovery

The above rates are only indicative and BHEL issue rate on date of actual issue will be applied.

3. STRUCTURAL STEEL SECTIONS:

All surplus raw steel remaining with the contractor shall be returned to BHEL stores at his own cost after completion of fabrication, in the form of full lengths, useful cut bits and scrap. The following yardstick will be adopted for the purpose of classification of scrap.

(a) Mild steel and alloy Steel plates and sheets	1000X500mm and above	Useful cut bit
(b) Mild steel and alloy Steel plates and sheets	Less than 1000 X 500 mm	Scrap
(c) Structural	One metre and above in length	Useful cut bits
(d) Structural	Less than one metre in length	Scrap

The invisible (Non-returnable) wastage should not exceed a maximum of 2% by weight of fabricated steel work and returnable wastage generated by way of scrap or useful cutbits shall be returned at "Actuals". Maximum permissible limit for scrap without recovery shall be 5% of actual fabricated quantity. However every care should be taken to see that raw steel is utilized most economically by preparing necessary cutting lists to restrict the scrap within the permissible limit.

Should the quantum of invisible wastage exceed the 2% permissible limit, RECOVERY AT TWO TIMES OF THE VALUE OF the extra tonnage involved (which will be evaluated on an average cost per tonne basis considering the total raw steel materials issued) will be effected from the contractor for the excess quantity involved (**2 times x Rs. 48,495 = Rs.96,990 / MT + applicable taxes at the time of recovery**).

The above rates are only indicative and BHEL issue rate on date of actual issue will be applied.

The Contractor shall submit a material tallying statement on completion of the work indicating the details of quantities of each material (section by section) received quantities used for fabrication as per DOD lists. Quantity returned in full length, useful cut bits and scrap and the quantity reckoned as invisible wastage.

a) For Structural Steel:

Single recovery rate for the non returned Scrap upto 5% of actual consumption : Rs. 48,495/- per M.T + applicable taxes at the time of recovery

a) The punitive recovery rate for steel qty. not Accounted and extra scrap generated beyond 5% of actual consumption : Rs. 96,990/- per M.T + applicable taxes at the time of recovery

ii) For Rails:

a) Single recovery rate for the non returned scrap upto 5% of actual consumption : Rs. 65,739/- per M.T + applicable taxes at the time of recovery

b) The punitive recovery rate for steel qty. not Accounted and extra scrap generated beyond 5% of actual consumption : Rs. 1,31,478/- per M.T + applicable taxes at the time of recovery

iii) For ERW Tubes:

a) Single recovery rate for the non returned scrap upto 5% of actual consumption : Rs. 42,534/- per M.T + applicable taxes at the time of recovery

b) The punitive recovery rate for steel qty. not Accounted and extra scrap generated beyond 5% of actual consumption : Rs. 85,068/- per M.T + applicable taxes at the time of recovery

iv) For ERW Tubes:

a) Single recovery rate for the non returned scrap upto 5% of actual consumption : Rs. 1,23,260/- per M.T + applicable taxes at the time of recovery

b) The punitive recovery rate for steel qty. not Accounted and extra scrap generated beyond 5% of actual consumption : Rs. 2,46,520/- per M.T + applicable taxes at the time of recovery

The above rates are only indicative and BHEL issue rate on date of actual issue will be applied.

5. The Contractor should maintain proper accounts of cement, MS rods / CTD bars, structural steel sections and other materials if any supplied by this organization and these should be available at the site of the work for verification and check by the official of this organization at any time.
6. All materials brought by the Contractor for incorporation in the work shall be got inspected and approved by the Engineer-in-charge before they are incorporated in the work
7. The Manager / Civil or his duly authorized representative shall have all reasonable times access to Contractor's premises of work and shall have the power at all the reasonable times to inspect and test any portion of the work or examine the materials and workmanship of the structures during their manufacture and test. The contractor shall give due notice in writing to the Inspecting Engineer of BHEL when the materials supplied to be incorporated in the work are ready for Inspection and test. No material shall be incorporated in the work until the inspecting Engineer certified in writing that such materials have been inspected and approved by him.
8. The Contractor shall closely scrutinize all the drawings issued in connection with the work by this organization and bring to the notice of the Engineer-in-charge if any discrepancies, omissions in the drawings before undertaking the actual work pertaining thereto.
9. The contractor should submit in advance every fortnight a detailed programme of work to be undertaken from time to time strictly in conformities with the "Time and Progress Chart" covering the entire constructed work and reschedule them wherever necessary during the progress of the work so as to achieve the target set. Periodical progress reports of every fortnight should also be furnished by the Contractor regarding the collection of materials issued and to be issued from BHEL Stores and other relevant information as asked for by the Engineer-in-charge and other BHEL Officers-in-charge of the work.
10. The contractor should extend full co-operation to the other contractors who may be doing other works in the same areas to enable them to execute their portions of work without any delay or difficulty.

TERMS AND CONDITIONS REGARDING COMPLIANCE WITH VARIOUS LABOUR LAWS BY THE CONTRACTORS FOR BHEL

1. The Contractor shall not employ in connection with the work any person who has not completed 18 years of age.
2. The Contractor shall in respect of labour employed by him either directly or through subcontractors, comply with or cause to be complied with the following statutory provisions and rules and in regard to all matters provided therein.
 - a) The Contract Labour (Regulation & Abolition) Act 1970 and the related Tamil Nadu Rules.
 - b) The Minimum Wages Act 1948 and the related Tamil Nadu Rules.
 - c) The Payment of Wages Act 1936 and the related Tamil Nadu Rules.
 - d) The Factories Act 1948 and the related Tamil Nadu Rules.
 - e) The Employee's Provident Fund & Miscellaneous Provisions Act 1952.
 - f) The Employees State Insurance Act 1948.
 - g) The Workmen Compensation Act 1923.
 - h) The Industrial Disputes Act 1947.
 - i) **The Payment of Bonus Act 1965.**

and any other law or modifications to the above or to the Rules made thereunder from time to time.

REGISTRATION AND LICENSING

3. Every Contractor shall register his name with the Welfare Section of BHEL before taking up the work awarded to him by giving the following information and getting a Code Number :
 - a) The Name of the Contractor
 - b) Nature of Contract Work
 - c) Period of work
 - d) Number of maximum labour employed by him on any one day
 - e) License No. & Date (Applicable in case of contractor employing 20 or more workers)
 - f) Whether enrolled for PF, ESI, etc., and enrolment No.

This information is called for, for the purpose of informing the Inspectorate of Factories whenever they call for information regarding contracts.

4. The Contractor employing 20 or more workmen is required to obtain license from the authorities (The Deputy Chief Inspector of Factories / Assistant Commissioner of Labour as the case may be). The license shall be amended and / or renewed wherever, there is an increase in the workmen employed by him or in the event of contract being extended or renewed. The Contractor shall inform the license number to the BHEL Management before taking up the work.
5. The Contractor (Licensed or unlicensed) shall promptly furnish every information and document required by BHEL authorities for the purpose of fulfilling their obligations as Principal Employer and / or Occupier of the Factory and shall render all necessary assistance for the same.

WAGES

6. The tenderer has to ensure payment of Minimum Wages as per Tamil Nadu State Minimum Wages as applicable under law from time to time.

The labourers engaged in this contract shall be paid additional payment as mentioned below in addition to the payment of Minimum wages as stated above.

- | | |
|--------------------------------|--------------------|
| a) Unskilled Worker | Rs. 3200 per month |
| b) Semi-skilled Worker | Rs. 3700 per month |
| c) Skilled Worker / Supervisor | Rs. 4100 per month |

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Also the labourers shall be paid a minimum bonus which shall be 8.33% as per the payment of Bonus Act 1965 for the total wages paid (i.e) Payment of minimum wages and additional payment as mentioned above.

The Contractor shall have to remit EPF & ESI contributions at the rates applicable under law to the authorities concerned for the total wages paid (i.e) Payment of minimum wages and additional payment as mentioned above.

At present the Tamil Nadu State Government Minimum wages declared is enclosed for your reference (Ref. Page No.11). Normally the revision will be with effect from 1st April of every year. Tenderers are requested to quote their offer after taking into account of the above factor also.

