

38 (d)	Plant and Machinery	Whole sale price index for Manufacture of Machinery for Mining, Quarrying and Construction as published by the office of the Economic Advisor to the Govt. of India, Ministry of Commerce and Industry,			
			Total		100%

* Values to be filled up at the time of drawal of contract

** Values to be filled up in the bid document

39. All items of work as per schedule of quantities of this tender should confirm to Orissa Detailed Standard Specification. I.R.C. & I.S.I. Codes & Bridge code section I, II, III, IV & VII & latest design criteria for pre-stressed concrete bridge specially for Roads & Bridges issued by MoRT&H., Government of India, Compacting shall have to be carried out with help of mechanical vibrators from the range of I.S.2505, I.S.2006, I.S.2514, I.S.4656.
40. Shuttering & centring shall be with suitable steel shutters in side of which shall be lined with suitable sheeting and made leak proof and watertight. All joints in formwork shall be properly sealed preferably with P.V.C. joints sealing tapes & compounds.
41. Form work including complete false work shall be designed by the Contractor without any extra cost to employer and the Department will have the right to inspect the scaffolding, centring and shuttering made for the work and can reject partly of fully such structures, if found defective in their opinion. Any eventually such as loss of lives or property due to failure of centring and shuttering shall be the responsibility of the Contractor regarding compensation of all claims thereof.
42. Cement Concrete should be machine mixed by weight by means of concrete mixture/batching plant confirming to relevant grade and approved by the Engineer-in-charge for all types of concrete works. The Contractor should arrange his own batching plant concrete mixer appropriate vibrators, pumps, etc. for this purpose at his own cost and departmental machinery if available only may be utilised on payment of necessary hire charges as detailed in clause of recovery sheet on necessary requisition.
43. Cement shall be used by bags and weight of one bag of Cement should be 50 (fifty) Kg. net & the Engineer-in-Charge or his representative shall have the right to test the weight & quality from time to time.
44. The tenderers shall make all arrangements for proper storage of materials but no cost for raising shed for store and pay of security guard etc. will be borne by the Department. The department is not responsible for any theft or loss of materials at site. It is contractor's risk. Under any such plea, if the tenderer stops the work he shall have to pay the full penalty as per clauses of the contract.
45. Approach Road to site of work for transport of materials to site of work is sole responsibility of the Contractor. Statutory traffic restriction in the town area for Transport of construction material to site of work is to be taken in to consideration before tendering and no consideration for extra time or compensation thereof shall be considered.
46. The contractor should at his own cost arrange necessary tools and plants required for efficient execution of work and the rates quoted should be inclusive of transportation, hire and running charges of such plant and cost of consumables.
47. The contractor shall properly co-ordinate with the execution of P.H. and Electrical works and takes care of the safety of workers.
48. The machineries if available, with the department may be supplied on hire as per charges noted in the enclosed statement and may be changed from time to time subject to the condition that the contractor will execute in advance an agreement with the Block Dev. Officer, PATNAGARH.