7. The Contractor shall fix wage periods in respect of which wages shall be payable. No wage period shall exceed one month.
8. The Contractor shall ensure payment of wages to the contract labour employed by him within three days from the end of wage period in case the wage period is one week or a fortnight and in all other cases before 10th day of the following month.
9. All Payment of wages shall be made on working days at the work site and during the working time and on date notified in advance. In case the work is completed before the expiry of the wage period final payment shall be made within 48 hours of the last working day.
10. Where the employment of any worker is terminated by or on behalf of the Contractor, the wages earned by him shall be paid before the expiry of the second working day from the day on which his employment is terminated.
11. Wages due to every worker shall be paid to him direct or to the person authorized by him in this behalf. All wages shall be paid in current coin or currency in both.
12. The Contractor shall ensure the disbursement of wages in the presence of such authorized representative of BHEL Management.
13. The above payment shall be verified by the authorized officer / representative of BHEL with the following certificate of the payment sheet "Certified that the amount shown in Column No..... has been paid to the workmen concerned in my presence onat....."
14. A certificate of payment shall be furnished in duplicate by the Contractor to the Engineer in charge each month in Form 'A'.
15. A notice showing the wage period and the place and time of disbursement of wages shall be displayed at the place of work and a copy to be sent to the Welfare Department by the Contractor under acknowledgement.
16. Notices showing the rate of wages, weekly rest days, hours of work, wage period, date of payment of wages, names and addresses of the Inspector having jurisdiction, the date of unpaid wages shall be displayed in Tamil and English in conspicuous places at the establishment and at work site by the Contractor. The Contractor shall inform the BHEL Management every month the details of contract labour engaged for contract in this following form :
 - a) Serial Number
 - b) Location
 - c) Period of work
 - d) No. of contract labour engaged during the month
 - e) No. of days worked
 - f) No. of men worked
 - g) Wages paid to workers

The above statement shall be furnished to BHEL Management at the end of every month.

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REGISTERS AND RECORDS AND COLLECTION OF STATISTICS

17. The following documents / formats under Contract Labour (Regulation & Abolition) Act 1970 and Tamil Nadu Rules thereunder shall be maintained by each contractor.
 - a) Register of persons employed by the Contractor
 - b) Employment Card
 - c) Service Certificate
 - d) Muster Roll, Wage Register, Deduction Register, Wage slip, Overtime Register, Register of Fines, Register of Advances etc.,
18. The Contractor shall display the abstract of the Contract Labour (Regulation & Abolition) Act and the Rules thereunder both in English and Tamil.
19. Half yearly Return shall be sent by the Contractor in duplicate to the Licensing Officer.
20. The Contractor shall submit the returns required under the Contract Labour (Regulation & Abolition) Act 1970 periodically to BHEL Management.
21. The Contractor shall without fail give up to date information in writing of the attendance of the workers employed by him.
22. The Contractor shall ensure that his workers keep and produce their Employment Card when coming to duty and take them back when leaving duty.
23. All the above registers and records shall be preserved in original for a period of three years. All the registers, records and notice maintained under the Act and rules shall be produced on demand by Inspector or any authority under the Act.

WORKING HOURS AND WORKING CONDITIONS

24. No worker shall be required or allowed to work on Sunday unless he has or will have a holiday on anyone of the three days before or after the said day.
25. The Contractor shall inform BHEL Management in the prescribed form details of the contract workers scheduled to work on Sunday, the day of rest and also indicate the substituted holiday in lieu thereof. This shall be intimated two days in advance before his workmen are booked for work on Sunday.
26. The contract labour working for more than nine hours in any day or for more than 48 hours in any week shall be paid wages at the rate of twice the ordinary rate of wages in accordance with the provisions of Sections 59 of the Factories Act 1948.
27. The Contractor shall provide all safety devices and personal protective equipment to his workmen at his own cost and shall ensure that his workmen wear / use such devices or equipment provided to them while doing the work and there should not be any relaxation on this.
28. The Contractor shall give four paid National Holidays to his workers, viz., 26th January, 1st May, 15th August and 2nd October.
29. The Contractor shall ensure that his workmen vacate the premises after the shift is over.
30. The Contractor shall give leave with wages to his workmen who have worked for a period of 240 days or more in the Factory premises during a calendar year. This leave shall be allowed during the subsequent calendar year at the rate of one day for every 20 days of work performed by the worker during the previous calendar year. The worker whose services commences on a day other than the first of January shall be entitled to leave with wages at the above rate (One day for every 20 days of work) only if he had worked for a minimum of 2 /3 of the total number of days in the remainder of the calendar year. This leave will be admissible only during the subsequent calendar year.

31. No woman worker shall be required or allowed to work in the Factory except between the hours of 6.00 A.M. and 7.00 P.M.
32. The Contractor shall comply with the provisions relating to Welfare and Health facilities as provided in the Contract Labour (Regulation and Abolition) Act 1970 read with the Tamil Nadu Contract Labour Rules 1975.

NOTICE OF ACCIDENTS

33. Notwithstanding anything contrary to this, in the event of accident the contractor shall be required to fill injury report and submit the Engineer in charge immediately and ensure the compliances of ESI / Workmen's compensation Act, Factories Act and Rules made thereunder. He shall also maintain a register of accident as per the Act.
34. The Contractor shall get the contract labour engaged by him insured under Workmen's Compensation policy from General Insurance Corporation of India before actually starting the work of contract. The insurance coverage should be for the entire period of Contract. The Contractor shall comply with the provisions of the Workmen's Compensation Act 1923. (This should be read in conjunction with the provisions of ESI Act)

COVERAGE UNDER THE ESI ACT / PF AND MISCELLANEOUS PROVISIONS ACT

35. The contractor shall ensure that all his workmen are covered under the Employee's State Insurance Act and produce to BHEL such Registration Number / Enrolment Number before executing the contract work.
36. The Contractor shall regularly pay the amount of contribution. i.e., employer's contributions as well as employees' contribution pursuant of the above scheme as fixed from time to time. The Contribution payable presently is 1.75% wages to be recovered from his workmen and 4.75% of wages to be contributed by the Contractor. Contributions recovered from employee and contribution made by the contractor may be rounded to the next higher multiples of five paise.
37. The Contractor shall take note of any amendment that may be brought forth in the above contribution rate and act accordingly.
38. The contractor shall ensure that his workmen are covered under the EPF & Miscellaneous Provisions Act 1952 and accordingly produce to the BHEL Management the registration / enrolment number before awarding of contract work. As per the existing provisions every worker shall be entitled and required to become a member of the fund. The employee's contribution payable at present is 12% of wages which will be recovered by the contractor from the wages of his workmen and the contractor should pay equal contribution. The contractor is also liable to pay any administrative charges in this behalf that may be decided from time to time. It will be the responsibility of the contractor to ensure such contribution payable in respect of workmen employed through sub-contractors also.
39. The Contractor shall take note of any amendment in the rate of contribution payable under the scheme from time to time.
40. The Contractor shall within seven days of the close of every month submit to BHEL a statement showing the amount of contribution payable / paid for employees engaged by him or through him and shall also furnish to BHEL such information as Principal Employer is required to furnish under the provisions of the ESI Act and PF as well as the schemes made thereunder to the authorities concerned.
41. Whenever any sum of money is found to be recoverable from or payable by the contractor under the above Act, the sum shall be deducted from any sum that may be due or which at any time thereafter may become due to the Contractor under this contract or under any other contract or from his security deposit. In case the recoveries are not sufficient to satisfy the claim, the contractor shall pay the balance thereof on demand. In case any recoveries are made under this clause from security deposit, the contractor shall immediately thereafter pay such further sums as may be required to replenish the shortage caused by such recoveries in amount of security deposit.

42. The Contractor shall abide by all the labour and other laws applicable to contract labour / worker under this contract and shall at all times keep BHEL indemnified against all losses, claims, prosecutions under any law.
43. In case of non-compliance of any of the provisions of the Acts and in case BHEL having complied with the same, BHEL will be entitled to recover the same from the contractor / sub-contractor.
44. Non-exercise of any of the powers or rights available to BHEL hereunder or under any law, shall not in any way operate as waiver thereof.

Note : The Specimen forms for the following are available in BHEL.

- | | | | |
|----|-----------|---|--|
| 1) | Form 'A' | - | Payment Certificate |
| 2) | Form IV | - | Application for License |
| 3) | Form XIII | - | Register of Workmen employed by contractor |
| 4) | Form XIV | - | Employment Card |
| 5) | Form XV | - | Service Certificate |
| 6) | Form XVI | - | Muster Roll |
| 7) | Form XVII | - | Register of wages |
| 8) | Form XIX | - | Wage slip |

GENERAL AND SPECIAL SPECIFICATIONS

1. Site Clearance

All the area upon which the construction is to be carried out and areas which are required by the Contractor for his construction facilities are to be cleared off all rubbish and objectionable matter at Contractor's own cost. Trees, if any, shall not be uprooted or cut without the prior approval of the Engineer-in-charge. All spoils, unserviceable materials and rubbish shall be burnt or removed from site. Usable materials, saleable timber, fire-wood etc., shall be stocked properly at work site in the manner as directed by the Engineer-in-charge. The cost of clearing the areas shall be deemed to have been included by the tenderer in his general rate.

2. Earthwork for Foundations

Earthwork excavation for foundations and filling in foundations shall conform to TNBP 23 and 24. The area to be excavated or filled in with excavated materials shall be clearly demarcated in the field by the Contractor. Excavation shall be done to lines and levels defined. Excavation shall be carried out to such widths, lengths, depths, profiles and grades as shown in the drawing or as may be specified by the Engineer – in – charge. Rough Excavation may be carried out up to a depth 15 cm less than the final level but the balance shall be excavated to precise level with special care. All soft pockets of soil met with even below the final level shall be removed and the excavation filled up as directed by Engineer-in-charge. The methods of excavation shall in every case be subject to the approval of the Engineer-in-charge and the contractor shall ensure the safety and stability of the excavations, being executed by him as well adjacent buildings, structures, services and other works in the vicinity of the site of work. Wherever necessary Engineer-in-charge may direct that the sides of the excavation should be timbered and shored at the contractor's own cost, adopting a proper method approved by the Engineer-in-charge. Not with-standing the above, should any slip occur, the contractor shall remove all the slipped materials from the excavated pit, at his own cost. He shall also make good at his own all damages caused to the work as well as adjacent buildings, structures etc., as a result of the slip, referred to.

All excavation work shall be subject to inspection and approved by the Engineer-in-charge before any further works in the excavated areas allowed to commence. Should any excavation be carried out beyond the specified depth, the contractor should fill it up at his own cost with the same type and class of material as it is proposed to be laid over the excavated portion. No payment will however be made to the contractor on his account.

The contractor shall ensure that the excavations and the structures under construction are kept free from water logging at all stages of construction. He shall take all necessary precautions and `streams, acquifers, springs, surface flows etc., are excluded effectively so as to ensure that the works are carried out in a reasonable dry conditions in accordance with the construction schedule.

Back filling around the foundations, trenches, plinth and under the floor shall be done in accordance with TNBP 24 and 25. The finished level of the plinth filling shall be trimmed to the slope required to be given to the finished floor. Back filling, watering and consolidation of excavated earth in layers etc., complete as per specifications shall be done unless otherwise stipulated in the tender schedule.

Removal of Hard rock by Blasting

This shall include all rock occurring in large masses which cannot be removed except by blasting. Blasting shall be done in conformity with TNBP 19 & 23 and as instructed by the Engineer-in-charge. When rock blasting has to be done adjacent to structures, the following precautions shall be observed.

- (1) All blasting should be completely muffled to prevent damage by flying pieces.
 - i. Blasting within 3 meters of the structures shall be avoided
 - ii. No blasting should be done within 1.5 meters of concrete / masonry structures.
 - iii. An isolated boulder extending under the existing structure but projecting within the area of blasting should be blasted.

- iv. The contractor shall be responsible for all damages caused by blasting and shall replace or repair the damaged structures at his own cost.

3. Plain and Reinforced Cement Concrete Works :

All design and construction shall be performed in accordance with the Indian standard code of Practice for plain and reinforced concrete – IS 456 and TNBP 30. Any Special requirements noted on the drawings or bill of quantities shall govern over the provisions of this specifications. Controlled concrete shall be used wherever specified in the schedule of items complying with all requirements of IS : 456 and as per special specifications appended herewith.

The coarse aggregate to be used shall be of hard broken granite stone jelly of various sizes as specified under respective items in the Bill of Quantities, conforming to IS 383 latest edition. The Engineer-in-charge may require the contractor to carryout moisture content tests in both fine and coarse aggregates. For determination of moisture content IS – 2386 shall be referred to. The amount of water to be added shall be then adjusted to compensate for any observed variation in the moisture contents. Proper control of mixing water is deemed of paramount importance. Mixtures with automatic water measuring drums shall be used or else. Water should be measured by volume in calibrated buckets. All measuring equipments shall be maintained in a clean serviceable condition and the accuracy periodically checked and got certified by the Engineer-in-charge. The contractor shall carryout slump tests apart from taking test cubes at regular intervals. All such methods of sampling and analysis of concrete shall be in accordance with IS – 1199.

Mixing of concrete shall be strictly carried out in an approved type mechanical mixer. The mixing equipment shall be capable of combining the aggregates, cement and water within the specified time (not less than 2 Minutes) into a thoroughly mixed and uniform mass and of discharging the mixture without segregation. Mixing shall be continued until there is a uniform colour and consistency, Concrete shall be handled from the place of mixing to the place of final deposit as rapidly as practicable by methods which will prevent segregation or loss of any of the ingredients. Before depositing the concrete, all debris and dirt shall be removed from the space to be occupied by concrete. Concreting shall not be done unless the formwork conform to the shapes, lines and dimension as shown in the drawings.

Unless otherwise approved, concrete shall be placed on single operation to the full thickness of slabs and beams and similar members and not exceeding 1 metre deep in walls, columns and similar members. Concrete shall be placed continuously until completion of the part of the work between construction joints or as directed by the Engineer-in-charge. The concrete after being laid shall be compacted by means of vibrators of approved type under proper supervision as directed by the Engineer-in-charge. Care should be taken to avoid segregation and formation of air bubbles. The whole process starting from the mixing of concrete to the placing and compaction shall not take more than 20 minute and the process shall be completed before the initial setting takes place. Curing shall be accomplished in accordance with IS-456 by keeping the concrete covered with a layer of sacking, canvas or similar absorbent materials and kept constantly wet for the period as directed by the Engineer-in-charge.

Reinforcement

All reinforcement shall be clean and free from pitting, loose mill-scales, dust, loose rust and coats of paint, oil or other coatings which may destroy or reduce bond. General construction details and workmanship relative to reinforcement including bar bends, lap splices and installation shall be in accordance with the IS-2502 as well as IS-456. All bars be bent as per the bar bending schedules indicated in the drawings or supplied separately relevant to particular drawing. The contractor shall in all cases verify himself the correctness of schedules, giving the number, length and the bending details of the bars. The numbers, sizes, shape and position of all the reinforcement shall, unless otherwise, directed or authorized by the Engineer-in-charge be strictly in accordance with the drawing. The reinforcement shall be adequately held in position by 18 / 20 SWG soft black annealed binding wire. The contractor must obtain the approval of Engineer-in-charge for the reinforcement placed, before any concrete is placed in the form. All reinforcing bars shall be so tied as to form a rigid cage to prevent displacement before or during concreting. Rate quoted for reinforcement should include cost of transporting M.S. Rods / CTD bars from BHEL Store to site of work, cleaning, cutting, bending, placing,

binding with contractor's own binding wire and providing necessary cover blocks of concrete but excluding cost of steel which shall be supplied free of cost at BHEL Stores.

Form Work

Formwork shall conform to the shape, lines and dimensions of concrete and RCC structures as shown in the drawings and shall be well within the permissible tolerance. Formwork for concrete shall be of plywood, steel, good seasoned timber or other approved materials, properly designed easy for removal and cleaning. They shall be of sufficient strength and rigidity to maintain their position and shape under loads incidental to placing concrete. The number of props, their sizes and dispositions shall be such as to be able safely carry the full dead load area constructional loads. The arrangement and alignment of formwork shall be got approved by the Engineer-in-charge prior to concreting. However this shall not relieve the contractor from his responsibility for proper work and safety. Formwork shall be sufficiently tight to prevent loss of cement slurry from the concrete. All joints and holes in the formwork shall be caulked with putty jute cloth or other approved materials to the satisfaction of the Engineer-in-charge. The stripping time for the shuttering and the formwork shall in general conform to the provisions in the relevant clauses of IS 456. Unless otherwise specified rates for reinforced cement concrete shall include cost of centering, shuttering charges also.

Expansion and Other Joints

Expansion Joints in concrete structures shall be provided at specified places as indicated in the drawings. The material shall be as specified by the Engineer-in-charge, expansion joints, with or without metal strip shall be as shown on drawings the filler shall be "EXPANDEX JOINT FILLER" premoulded non – extrudent type fibrous joint filler impregnated with bitumen conforming to IS : 1838. The filler shall be durable, waterproof, compressible and shall have a high degree recovery after compression is released, ensuring thereby that no free space develops in the expansion joints. The top 25 mm, or as specified in the drawings, shall be sealed with "SHALITEX SEALING COMPOUND" or equivalent after application of approved primer.

4. Stone Masonry

General: Stone masonry shall conform to TNBP 35. Stone shall be obtained from the approved quarry and shall be free from decay and weathering.

All stones shall be thoroughly wetted before use. The mortar used for jointing shall be as specified under the respective items of the ' Bill of Quantities'.

The walls shall be carried up truly plumb. Every stone shall be carefully fitted to the adjacent stones so as to form neat and closed joints.