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49. No claim whatsoever will be entertained for supply of machineries.
50. The tenders should furnish along with their tender a list of works executed during the last three years duly certified by the concerned Engineer-in-charge indicating the satisfactory completion for Civil, P.H. & Electrical works as per the proforma enclosed in a separate sheet of Schedule-H.
51. An applicant or any of its constituent partners of whose contract for any work has been rescinded or who has abandoned any work in the last Five years, prior to the date of the bid, shall be debarred from qualification. The tenderer must submit the required information in schedule-E of the DTCN the tenderer is to furnish an affidavit (in original) in the specified format as per Schedule-F of the DTCN regarding authentication of tender documents & information about any litigation & Bank guarantee etc. Non-furnishing of the information in Schedule - E and required affidavit in Schedule - F(Original), the tender will be liable for rejection.
52. It should be clearly understood that:
- The joints of the bars are to be provided with lapping, welds or bolts nuts as well be directed by the Engineer-in-charge. No payment shall be made for the lapping/welding of M.S/Tor steel reinforcement.
 - Concrete test specimens 150mm × 150mm × 150mm in size (whether plain or reinforced concrete) for the testing shall be taken for each structural member by a representative of the contractor in the presence of responsible officer of the rank not lower than that of an Assistant Engineer or sub- Divisional Officer. The contractor shall bear the cost so involved in testing. The test specimen in cube should be carried out in the Departmental Control and Research Laboratory of Cuttack or Bhubaneswar/ Balangir. Test should be carried out in accordance with the stipulation in Bridges code section- III.
 - Test specimens shall be formed carefully in accordance with the standard method of taking test specimen and no plea shall be entertained later on the grounds that the casting of the test specimen was faulty and that the result of the specimen did not give a correct indication of the actual quality of concrete.
 - Plain concrete and reinforced concrete specimens will be tested in Government Test Houses or Control and Research Laboratory at Cuttack/ Bhubaneswar/ Balangir. Cost of testing of all specimens and samples will be borne by the Contractor.
53. The rates quoted should be inclusive of carriage of water required in connection with execution of the work. No claim for carriage of water whatsoever will be entertained.
54. The contractor shall employ one or more Engineering Graduate or Diploma holders as apprentice at his cost if the work as shown in the tender exceeds Rs.2, 50,000.00. The apprentices will be selected by the Block Dev. Officer, PATNAGARH. The period of employment will commence within one month after the date of work order and would last till the date, when 90% of the work is completed. The fair wage to be paid to the apprentices should not be less than the emolument of personnel of equivalent qualification employed under Government. The number of apprentices to be employed should be fixed by the Block Dev. Officer, PATNAGARH in the manner so that the total expenditure does not exceed one percent of the tendered cost of the work.
55. List of tool & plants in running condition in possession of contractor is to be furnished in a separate sheet of Schedule-C.
56. It is the responsibility of the contractor to procure and store explosive required for blasting operation. Department may render necessary possible help for procuring license.
57. The contractor will be responsible for any misuse, loss or damages due to any reasons whatsoever of any departmental material during the execution of work. In case of loss, damage or misuse, recovery at the rate at 5 times the cost of the materials will be deducted from the bills or his other dues.
58. The prevailing percentage of I.T. Department of the gross amount of the bill towards income tax will be deducted from the contractor's bill.

59. The Estimated Cost is excluding GST and including CESS, Royalty and Cost of Conveyance. The rates of item basing on which estimated cost has been derived are excluding GST on different components to arrive at such rates. GST as applicable on Works Contract shall be paid over the bill amount at the time of payment of Bill.
60. It must be clearly understood that under no circumstances any interest is chargeable for the dues or additional dues if any payable for the work executed and final bill pending disposal due to any reason whatsoever.
61. No extra payment will be made for removing spreading and consolidating salvaged metals and materials.
62. Additional performance Security: (Amendment to Para 3.5.5(v) Note-ii of OPWD Code Vol-I by modification) (Revised/substituted as per Works Deptt. Office Memorandum No.4559 Dt.05.04.2021)

The Successful bidder who has quoted less bid price / rates than the estimated cost put to tender shall have to furnish the exact amount of differential cost i.e. estimated cost put to tender minus the quoted amount as Additional Performance Security (APS) in shape of TDR in favour of the Block Dev. Officer, PATNAGARH/Bank Guarantee in favour of the Block Dev. Officer, PATNAGARH from any Nationalised/Schedule Bank in India Counter guaranteed by its local branch at PATNAGARH within 7 (Seven) days of issue of letter of acceptance (LOA) by the Block Dev. Officer, PATNAGARH to the successful bidder otherwise the bid of the successful bidder shall be cancelled and the EMD/Bid Security shall be forfeited. Further processing for blacklisting shall be initiated against the bidder.

If the contractor fails to complete the work, the amount so furnished as Additional Performance Security will be forfeited in addition to the other penal clauses, if any, to be imposed.

Revised Amendment has been modified with OM No.4559 Dt.5.04.2021 of Works Deptt.