To give sufficient lateral bond, vertical joints shall be avoided. Prescribed number of headers as required shall be provided to give sufficient transverse bond. At junctions of wall the stones each alternate course shall be so carried into each of the respective walls as to unite the work thoroughly. Where breaks are unavoidable in carrying up the work continuously in horizontal course sufficiently long steps shall be left to joint the old and new work building of two thin faces and filling up the middle with small stuff or dry packing shall be strictly avoided. When plastering or raised pointing is not required to be done joints shall be struck flush and finished simultaneously.

Coursed Rubble Masonry

Coursed rubble masonry shall conform to TNBP 35-H, I and J. Faces shall be accurately squared and all face joints shall be dressed at right angles. This bushing on the facing stones shall not project more than 38mm.

Face stones shall be laid alternate headers and stretchers. Depth of each course shall not be less than 150 mm. No course shall be greater than any course below. The height shall not exceed the breadth of stones of face. No stone shall tail into the wall less than its height. No pinning shall be allowed on the face. The stones shall be solidly bedded set full in mortar with joints not exceeding 12 mm in thickness.

Random rubble masonry

Random rubble masonry work shall conform to TNBP 35-L and J. Stones shall be hammer dressed at faces and joints to enable them to come into close proximity with each other. The face stone shall be laid headers and stretchers alternately, so as to break joint by at least 75mm. Thickness of joint shall not exceed 12mm. No pinning shall be used on the face and face stone shall extend well back into the headers. Stones less than 130 mm. in height shall not be used on the face.

Bond stones running through the wall shall be provided at 1.8M intervals in walls up to 0.60 M. thickness and if the wall is more than 0.60 M. thick a line of headers shall be laid from face to back each header overlapping the other by at least 150 mm.

5. Brick Masonry:

First class Bricks: Brick shall be sound, hard, tough, rectangular in shape and size, well burnt of uniform deep red or copper colour and conform to IS – 1077.

Brick shall be free from cracks, chips, flaws, stone or humps of any kind. Bricks shall be homogeneous in texture and emit a clear ringing sound on being struck and shall have a minimum compressive strength of 50KG / sq.cm. and shall not absorb water more than 20% of its weight, when soaked cold water for 24 Hrs. All bricks shall be table moulded.

Second Class Bricks: These shall be ground moulded but should otherwise conform to the specifications of first class bricks except for some surface cracks are allowable. These shall have minimum compressive strength of 50 Kg./sq.cm.

Samples of each type of brick, shall be got approved by the Engineer-in-charge before being used. All subsequent deliveries shall be up to the standards of the approved samples.

Brickwork shall conform to TNBP31 and IS –2212.

Brick works shall be classified as first or second class according to the classification of bricks used and the method of laying. The thickness of joints shall not exceed 6 mm. In first class brickwork and 10 mm in second class brick work.

Bricks shall be well soaked before use on works for at least 6 hrs. The soaked bricks shall be kept on wooden planks or platform. Brick required for masonry with clay or lime mortars shall not be soaked.

Brickwork shall be laid with specified mortar to be prepared in accordance with IS –2250. Brick works shall be laid in English Bond unless otherwise specified. Half or cut bricks shall not be used except when needed to complete the bond. Each course shall be taken up truly plumb, if battered, the batter is to be truly maintained. The level of brickwork shall be checked up at every one metre interval. Bricks shall be laid with frogs upward, while laying bricks shall be thoroughly bedded and flushed in mortar and taped into position with a wooden mallet and the superfluous mortar removed. Walls of all structures shall be carried up regularly in all cases, leaving no part, one metre lower than the other. Where the masonry of one part has to be delayed, the work shall be raked back according to bond (and not toothed) an angle not exceeding 45 Deg. But the raking back should not start within 60cm. of a corner vertical joints in alternate courses shall come directly over one another. The brickwork shall not be raised more than 14 courses per day. All iron fixtures, pipes, conduits, drains, sleeves, bolts, holdfasts of doors and windows etc. which are required to be built in walls shall be embedded in cement mortar or cement concrete as specified, in their correct position as the work proceeds.

Joints

Joints shall be restricted to 6 mm in first class brickwork and 10mm in second class brick work. All bed joints shall be normal to the pressure upon them, radial in arches and at right angles to the face in battered retaining walls. Care shall be taken that all joints are fully mortared (proportion as specified in the schedule items) well flushed up and in case where no pointing to be done, neatly struck at the work proceeds. The joints in faces which are to be plastered or pointed shall be squarely raked out to a depth of 12 mm while the mortar is still

green. The raked joints shall be well brushed to remove loose particles. After the work the faces of work shall be cleared well by brush so as to remove any splashed mortar during the course of raising the brickwork.

Curing

Green work shall be protected from rain by suitable covering. Masonry work shall be kept thoroughly well watered on all faces for atleast 10 days after completion. In case of fat lime mortar curing shall commence two days after laying of masonry and shall continue for seven days.

6. Scaffolding

Scaffolding will generally be single but may be double if warranted for the particular work as approved by the Engineer-in-charge. The contractor shall take all measure to ensure safety of work and the working people.

Payment for brickwork shall be made on cubic metre basis on the volume of actual work done. Half brick wall and brick on edge wall shall be paid on square metre basis. The rate of brick work shall include scaffolding and all items mentioned above and no extra payment will be made for cutting bricks if required either for openings or for rounding or insertions or for recesses at the time of brick wall construction.

7. Damp Proof Course

Damp proof course shall either be with cement concrete or with cement mortar of specified thickness as mentioned in the relevant item of schedule. Damp proof course shall not be carried across doorways. It shall be laid for all walls except verandah retaining wall or for particular wall only directed by the Engineer-in-charge. It shall be laid flush with floor level or as instructed by the Engineer-in-charge.

Damp proof course with cement concrete shall be of 25 or 38 mm thick in cement concrete M15/M20 as specified using 12mm. and down size aggregate well rammed and smoothed with trowel. It will be kept wet for 40 hours and after it has dried, two coats of hot bitumen shall be applied over it and allowed it to dry after which sand shall be sprinkled over it.

Damp proof course with cement mortar shall be 12 or 20 mm thick in cement mortar 1:3 well mixed with crude oil at 5% by weight of cement used.

8. Cement Plastering:

Cement plastering shall be in accordance with IS – 1661 and TNBP –56 & 57, Cement mortar shall conform to IS – 269. The mortar of specified mix and thickness shall be used.

The surface to be plastered shall be thoroughly cleaned so that it is free from dust, oil, salts etc., The joints of masonry shall be raked out to a depth of atleast 12 mm. On cement concrete surfaces the surface shall be cleaned with wire brush and scarified by lines with trowel or hacking done. The surfaces in both cases shall be washed properly and kept wet for 4 hours before plastering is commenced.

Plastering shall be started from top and gradually worked down towards the floor. It shall not at any place be thinner than specified. To ensure even thickness plaster of about 15 cm X 15 cm shall be first applied horizontally and vertically at not more than 2 metres intervals over the entire surface to serve as gauges. The surface of these gauges shall be truly in the plane of finished surface. The mortar shall then be laid in the wall or other surfaces between the gauges and finished even. All corners shall be rounded to a radius of 24 mm unless otherwise directed. The contractor shall not be paid for any extra thickness of plaster done than as specified.

Plaster, when more than 15 mm thick shall be applied in two coats, a base coat followed by the finishing coat. Thickness of the base coat shall be just sufficient to fill up unevenness in the surface, no single coat, however, shall exceed 12mm in thickness. The under coat shall be roughened or scratched before it is fully hardened.

Curing shall start 24 hours after the plaster is laid. It shall be kept wet for 14 days. During this period it shall be suitably protected from all damages at the contractor's cost by such means as approved by the Engineer-in-charge.

Any cracks which appear in the surface shall be cut out in rectangular shape and redone as directed by the Engineer-in-charge. Wherever specified standard waterproofing compound as approved by the Engineer-in-charge shall be added to the mortar at the rate of 2% or as specified by the manufacturer by the weight of cement for which the rate shall be paid separately. The rate for plastering shall include cost of scaffolding, swing etc., needed for the work with labour and material all complete.

9. Steel Door, Windows and Ventilators:

All steel doors, windows and ventilators shall conform to IS – 1038, IS – 1361 and IS 1081 or equivalent as mentioned in the bill of quantities and as approved by the Engineer-in-charge.

Rolled steel sections shall conform to Is – 226. The sections shall be cold straightened and finished goods shall be free from bends and other defects. Materials used in the fabrication shall be the best procurable and conforming to relevant IS specification. Thickness and specification of the glass to be provided shall be as indicated in the relevant item of the bill of quantities. Glass shall be free from flaws, specks, bubbles, etc., Bolts, nuts, screws, peg stays and other mild steel fittings shall be treated for corrosion as per relevant Indian Standards. Putty for glazing shall conform to IS – 420.

Doors, windows and ventilators, etc., shall be truly square and free from twist and warp. They shall be constructed of sections which have been cut to the required lengths and welded or riveted at the corners as per standard specifications.

All steel surfaces shall first be thoroughly cleaned free of rust scale or dirt and mill scale by approved means and shall be painted with one coat of approved primer conforming IS – 102 before despatch. Alternatively if specified they may be galvanised by the “Hot dip” zinc spray or electro galvanising process described IS – 1361. Doors, windows and ventilators shall be fixed in positions, as specified under IS 1081.

Whenever contractor is required to supply the doors, windows and ventilators etc., he shall first submit to the Engineer-in-charge, the details about source of supply, detailed drawing and specifications etc., for prior approval.

10. M.S Rolling Shutters :

It shall be of approved quality, made out of 18 gauge 75 mm black laths mechanically operated by reduction gear type mechanism. It shall be fitted with two self-aligning ball bearing with locking arrangements (both inside and outside) including M.S pressed side guides bottom rails brackets and top rolling spring pressed etc., complete provided with locking arrangements for padlocks, pulling hooks, handles, top cover etc., It shall be painted with one coat of approved primer conforming to Is – 102 before despatch.

11. Wooden Doors, Windows and Ventilators :

All wood work for doors, windows, ventilators cup board, shelves, etc., conform to relevant IS specification and TNBP 82 and shall be well seasoned teak wood or well seasoned country wood (pillamarudu or karumarudu) as the case may be. Timber shall be best quality and shall be free from knots, injurious open shales, bore holes, decay, soft or spongy spots, hollow pockets and all other defects and blemishes. Timber shall conform to IS 1003 (Part 1). Size of doors, windows and ventilators shall as specified in the relevant item of schedule and detailed drawings and generally in conformity with IS – 1003, part I and part II. The rates for doors, windows and ventilators etc., shall be for the finished work inclusive of fixing them in position with necessary iron hold fasts and furniture fitting of oxidized iron or aluminium or oxidized brass as stated in the description of the relevant items of the bill of quantities and as directed by the Engineer-in-charge. Fittings and furniture shall be of best quality and machine made and robust type. Wherever glazed shutters are to be provided, the cost of glass panes of specified thickness and fixing them in position should be included in the quoted rate. All glass shall be of superior quality from approved manufacturer. In case of solid core flush doors, they should conform to IS:2202 Part I and Part II. The flush door shutters should have a finished thickness as specified in the scheduled item. Flush door shutters shall be obtained from firms of repute as approved by the Engineer-in-charge.

12. ROOFING : (A) R.C.C Slabs :

Roof slab shall be of RCC of specified mix conforming to IS : 456, with adequate main tensile, transverse and adhesive reinforcement of ribbed steel bars of mild steel rounds. Unless otherwise mentioned the rates for RCC slab shall include cost of concrete, centering and shuttering charges, vibration charges, rounding of corners, curing and finishing etc., complete. Expansion joints in reinforced cement slabs shall be as per TNBP 30.

The ceiling should be finished as per Clause 30 of TNBP. No extra payment shall be made towards cost of ceiling plaster necessitated on account of defective centering materials used or poor workmanship.

The top of roof slab shall be finished with weathering course treatment if so specified. The weathering course work shall conform to TNBP 44-HJ and consist of concrete with broken brick in neat slacked lime of specified thickness finished with one course of pressed split tiles / pressed tiles of specified thickness and size as described in the bill of quantities.

(B) Roofing and Side Cladding with A.C. sheets :

The A.C. sheets shall be of specified and approved quality and shall conform to IS 459- 1962 in all respects. The sheet shall be laid with the smooth side upwards and with a minimum end lap of 15cm. and for every flatter slopes this should be 20cm. The laying operation shall include scaffolding works involved. Sheets shall be secured to the purlins by means of 8mm galvanized iron J or L hook bolts and nuts. The grip of the hook bolt on the side of the purlin shall be not less than 25mm. Each bolt shall have a bitumen washer and galvanized iron washer placed over the sheet before the nuts are screwed down from above. Hole for hook bolts etc., shall be drilled and not punched in the ridges of the corrugations in the exact positions. The diameter of these holes shall 1.5 mm more than the diameter of the fixing bolts. The payment will be square metre basis of the laid area.

13. A.C. Rain Water Pipes

The pipes shall be of standard quality conforming to IS 1628. These shall be straight, true smooth and regular in thickness. They shall be free from cracks and other flaws. The supply shall include all necessary pipe fittings and accessories.

All pipes shall be fixed to wall or columns by standard M.S butt holder clamps of approved make. The spigot of the upper pipe shall be properly fitted into the socket of the lower pipe, such that there is uniform annular space for filling with the jointing materials. One third depth of this annular space is to be filled with spun yarn soaked in bitumen of approved quality and properly pressed with caulking tool. The remaining two, third depth of the joint is to be filled with Cement Mortar 1:2 (1Cement : 2 coarse sand) and shall be pressed with caulking tool and finished smooth at the top at an angle of 45 Deg. sloping up.

The rate shall include supplying and fixing pipes with specials and accessories, including sizing as required, jointing, testing, cutting of walls and making good necessary scaffolding etc., complete.

14. Flooring :

Flooring shall consist of a base course of cement concrete of specified thickness and proportion laid over the compacted earth or sand filling as specified and a finishing layer of concrete, mosaic, glazed tiles or any other material as specified to be laid. Flooring work for Factory shop floors as well as mosaic flooring shall be done as per the special specifications.

The bed flooring shall be prepared either level or sloped as per relevant drawing or as instructed by the Engineer-in-charge. Filling in basement with earth or sand shall be in accordance with TNBP 25. On the prepared bed, cement concrete of specified mix and thickness shall be laid and well consolidated.

A. Ellispattern, 1st Sort Flooring

On the clean wet surface of the concrete base before it has set, will be laid a layer of cement concrete to give a finished depth of 20/25 mm over the base concrete. The cement concrete will be of 1:3 proportion (one cement and 3 hard broken stone chippings 3 to 10 mm Size). To make a coloured floor red oxide iron powder or other approved materials should be mixed with cement at the rate 10% of the weight of cement or as directed by the Engineer-in-charge. Ellis pattern flooring shall be done as described under clause 41-G of TNBP.

B. Glazed Tile Flooring

The tiles shall be of ceramic white or coloured and of specified dimensions as described in the schedule item. The top surface of tiles shall be glazed with a neat finish of uniform colour and texture and free from flaws, cracks, craze, specks or other imperfections. Tiles shall be true and shape with straight edges, non-absorbing and non – fading. Samples of tiles together with manufacturer's literature shall be submitted to the Engineer-in-charge for approval. Tiles shall conform to IS 177 latest.

Over the prepared surface of the floor a bedding layer of Cement Mortar (1:3) of specified thickness shall be laid-in-proper level and slope using screed patterns. The bedding layer shall be deeply scratched while it is set. A mortar set bed of 6mm thickness in cement lime mortar 1:1:3 (one cement one lime putty and three sand), shall be laid over the bedding layer. After mortar setting, bed has been leveled, a skin of neat cement shall be trowelled to the mortar setting bed immediately before the tiles are set. As soon as the mortar setting bed has sufficiently hardened, all tiles shall be finally secured in place and gently beaten in and finished surface brought to desired level. When grouting the glazed tiles, special care shall be taken to prevent scratching of the glazed surface. Joints shall be pointed with white or coloured cement to match the tile surface and cured. No joint shall be more than 1.5 mm thick.

15. White Washing and Colour Washing

White washing and colour washing shall be done as per clauses 63 and 64 of TNBP. The surface shall be thoroughly cleaned off mortar drops and foreign matter. All patchings must be scraped properly. The white washing shall be done from pure shell lime / Janathacem. Samples of lime shall be got approved by the Engineer-in-charge. The wash shall be applied with a brush, the coats being laid on vertically and horizontally alternatively, each coat being allowed to dry before next coat is applied. For colour washing the desired shade shall be obtained by mixing approved quantity of colouring matter or distemper with shell lime solution and applied as per white. The contractor shall take every precaution to prevent white wash being splashed on wall, floor and other places and articles not to be white washed. No colour wash shall be done unless a sample pattern of the mixed colour has been approved by the Engineer-in-charge. The rates shall be inclusive of scaffolding charges, cost of ladder etc.,

16. Painting

All painting work shall be done in accordance with TNBP-66 and the relevant Indian Standard Specifications. Paints, varnishes, cement paints etc., shall be the highest grade products of well known approved manufacturer and shall be delivered to site in original sealed containers. It is desired that materials of one manufacturer only shall be used as far as possible. Colours shall be uniform and nonfading. Samples of all colours selected shall be submitted to the Engineer in charge for approval before bulk purchase is made. All finished work shall match corresponding samples kept with the Engineer.