Additional Performance Security			
Amount	Sl No	Range of difference between estimated cost put to tender and Bid amount.	Additional Performance Security to be deposited by the successful bidder.
	1	Below 5%	No additional Performance Security.
	2	From 5% and above and below 10%	50% of (Difference between estimated cost put to tender and Bid Amount
	3	From 10% and above.	150% of (Difference between estimated cost put to tender and Bid Amount

64. **Sample of all material** - The contractor shall supply sample of all materials fully before procurement for the work for testing and acceptance as may be requiring by the concerned Engineer. Incharge.
65. Super class contractor shall employ under himself two Graduate Engineer and two Diploma holders belonging to the State of Odisha. Special class contractor shall employ under him one graduate Engineer and two Diploma Holders belonging to the state of Orissa. Likewise 'A' class contractor shall employ under him one Graduate Engineer or two Diploma Holders belonging to state of Orissa. The contractor shall pay to the Engineering personnel monthly emoluments, which shall not be less than the emoluments of the personnel of equivalent qualification employed under the State Govt. of Odisha. The Engineer-in Chief (Civil), Orissa may however assist the contractor with names of such unemployed Graduate engineers and Diploma Holders if such help is sought for by the contractor. The names of such Engineering personnel appointed by the Contractors should be intimated to the tender receiving authority along with the tender as to who would be supervising the work. Each bill of the Super Class, Special Class or 'A' Class Contractor shall be accompanied by an employment Roll of the

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- Engineering personnel together with a Certificate of the Graduate Engineer or Diploma Holder so employed by the contractor to the effect that the work executed as per the bill has been supervised by him. (Vide Works Department No. Codes M-22/91-15384 dated 9.7.91). The required certificate is to be furnished in the Performa contained in a separate sheet vide Schedule-B
66. An engineering personnel of the executing agency should be present at work site at the time of visit of High level Inspecting officers.
 67. All reinforced cement work should conform to Orissa Detailed specification and should be of proportion M-15 and M-20 having a minimum compressive strength (in work test) 150Kg/200Kg: per Cm² in 15 Cm cubes at 28 days, after mixing and test conducted in accordance with IS 456/2000 and IS 516 using 12mm to 20mm. size hard black crusher broken granite chips (20mm size not be exceed 25%).
 68. Bailing out of water from the foundation, pipeline trenches S. Tanks/Soak pits/Sumps/M.H. etc. either rainwater or sub-soil water if necessary should be borne by the contractor. No payment will be made for benchmarks. Level pillars, profiles and benching and levelling the ground wherever required. The rates quoted should be for finished items of works inclusive of these incidental items of work.
 69. It should be understood clearly that no claims whatsoever would be entertained.
 70. The tenderer shall have to abide by the C.P.W.D. safety code rules introduced by the Government of India, Ministry of work Housing and Supply in their standing order No-44150 dtd. 25.11.57.
 71. The Contractor will have to submit to the Block Dev. Officer, PATNAGARH for monthly return of labour both skilled and unskilled employed by him on the work.
 72. All fittings for doors and windows P.H. & Electrical works as supplied by the Contractor should be of best quality and conform to relevant I.S. specification and should be got approved by the Engineer-in-charge of the respective wing before they are used on the work.
 73. After completion of the work the contractor shall arrange at his own cost all requisite equipments for testing buildings, if found necessary and bear the entire cost of such test, including the inspection of Electrical Inspector.
 74. The Tenderer has to furnish along with their tender.
 1. list of works, which are at present in their hand
 2. list of T&P and
 3. list of work executed in the prescribed Performa enclosed.
 75. All reinforced cement concrete works should be finished smooth Extra charges for plastering if required to any R.C.C. structures like roof slab, Columns, Chajjas, fins, parapets, shelves etc. shall not be paid.
 76. Deleted.
 77. The contractor has to arrange the samples of materials required for execution to be got tested and approved by the Department before taking up the work and during course of execution required from time to time. All such samples are to be tested at Government Test house or at Control and Research Laboratory Cuttack /Balangir at the cost of the Contractor with no extra cost to the Department work due for civil work.
 78. If there is any damage to the to natural calamities like flood or cyclone or any other cause during the course of execution of work or up to 12 months after completion of work or if any, imperfection becomes apparent to the work within 12 months from the date of final certificate of completion of work the contractor shall make good of all such damages at his own cost with no extra cost to the Department. No claims, whatsoever, in this regard will be entertained.
 79. The fly ash bricks should be well made and of good qualities. The bricks should be approved by the Engineer-in-charge before use in the work and should conform to the minimum strength as per National Building Code.
 80. Under Section 1 of contract labour Regulation and Abolition Act 1970 the contractor who undertakes execution of work through labour should produce valid licence from the licensing authority of labour Department.