Preparation of Surface :

Before painting wooden surfaces, protruding timber fibres shall be removed and nail marks shall be covered with putty. The surface shall be thoroughly cleaned and sand prepared. In case of steel work it shall be scraped, well brushed and cleaned free of rust, scale dirt. Base preparation for painting concrete, masonry and plastered surfaces shall be carried out as per IS 2395 – Part I. Before actually proceeding with the work of painting the concrete, masonry and plastered surfaces, it shall be verified that the surfaces shall be completely dry, free from efflorescence and alkaline effect.

Application

The primer shall be applied with brushes and spread as evenly and as smooth as possible. For steel work a priming coat of Red Oxide / Zinc Chromate paint shall be applied. Painting shall be done by skilled labourers in a work-man like manner. All coats shall be of proper consistency and shall be well brushed out, so that no brush marks are visible. The under coating should be nearest to the specified colour of the finishing coat. Unless otherwise specified ready mixed synthetic enamel paints shall be used for painting, wood and steel work. Under coats should be completely dry before finishing coat is taken up. Priming coat and under coat shall be rubbed with sand paper and dusted clean. The finished coat of approved paint shall then be applied.

17. Cement Painting

Cement Paint solution shall be applied to the surface with hair brushes in a number of coats to get uniform finish. After the first coat of paints has hardened, it shall be cured with water atleast for 24 hours. The surface shall be wetted again before the application of the second coat. Atleast 24 hours should lapse between the two coats, number of coats shall be as specified in the schedule of quantities. It shall be kept damp atleast for seven days.

18. French Polish

French polish to be used shall comply with IS 348. Polishing shall be obtained by dissolving 1 lbs, of shellac in one gallon of methylated spirit without applying any source of heat. After the shellac has dissolved ¼ lbs of cobalt, ¼ lbs of lobano and 0.4 oz of crystals of desired pigment shall be added. The solution shall be applied with a pad of fine muslin cloth tied as per general practice. The pad shall be dipped into the solution and wrung with fingers and be rubbed hard on the surface in this way, the first coat is to be given after this gets dried up, the successive coats shall be given in the same fashion till the mirror like surface is obtained. The wood to be polished shall be first applied with a filler composed of 1.25 Kg. of whiting mixed with one litre of methylated spirit and then sand papered when dry. The finished surface shall have uniform texture and gloss. Approved transparent sealer shall only be used in base preparation.

SPECIAL SPECIFICATION FOR LAYING HDPE PIPES AND SPECIALS - SUPPLY AND INSTALLATION

A-Technical Specification on HDPE Pipes and specials

1.0 Scope

This specification covers the requirements for successfully designing, manufacturing, supplying testing at works of High Density Polyethylene Pipes used for water supply.

2.0 Applicable codes

2.1 The manufacturing, testing, supplying and testing at work sites of HDPE pipes shall comply with all currently applicable statutes, regulations, standards and Codes. In particular, the following standards, unless otherwise specified herein, shall be referred. In all cases the latest revision of the Codes shall be referred to. If requirements of this Specification conflict with the requirements of the standards / Codes, this Specification shall govern.

Code No.	Title / Specification
IS 2530-1963	Methods of test for polyethylene moulding materials and polyethylene compounds
IS 4905-1968	Methods for random sampling
IS 4984-1995	High Density Polyethylene Pipes for Water Supply- Specification
IS 5382-1985	Rubber sealing rings for gas mains, water mains and sewers.
IS 7328-1992	High density polyethylene materials for moulding and extrusion-Specification
IS 7634-Part 2-1975	Laying & Jointing of Polyethylene (PE) Pipes
IS 8008: Part 1-2003	Injection Moulded/Machined High Density Polyethylene (HDPE) fittings for Potable Water supplies – Specification – Part 1: General Requirements for fittings.
IS 8008: Part 2-2003	Part 2: Specific Requirements for 90° Bend.
IS 8008: Part 3- 2003	Part 3: Specific Requirements for 90° Tee.
IS 8008: Part 4-2003	Part 4: Specific Requirements for Reducers.
IS 8008: Part 5-2003	Part 5: Specific Requirements for Ferrule Reducers.
IS 8008: Part 6-2003	Part 6: Specific Requirements for Pipe ends.
IS 8008: Part 7-003	Part 7: Specific Requirements for Sandwich Flanges.

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Code No.	Title/Specification
IS 8008: Part 8-2003	Injection Moulded/Machined High Density Polyethylene (HDPE) fittings for Potable Water supplies – Specification – Part 8: Specific Requirements for Reducing Tees.
IS 8008: Part 9-2003	Part 9: Specific Requirements for End Caps.
IS 8360 Part 1: 1977	Specification for fabricated high density polyethylene (HDPE) fittings for potable water supplies – Part 1 : General requirements.
IS 8360 Part 2: 1977	Part 2 Specific requirements for 90 Tees.
IS 8360 Part 3: 1977	Part 3 Specific requirements for 90 bends.
IS 9845-1986	Method of analysis for the determination of specific and/or overall migration of constituents of plastics material and articles intended to come into contact with foodstuff
IS 10141-1982	Positive list of constituents of polyethylene in contact with foodstuffs, pharmaceuticals and drinking water.
IS 10146-1982	Polyethylene for its safe use in contact with foodstuff, Pharmaceuticals and drinking water.

2.2 Other Codes not specifically mentioned here but pertaining to the use of HDPE pipes form part of these Specifications.

3.0 Designation

All pipes shall be designated as per IS 4984 with ISI mark, according to the grade of material, followed by pressure rating and nominal diameter, for example, PE 100 PN 10 DN 355 indicates a pipe pertaining to material grade 100 having a pressure rating 1.0 MPa and outside nominal diameter 355 mm.

4.0 Colour

The colour of the pipe shall be black.

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5.0 Materials

5.1 The material used for the manufacturer of pipes should not constitute toxicity hazard, should not support microbial growth, should not give rise to unpleasant taste or odour, cloudiness or discoloration of water. Pipe manufacturers shall obtain a certificate to this effect from the manufacturers of raw material by any internationally reputed organization as per the satisfaction of the engineer in charge.

5.2 Raw Material

5.2.1 a) Raw material used to manufacture the HDPE pipes shall be 100% virgin PE compound or Natural black PE resin confirming to IS: 4984, IS: 7328 and ISO: 4427 for this a certification has to be given by the resin manufacturer as per clause 3.2.3 of IS: 4984. The resin proposed for manufacturing of the pipes should also comply with the following norms as per ISO 9080.

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- b) The resin should have been certified by an independent laboratory of international repute for having passed 10,000 hour long term hydrostatic strength (LTHS) test extrapolated to 50 years to show that the resin has a minimum MRS of over 10MPa. Internal certificate of any resin manufacturer will not be acceptable.
- c) Certificate for having passed the full scale rapid crack propagation test as per ISO 13478. High density Polyethylene (HDPE) used for the manufacture of pipes shall conform to designation PEEWA-45-T-006 of IS 7328. HDPE conforming to designation PEEWA-45- T-012 of IS 7328 may also be used with the exception that melt flow rate (MFR) shall not exceed 1.10-g/10 min. In addition the material shall also conform to clause 5.6.2 of IS 7328.
- d) The specified base density shall be between 941.0kg/ m³ and 946.0kg/ m³ (both inclusive) when determined at 27°C according to procedure prescribed in IS 7328 The value of the density shall also not differ from the nominal value by more than 3 kg/ m³ as per 5.2.1.1 of IS 7328. The MFR of the material shall be between 0.41 and 1.10 (both inclusive) when tested at 190°C with nominal load of 5 kgf as determined by method prescribed in IS 2530. The MFR of the material shall also be within ± 20 percent of the value declared by the manufacturer.
- e) The resin shall be compounded with carbon black. The carbon black content in the material shall be within 2.5 ±0.5% and the dispersion of carbon black shall be satisfactory when tested as per IS 2530.

5.3 **Anti-oxidant**

The percentage of anti-oxidant used shall not be more than 0.3 percent by mass of finished resin. The anti-oxidant used shall be physiologically harmless and shall be selected from the list given in IS 10141

5.4 **Reworked Material**

No addition of **Reworked/ Recycled Material** from the manufacturer's own rework material resulting from the manufacture of pipes is permissible and the vendor is required to use only 100% virgin resin compound.

5.5 **Maximum Ovality of Pipe**

The outside diameter of pipes, tolerance on the same and ovality of pipe shall be as given in table 2 of IS 4984. Ovality shall be measured as the difference between maximum outside diameter and minimum outside diameter measured at the same cross section of the pipe, at 300 mm away from the cut end.

5.6 **Wall Thickness**

The minimum & maximum wall thickness of pipe for the PE100 shall be as given in table 5 in IS: 4984.

5.7 **Length of Straight Pipe**

The length of straight pipe used shall be 6 m. Short lengths of 3 meter (minimum) up to a maximum of 10% of the total supply may be permitted as decided by Engineer in-charge.