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81. Standard co-efficient for linear measurement will be adopted while calculating consumption of steel and no claim whatsoever regarding difference in co-efficient of steel will be entertained. The rates quoted shall be inclusive of any eventuality of difference for co-efficient for linear measurements.
82. Engineering contractors excepting those claiming exemption with production of affidavit, should furnish E.M.D as specified in the Tender Notice failing which the tender will be summarily rejected.
83. That for the purpose of jurisdiction in the event of disputes if any of the contract would be deemed to have been entered in to within the State of Orissa and it is agreed that neither party to the contract will be competent to bring a suit in regard to the matter by this contract at any place outside the State of Orissa.
84. **SPECIAL CONDITIONS (PART OF THE CONTRACT)**
- (i) All materials before they are being used in the items of works as per this Schedule of quantities and also the finished items of work where tests are applicable shall have to be tested through the Engineer-in-charge of the respective wing at appropriate Laboratories according to the relevant I.S. specifications of the materials and the said items of works and the cost of all such tests shall have to be borne by the Contractor and the rates of the items of works should be inclusive of cost of such tests.
- (ii) The tests have to be planned & carried out such that the progress of work is not hampered
- (iii) The tests are mandatory as per the prescribed frequencies and I.S. specifications. However, these are not exhaustive and the Engineer-in-charge has the right to prescribe other required test if any as will be considered from time to time.
85. In case of ambiguity between clauses of this D.T.C.N. and the P1 contract form, the relevant Clauses of the P1 contract form shall prevail over the D.T.C.N. The clauses not covered under P1 contract form shall be governed by the clauses of the D.T.C.N.
86. It must be definitely understood that the Government does not accept any responsibility for the correctness and completeness of the trial borings shown in the Cross Section.
87. Schedule of quantities is accompanied in Cover-II (Price Bid). It shall be definitely understood that the Government does not accept any responsibility for the correctness or completeness of this schedule and that this schedule is liable for alternation or omissions, deductions or alternations set forth in the conditions of the contract and such omissions, deductions, additions or alternations shall no way invalidate the contract and no extra monetary compensation, will be entertained.
88. In case of any complaint by the labour working about the non payment or less payment of his wages as per latest minimum Wages Act, the Addl. E.O. (Tech), ZP will have the right to investigate and if the contractor is found to be in default, he may recover such amount due from the contractor and pay such amount to the labour directly under intimation to the local labour office of the Govt. The contractor shall not employ child labour. The decision of the Addl. E.O. (Tech), ZP is final and binding on the contractor.
89. The contractor should arrange the materials like Steel, Cement, paint and bitumen etc. of approved quality and specification at his own cost for completion of the work with the time schedule. No extension of time will be granted on the application of the contractor due to delay in procurement of materials.
90. If the contractor removes Government materials supplied to him from the site of work with a view to dispose of the same dishonestly, he shall be in addition to any other liability civil or criminal arising out of his contract be liable to pay a penalty equivalent to five times of the price of the materials according to the stock issue rate or market rate whichever is higher. The penalty so imposed shall be recovered at any time from any sum that may then or at any time thereafter become due to the contractor or from his security deposit or from the proceeds of sale thereof.
91. Though Departmental issue of cement and steel has indicated, it may not be taken as binding. The contractor must have to arrange by themselves cement, steel, bitumen and every sort of materials from approved manufacturer, get it tested in the Departmental Laboratory and approved by the Department before use. No extension of time or escalation of price on such accounts shall be entertained in future.

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92. TOR rods, plates and structural members will be supplied in quantity, length and size available in the stock. For payment of reinforcement, the steel including plates etc. shall be measured in length of different diameter, size and specification as actually used (including hooks and cranks) in the work correct to an inch or cm. and their weight calculated as per sectional weight prescribed by the Indian Standard Specification or as directed by the Engineer-in-Charge (Wastage of bars and unnecessary lapping will not be considered for measurement and payment).
93. The contractor should at his own cost arrange necessary tools and plants required for the efficient execution of work and the rates quoted should be inclusive of the running charges of each plant and cost of conveyance.
94. Orissa Bridge & Construction Corporation Ltd. will be allowed price preference up to 3% over the lowest quotation or tender as laid down in works and Transport Department Resolution No-285 date-17.04.1974. The Orissa Construction Corporation will be allowed a price preference to the extent of up to 3% over the lowest tender amount (Where their tender is not the lowest) provided they express willingness to execute the work after reduction of rates by negotiation.
95. The contractor is required to pay royalty to Govt. as fixed from time of time and produce such documents in support of their payment to the concerned Engineer-in-Charge with their bills, falling which the amount towards royalties of different materials as utilised by them in the work will be recovered from their bills and deposited in the revenue of concerned department.
96. Under no circumstances interest is chargeable for the dues or additional dues if any payable for the work.
97. **Trial Boring** - The foundation level as indicated in the body of the departmental drawing is purely tentative and for the general guidance only. The Department has no responsibility for the suitability of actual strata at the foundation level. The contractor has to conduct his own boring before starting the work and get the samples tested at his own cost to ascertain the S.B.C. and credibility of the strata at founding level while quoting his rates for tender the contractor shall take in to account of the above aspects.
98. Any defects, shrinkage or other faults which may be noticed within 12 (twelve) months from the completion of the work arising out of defective or improper materials or workmanship timing are upon the direction of the Engineer-in-Charge to be amended and made good by the contractor at his own cost unless the Engineer for reasons to be recorded in writing shall be decided that they ought to be paid for and in case of default Department may recover from the contractor the cost of making good the works. The contractor is also required to maintain the road/ building for 12 months from the date of successful completion of the work.
99. From the commencement of the works to the completion of the same, they are to be under the contractors charge. The contractor is to be held responsible to make good all injuries, damages and repairs occasioned or rendered necessary to the same by fire or other causes and they hold the Govt. of Odisha harmless for any claims for injuries to person or structural damage to property happening from any neglect, default, want of proper care or misconduct on the part of the contractor or anyone in his employment during the execution of the work. Also no claim shall be entertained for loss due to earthquake, flood, cyclone, epidemic, riot or any other calamity whether natural or incidental damages so caused will have to be made good by the contractor at his own cost.
100. **Gradation of ingredients:** The coarse and fine aggregate shall meet the grade requirement as per the latest provision of relevant I.S. Code / I.R.C. code / MoRT&H specifications.
101. Where it will be found necessary by the Department, the Officer-in-Charge of the work shall issue an order book to the contractor to be kept at the site of the work with pages serially numbered. Orders regarding the work whenever necessary are to be entered in this book by the P.W.D. Officer-in-Charge with their dated signatures and duly noted by the contractor or his authorised agents with their dated signature. Orders entered in this book and noted by the contractor's agent shall be considered to have been duly given to the contractor for following the instructions of the Department. The order Book shall be the property of the P.W.D. and shall not be removed from the site of work without written permission of the



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Engineer-in-charge and to be submitted to the Engineer-in-charge every month.