5.8 **Workmanship / Appearance**

Pipes shall be free from all defect including indentations, delaminating, bubbles, pinholes, cracks, pits, blisters, foreign inclusions that due to their nature degree or extent detrimentally affect the strength and serviceability of the pipe. The pipe shall be as uniform as commercially practicable in colour opacity, density and other physical properties as per relevant IS Code or equivalent International Code. The inside surface of each pipe shall be free of scouring, cavities, bulges, dents, ridges and other defects that result in a variation of inside diameter from that obtained on adjacent unaffected portions of the surface. The pipe ends shall be cut clearly and square to the axis of the pipe.

5.9 Handling, Transportation Storage and Lowering of pipes

During handling, transportation, storage and lowering, all sections shall be handled by such means and in such a manner that no distortion or damage is done to the section or to the pipes as a whole.

The following procedures should be followed so as to eliminate potential damage to pipes and fittings and to maintain maximum safety during unloading, lifting and lowering.

- Pipes must not be stored or transported where they are exposed to heat sources likely to exceed 60°C.
- Pipes shall be stored such that they are not in contact with direct sunlight, lubricating or hydraulic oils, petrol, solvents and other aggressive materials.
- Scores or scratches to a depth of greater than 10% or more of wall thickness are not permissible; any pipes having such defects should be strictly rejected.
- PE pipes should not be subjected to rough handling during loading and unloading operations. Rollers shall be used to move, drag the pipes across any surface.
- Only polyester webbing slings should be used to lift heavy PE (>315mm) pipes by crane. Under no circumstances, chains, wire ropes and hooks be used on PE pipes.
- Pipes shall not be dropped to avoid impact or bump. If any time during handling or during installation, any damage, such as gouge, crack or fracture occurs, the pipe shall be repaired if so permitted by the competent authority before installation.
- Straight lengths should be stored on horizontal racks giving continuous support to prevent the pipe taking on a permanent set
- The truck used for transportation of the PE pipes shall be exclusively used of PE pipes only with no other material loaded – especially no metallic, glass and wooden items. The truck shall not have sharp edges that can damage the Pipe.
- Pipes manufactured at factory are to be carried to the site of work directly or stacked suitably and neatly along the alignment/road side/elsewhere near by the work site or as directed by the Engineer.
- Damages during transit, handling, storage will be to the Contractor's account and replacement for such pipes has to be made by the Contractor without any extra cost to BHEL as directed by the Engineer-in-charge.

5.10 Fittings & Specials

All HDPE fittings/ specials shall be fabricated in accordance with IS: 8360 (Part I & III). PE Injection moulded fittings shall be as per IS: 8008 (Part I to IX). All fittings/specials shall be fabricated or injection moulded at factory only. No fabrication or moulding will be allowed at site, unless specifically permitted by the Engineer. Fittings will be butt welded on to the pipes or other fittings by use of heat fusion.

5.10.1 Bends

HDPE bends shall be plain square ended conforming to IS: 8360 Part I & III Specifications. Bends may be fabricated by jointing several small sections of pipes to reach the required angle.

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5.10.2 **Tees**

HDPE Tees shall be plain square ended conforming to IS: 8360 Part I & II Specifications. Tees may be equal tees or reduced take off tees. Tees may be moulded or fabricated from pipes elements.

5.10.3 **Reducers**

HDPE Reducers shall be plain square ended conforming to IS: 8008 Part I & VII Specifications. Reducer must be moulded.

5.10.4 **Flanged HDPE Pipe Ends**

HDPE Stub ends shall be square ended conforming to IS: 8008 Part I & VII Specifications. Stub ends will be welded on the pipe. Flange will be of slip on flange type as described below.

5.10.5 **Slip-On Flanges**

Slip-on flanges shall be metallic flanges covered by epoxy coating or plastic powder coating. Slip-on-flanges shall be conforming to standard mating relevant flange of valves, pipes etc. Nominal pressure rating of flanges will be PN10.

5.11 **Welding Procedure**

Joining between HDPE pipes and specials shall be done as per the latest IS: 7634 part II. Method of joining between the pipes to pipes and pipes to specials shall be with butt fusion welding using automatic or semi automatic, hydraulically operated, superior quality butt fusion machines which will ensure good quality butt fusion welding of HDPE pipes if approved by the concerned Engineer-in-charge.

5.12 **Tests to Establish Portability of Work**

Pipe specimen shall be subjected to tests specified below in order to establish the suitability of these pipes for use in carrying potable water:

- I) Smell of the extract
- II) Clarity of the colour of the extract
- III) Acidity and alkalinity
- IV) Global migration UV absorbing material Heavy metals
- V) Un reacted monomers (styrene) and Biological tests

5.13 **Hydraulic Testing**

Pipes shall be given different hydraulic tests for ensuring quality of manufacture as per relevant clause IS specification.

5.14 **Measurement**

The net length of pipes as laid or fixed shall be measured in running meters correct to a cm. The portion of the pipe at the joints (inside the joints) shall not be included in the length of pipe work. Excavation, refilling, masonry and concrete work wherever required shall be measured and paid for separately under relevant items of work.

5.15 **Requirement for the HDPE pipe Supplier :-**

The tenderer should submit the following data / certificates regarding HDPE pipes along with the Qualification bid .

- **Brand Name, Manufacturer's capacity, previous supply details etc.,**
- **Details of ISO 9000 / 14000 accreditation.**
- **Manufacturer's recommendation and Pressure testing procedure.**
- **Expert's visit (Manufacturer's representative) during laying of pipe line.**

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- 5.16 The tenderer should have automatic superior quality butt fusion welding machines with hydraulic jacks, surface cleaning planner, and digitally controlled heating mirror and hydraulic power pack for doing the installation and a list of equipments, detailed welding procedure, pressure testing procedure etc.should be submitted along with the offer.

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B - HDPE pipes and specials- Installation

1.0 Lowering and Laying of Pipes

- Each pipe shall be thoroughly checked for any damages before laying and only the pipes which are approved by the Engineer shall be laid.
- While installing the pipes in trenches, the bed of the trench should be level and free from sharp edged stones. In most cases, the bedding is not required, as long as the sharp and protruding stones are removed, by sieving the dug earth, before using the same a backfill material. While laying in rocky areas suitable bed of sand or gravel should be provided. The fill to about 10 to 15 cm above the pipe should be fine sand or screened excavated material. Where hard rock is met with, bed concrete M15, 15 cm or 20cm thick sand bed as approved by the Engineer may be provided
- As PE pipes are flexible, long lengths of fusion-jointed pipes having joints made above ground can be rolled or snaked into narrow trenches. Narrow buckets can excavate such trenches.
- During the pipe laying of continuous fusion jointed systems, due care and allowance should be made for the movements likely to occur due to the thermal expansion/contraction of the material. This effect is most pronounced at end connections to fixed positions (such as valves etc) and at branch connections. Care should be taken in fixing by finishing the connections at a time the length of the pipe is minimal (lower temperature times of the day.)
- For summer time installations with two fixed connection points, a slightly longer length of PE pipe may be required to compensate for contraction of the pipe in the cooler trench bottom.
- The final tie-in connections should be deferred until the thermal stability of the pipeline is achieved.
- The flexibility of polyethylene pipes allows the pipe to be cold bend. The fusion jointed PE pipe is also flexible as the plain Pipe. Thus the total system enables directional changes within the trench without recourse to the provision of special bends or anchor blocks. However, the pipe should not be cold bend to a radius less than 25 times the OD of the pipe.
- The Installation of flanged fittings such as connections to sluice/air/gate valves and hydrant tees etc., requires the use of stub ends (collars/flange adaptors complete with backing rings and gaskets. Care should be taken when tightening these flanges to provide even and balance torque.
- Provision should be made at all heavy fittings installation points for supports (such as anchoring of the flange in the soil) for the flange joint to avoid the transfer of valve wheel turning torque on to the PE flange joint.
- PE pipe is lighter than water. Hence care should be taken for normal installations where there could be a possibility of flooding of the trench thus the trench shall be kept free of water till the jointing has been properly done.
- When flooded, some soils may lose cohesiveness, which may allow the PE pipe to float out of the ground. Several design checks are necessary to see if groundwater flotation may be a concern. Obviously, if the pipeline typically runs full or nearly full of liquid, or if groundwater is always below the pipe, flotation may not be a significant concern.
- However, weights by way of concrete blocks (anchors) are to be provided so that the PE pipe does not float when suddenly the trench is flooded and the soil surrounding the pipe is washed away. Thus site conditions study is necessary to ensure the avoidance of flotation.
- Pipe embedment backfill shall be stone-free excavated material placed and compacted to the 90% maximum dry density.