102. No part of the contract shall be sublet without written permission of the concerned Block Dev. Officer, Titilagarhor transfer is made by power of Attorney authorising others to receive payment on the contractor's behalf.
103. The contractor should attach the certificate in token of payment deposit with the registration authority as per recent circular of the Government relating to his registration.
104. The rates quoted by the contractor shall cover the latest approved rates of labours, materials, P.O.L. and Royalties. Arrangement of borrows areas; land, approach road to the building site etc. are the responsibility of the contractor.
105. The rate for each work of concrete items wherever dewatering is imperatively necessary the term dewatering shall mean the execution or operation of the items due to standing water as well as due to percolation of water. The quoted rates will be inclusive of this.
106. Deleted.
107. Number of tests as specified in I.R.C. / MO RT & H / I.S.I specification required for the construction of roads /bridges / buildings or any other structural works will be conducted in any Govt. Test House / Departmental laboratories/reputed material testing laboratory as to be decided by the Engineer-in-charge. Testing charges including expenditure for collection / transportation of samples /specimens etc. will be borne by the contractor. The collection of samples and testing are to be conducted for both prior to execution and during execution as may be directed by the Engineer-in-charge and on both the accounts the cost shall be borne by the contractor.
108. In case the 1st lowest tenderer or even the next lowest tenderers withdraw in series one by one, thereby facilitating a particular tender for award, then they shall be penalized with adequate disincentives with forfeiture of EMD unless adequate justification for such back out is furnished. Appropriate action for black listing the tenderers shall also be taken apart from disincentivising the tenderer.

109. Condition for issue of plant & machinery to contractor on hire: - Deleted

110. AMMENDMENT TO THE CONDITION OF F2 CONTRACT

Clause-2(a) of F2 Contract: -TIME CONTROL: -

(A) Progress of work and Re-scheduling programme.

- The Block Development Officer, PATNAGARH shall issue the letter of acceptance to the successful contractor. The issue of the letter of acceptance shall be treated as closure of the Bid process and commencement of the contract.
- Within 15 days of issue of the letter of acceptance, the contractor shall submit to the Block Development Officer, PATNAGARH for approval a Programme commensurate to Clause no.15 showing the general methods, arrangements, and timing for all the activities in the Works along with monthly cash flow forecast.
- To ensure good progress during the execution of the work the contractors shall be bound in all cases in which the time allowed for any work exceeds one month to complete, 1/4th of the whole time allowed under the contract has elapsed, 1/2 of the whole of the work before 1/2 of the whole time allowed under the contract has elapsed, 3/4th of the whole of the work before 3/4th of the whole time allowed under the contract has elapsed.
- If at any time it should appear to the Engineer-in-Charge that the actual progress of the work does not conform to the programme to which consent has been given the Contractor shall produce, at the request of the Engineer-in-Charge, a revised programme showing the modifications to such programme necessary to ensure completion of the works within the time for completion. If the contractor does not submit an updated Programme within this period, the Engineer-in-Charge may withhold the amount of 1% of the contract value from the next payment certificate and continue to withhold this amount until the next payment after the date on which the overdue Programme has been submitted.
- An update of the Work Programme shall be a programme showing the actual progress achieved, on each activity and the effect of the progress achieved on the timing of the remaining work including any changes to the sequence of the activities.



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- The Engineer-in-Charge's approval of the Programme shall not alter the Contractor's obligations. The Contractor may revise the Programme and submit it to the Engineer-in-Charge again at any time. A revised Programme is to show the effect of Variations and Compensation Events.

(B) Extension of the Completion Date.

- The time allowed for execution of the works as specified in the Contract data shall be the essence of the Contract. The execution of the works shall commence from the 15th day or such time period as mentioned in letter of Award after the date on which the Engineer-in-Charge issues written orders to commence the work or from the date of handing over of the site whichever is later. If the Contractor commits default in commencing the execution of the work as aforesaid, Government shall without prejudice to any other right or remedy available in law, be at liberty to forfeit the earnest money & performance guarantee / Security deposit absolutely.
- As soon as possible after the Agreement is executed; the Contractor shall submit the Time & Progress Chart for each milestone and get it approved by the Department. The Chart shall be prepared in direct relation to the time stated in the Contract documents for completion of items of the works. It shall indicate the forecast of the dates of commencement and completion of various trades of sections of the work and may be amended as necessary by agreement between the Block Development Officer, PATNAGARH and the Contractor within the limitations of time imposed in the contract documents, and further to ensure good progress during the execution of the work, the contractor shall in all cases in which the time allowed for any work, exceeds one month (save for special jobs for which a separate programme has been agreed upon) complete the work as per milestone given in contract data.
- In case of delay occurred due to any of the reasons mentioned below, the Contractor shall immediately give notice thereof in writing to the Engineer-in-Charge but shall nevertheless use constantly his best endeavours to prevent or make good the delay and shall do all that may be reasonably required to the satisfaction of the Engineer-in-Charge to proceed with the works.
 - i) Force major, or
 - ii) Abnormally bad weather, or
 - iii) Serious loss or damage by fire, or
 - iv) Civil commotion, local commotion of workmen, strike or lockout affecting any of the trades employed on the work, or.
 - v) Delay on the part of other contractors or tradesmen engaged by Engineer-in-Charge in executing work not forming part of the Contract.
 - vi) In case a Variation is issued which makes it impossible for Completion to be achieved by the Intended Completion Date without the Contractor taking steps to accelerate the remaining work and which would cause the Contractor to incur additional cost, or
 - vii) Any other cause, which, in the absolute discretion of the authority mentioned, in Contract data is beyond the Contractors control.
 - □ Request for reschedule and extension of time, to be eligible for consideration, shall be made by the Contractor in writing within fourteen days of the happening of the event causing delay. The Contractor may also, if practicable, indicate in such a request the period for which extension is desired.
 - In any such case a fair and reasonable extension of time for completion of work may be given. Such extension shall be communicated to the Contractor by the Block Dev. Officer, PATNAGARH in writing, within 3 months of the date of receipt of such request. Non-application by the contractor for extension of time shall not be a bar for giving a fair and reasonable extension by the Block Dev. Officer, PATNAGARH and this shall be binding on the contract.

(C) Compensation for Delay.

If the contractor fails to maintain the required progress in terms of clause 2 or to complete the

work and clear the site on or before the contract or extended date of completion, he shall, without prejudice to any other right or remedy available under the law to the Government on account of such breach, pay as agreed compensation the amount calculated at the rates stipulated below as the Block Dev. Officer, PATNAGARH (whose decision in writing shall be final and binding) may decide on the amount of tendered value of the work for every completed day / month (as applicable) that the progress remains below that specified in Clause 2 or that the work remains incomplete.

This will also apply to items or group of items for which a separate period of completion has been specified. Compensation @ 1.5% per month of for delay of work, delay to be completed on per Day basis.

Provided always that the total amount of compensation for delay to be paid under this condition shall not exceed 10% of the Tendered Value of work or to the Tendered Value of the item or group of items of work for which a separate period of completion is originally given.

The amount of compensation may be adjusted or set-off against any sum payable to the Contractor under this or any other contract with the Government. In case, the contractor does not achieve a particular milestone mentioned in contract data, or the rescheduled milestone(s) in terms of Clause 2.5, the amount shown against that milestone shall be withheld, to be adjusted against the compensation levied at the final grant of extension of time. Withholding of this amount on failure to achieve a milestone shall be automatic without any notice to the contractor. However, if the contractor catches up with the progress of work on the subsequent milestone(s), the withheld amount shall be released. In case the contractor fails to make up for the delay in subsequent milestone(s), amount mentioned against each milestone missed subsequently also shall be withheld. However, no interest whatsoever shall be payable on such withheld amount.

(D) Bonus for early completion: - (Amendment to Para 3.5.5(v) Note-iii of OPWD Code Vol-I by modification) (Revised/substituted as per Works Deptt. Office Memorandum No.5288 dt.04.05.2016)

For availing incentive clause in any project which is completed before the stipulated date of completion, subject to other stipulations it is mandatory on the part of the concerned Block Dev. Officer, PATNAGARH to report the actual date of completion of the project as soon as possible through FAX or e-mail so that the report is received within 7 days of such completion by the concerned Superintending Engineer, Chief Engineer & the Administrative Department. The incentive for timely completion should be on a graduated scale of 1(one) percent to 5(five) percent of contract value. Assessment of incentives may be worked out for earlier completion of work in all respect in the following scale.