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2.0 Jointing of Pipes

2.1 The pipe shall have a jointing system that shall provide for fluid tightness for the intended service conditions. Appropriate jointing for HDPE pipe as per IS 4984 shall be selected considering site and working condition, pressure and flow of liquids

2.2 Bedding, Backfilling and Compaction

2.2.1 Bedding

In case of sandy strata no separate bedding is required. However the bottom face / trench bed where pipe shall be placed shall be compacted to provide a minimum compaction corresponding to 95% of maximum dry density. The pipe bedding should be placed so as to give complete contact between the bottom of the trench and the pipe.

2.2.2 Back Filling

Backfilling should be placed in layers not exceeding 15cm thickness per layer, and should be compacted to a minimum of 90% maximum dry density. The refilling should be done on both sides of pipe together & height difference in earth fill on each side should not be more to cause lateral movement of pipe.

Most coarse-grained soil are acceptable. This may comprise of gravel or sand. However silty sand, clayey sand, silty and clayey gravel shall not be used unless proposed to be used in conjunction with gravel or clean sand.

It is very important that the pipe zone backfill material does not wash away or migrates in to the native soil. Likewise, potential migration of the native soil in to the pipe zone backfill must also be prevented.

Heavy earth moving equipment used for backfilling should not be brought until the minimum cover over the pipe is 90 cm in the case of wide tracked bulldozers or 120 cm in the case of wheeled roaders or roller compactors.

2.2.3 Compaction

Vibratory methods should be used for compaction. Compaction within distances of 15 cm to 45 cm from the pipe should be usually done with hand tampers. The backfill material should be compacted not less than 90% of maximum dry density.

2.2.4 Thrust Block

RCC thrust block should be suitably designed & provided at bends and at places of reduction in cross section to take care of thrust

3.0 Butt Fusion

The most widely used method for joining individual lengths of *large diameter polyethylene pipe (>75mm)* is by heat fusion of the pipe ends This technique produces a permanent, economical and flow-efficient joint. Field-site butt-welding may be made readily by **trained operators** using specially developed butt fusion machines.

4.0 General Guidelines for butt-welding:

The welding area has to be protected from unfavorable welding conditions such as moisture, wind, dirt, excessive surface temperature and low temperatures < 5⁰ C and intensive UV radiation. If the pipe is exposed to such UV radiation, the pipe ends are to be thoroughly scrapped (by planning tool) before the welding procedure is adopted.

Heating Pressure:	0.15N/mm ²
Welding Temp:	200 - 220 ⁰ C

The seven steps involved in making a butt fusion joint are:

Securely fasten the components to be joined
Square cut the surface of the pipe end
Face the pipe ends
Align the pipe profile
Melt the pipe interfaces
Join the two profiles together
Hold under pressure and release

Butt fusion cycle and parameters are given in Annex A in ISO 11414 – the users are requested to follow this guideline for a good weld.

Caution: An additional 10 to 60 minutes cooling time may be required (depending on pipe size) after removing the pipe from the fusion equipment before subjecting the pipe for bending, burying, pressure testing or similar handling .

4.1 Bead Removal:

In some pipe system usage, the bead from the butt fusion process may be undesirable. Inside beads may create minor flow turbulence of liquids or may become an obstacle on which solids in the fluids may become lodged. Furthermore, outside beads may be a hindrance to relining operations. Equipments are available to remove the bead. The bead removal shall not affect the performance of the pipe and the weld

However, it must be noted that the friction factor ('c' value; 'k' value) as given elsewhere in the manual takes cognizance of the inside bead. Hence the bead does not effect the design parameters for flow rates in PE pipes.

4.2 Butt Fusion Equipment:

The user is cautioned for the proper procurement of the welding equipment and the Inspection agencies shall necessarily be assured that the welding contracting company has the proper machine for a good field weld. Few of the necessary performance requirements of the machine are given below. Detailed data available in ISO 12176-1

The butt fusion equipment shall incorporate a facility for supporting the heating plate and planning tool (necessary to square cut the pipe end) when in use. The machine shall be robust enough to stand normal field use.

The design of the butt fusion machine shall allow the heating plate to be removed and the pipe ends closed after heating, without damaging the heating surfaces, within a time frame of maximum of 6 secs upto d<250mm and 12 secs for d>250mm.

The clamp alignment system shall be such that there shall be perfect axial alignment of the pipe surface – during heating and during pressurizing the pipe ends after heating, is assured.

The guide elements of the machine shall be such that the gap between the pipe ends shall not exceed 0.25mm for d<250mm and 0.5mm d>250mm

Butt-welding machines can be manual, hydraulic or pneumatic. However, a locking system to hold the fusion force is to be ensured in all the systems.

All the systems shall be protected against over pressure. It shall be capable of maintaining the required interface force on the pipe or fittings end as long as necessary

There shall be a display of the pressure applied.

4.3 Trained Manpower for Butt Welding:

Only trained and technically qualified for the welding method are to be employed for the welding operation

It is necessary that the manufacturer certified person need only be authorized for butt-welding. These persons shall carry at all the time in the field during site work, a valid and authentic certificate that the person performing welding has been so trained .

The certificate shall be issued to only those persons trained by the Pipe manufacturer where a minimum of three samples of butt welded Pipe pieces of size >160mm OD have failed in Ductile mode at the welded joint when tested as per ISO 13953. The certificate shall carry the details of such test results.

5.0 Pressure Testing

This section deals with the standard procedures for testing installed pipelines prior to commissioning. This testing shall be ordered only if the contractor ensures that the accessories other than PE also conform to the testing norms for PE pipes. Testing may be conducted in full system or in sections. The test section size is determined by test equipment capability and adequate water availability.

Warning:

Pipe system pressure testing is performed to discover unacceptable faults on a piping system. Hence, pressure testing may cause faults to fail and catastrophic hazards may occur. Adequate precautions for working personnel and the local community are to be widely published. Compressed Air should not be used for testing as it gives erroneous results and also hazardous to the personnel present.

5.1 Test Pressure

The test pressure may be limited by walls or other lower pressure rated components in the system. Hence, it is advisable to test Long lengths of Flanged sections of PE pipe of the designated rating with only the PE Pipe system components (bends, tees, collars, reducers etc.) shall be used for testing the system.

For pressure piping system the maximum allowable test pressure is 1 ½ times the system design operating pressure or Pipe rating whichever is higher.

5.2 Test Duration

For any test pressure, the total test pressure time including initial pressurization, initial expansion, and time at test pressure must not exceed three (4) hours. If the test is not complete due to leakage, equipment failure etc; the system shall be depressurized the same shall be allowed to 'relax' for at least eight hours, before bringing the section to test pressure again.

5.3 Hydrostatic Testing

The pressure-testing medium shall be clean water only. The test section shall be completely filled with water. Any trapped air is to be bled off by suitable air release mechanism at the end of the pipe section. While the test section is being filled, venting at high points may be necessary to purge air pockets. Failure to do this will give false notion of pipe having been filled and while testing the pipe the air pockets may get compressed and hazards may occur. Venting may also be done by simply loosening the flange at the end of the test section. Retighten any loose flange before test pressure is applied.

5.4 Test Procedure

The test procedure consists of initial expansion and test phases

Initial Expansion Phase

Gradually pressurize the test section to test pressure, and maintain test pressure for three (3) hours. During the initial expansion phase, polyethylene pipe will expand slightly. Additional test liquid will be required to maintain pressure. It is not necessary to monitor the amount of water added during the initial expansion phase.

Test Phase

Immediately following the initial expansion phase, reduce test pressure by 10 psi (0.7 Kg/cm²), and stop adding test liquid. If test pressure remains steady (within 5% of the target value) for one (1) hour, no leakage is indicated.

5.5 Test Certification

The test should be carried out in the presence of Engineer-in-Charge and will be inspected and certified by Engineer-in-Charge and cleared by Site-in-Charge. Suitable record in the form of Log Sheet must be maintained.


6.0 Measurement

The net length of pipes as laid or fixed shall be measured in running meters correct to a cm. The portion of the pipe at the joints (inside the joints) shall not be included in the length of pipe work. Excavation, refilling, masonry and concrete work wherever required shall be measured and paid for separately under relevant items of work.

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Log Sheet Format for Record of Test

	Name of Work: Replacement of Pumping main with HDPE Pipe between level crossing near RPS to Tank No 4 and CCDP main to FCB OHT.			
S.No	Description of Test	Initial Expansion Phase	Test Phase	Remarks
1	Hydrostatic Pressure Test for Leakage	Pressure maintained (Target Pressure): Duration:	Pressure Obtained: Duration:	
		NAME	SIGNATURE & DATE	
	INSPECTED BY			
	CLEARED BY			
	CUSTOMER			SHEET 1 / 1 SHEET

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GENERAL CONDITIONS OF CONTRACT FOR LUMPSUM, ITEM RATES AND PERCENTAGE CONTRACT

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