- i. Before 30% of the contract period = 5% of contract value
- ii. Before 20% to 30% of the contract period = 4% of contract value.
- iii. Before 10% to 20% of the contract period = 3% of contract value.
- iv. Before 5% to 10% of the contract period = 2% of contract value.
- v. Before 5% of the contract period = 1% of contract value.

(E) Management Meetings

- Either the Engineer or the Contractor may require the other to attend a management meeting. The business of management meetings shall be to review the plans for remaining work and to deal with matters raised in accordance with the early warning procedure.
- The Engineer shall record the business of management meetings and is to provide copies of his record to those attending the meeting and to the Employer. The responsibility of the parties for actions to be taken to be decided by the Engineer either at the management meeting or after the management meeting and stated in writing to all who attended the meeting.

Clause-2 (b) of Item Rate P1 Agreement: - Rescission of Contract (Amendment as per letter No.10639 dt 27.05.2005 of Works Department, Orissa): -

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To rescind the contract (of which rescission notice in writing to the contractor under the hand of the Block Dev. Officer, PATNAGARH shall be conclusive evidence), 20% of the value of left over work will be realised from the contractor as penalty.

110. The tenderers are required to go through each clause of P.W.D. Form P-1 carefully in addition to the clauses mentioned here in before tendering.
111. The safety certificate of the E.I. work will be furnished by the agencies after getting necessary verification from the electrical inspector / equally competent authority responsible for the work prior to Energisation of the building.
112. Amendment to Para 3.5.18 Note-viii of OPWD code Vol-I (Revised/substituted as per Works Deptt. Office Memorandum No.12366 dt.8.11.2013)
- Before acceptance of tender, the successful bidder will be required to submit a work programme and mile stone basing on the financial achievement so as to complete the work within the stipulated time and in case of failure on the part of the agency to achieve the mile stone liquidated damage will be imposed.
113. Contractor may be black listed as per amendment made to Appendix XXXIV to OPWD Code Vol.- II on rules for black listing of Contractors vide letter No.3365 dt.01.03.2007 of Works Department, Odisha.

As per said amendment a Contractor may be blacklisted

- a) Misbehaviour/ threatening of Departmental & supervisory officers during execution of work/ tendering process.
- b) Involvement in any sort of tender fixing.
- c) Constant non-achievement of milestones on insufficient and imaginary grounds and non-adherence to quality specifications despite being pointed out.
- d) Persistent and intentional violation of important conditions of contract.
- e) Security consideration of the State i.e. any action that jeopardizes the security of the State.
- f) Submission of false/ fabricated / forged documents for consideration of a tender.

Total 113 Items only

HIRE CHARGES OF PLANTS AND MACHINERIES (Whenever Required)

Sl No.	Description			Usage Rates in Rs.	
	Machine	Activity	Output	Unit	Rate
1.	Dozer D-50-A-15	Spreading Cutting Cleaning	200cum/hour 100cum/hour 150cum/hour	Per hour Perhour Perhour	1592.17
2.	Dozer D-80-A-12	Spreading Cutting Cleaning	300cum/hour 150cum/hour 200cum/hour	Perhour Per hour Perhour	2190.43
3.	Motor Grader 3.35meter blade	Clearing Spreading GSB WMM	200cum/hour 200cum/hour 50cum/hour 50cum/hour	Per hour Perhour Per hour Perhour	1343.48
4.	Tractor with ordinary grader			Per hour	251.30
5.	Hydraulic Excavator of 1cum bucket	Soil ordinary Soil Marshy Soil unsuitable	60cum/hour 60cum/hour 60cum/hour	Per hour Perhour Perhour	730.43
6.	Hydraulic Excavator of 2cum bucket	Soil		Per hour	1624.35
7.	Front End loader 1 cum bucket capacity	Soil loading Aggregate loading	60cum/hour 25cum/hour	Per hour Per hour	452.17
8.	Tipper 5cum	Transportation of soil, GSB, WMM, Hotmix etc.	5.5cum	Per km. Per tonne.km Per hour	20.87 2.17 506.09
9.	Vibratory Roller 8-10 tonne	Earth/soil GSB WMM	100cum/hour 60cum/hour 60cum/hour	Per hour Perhour Perhour	864.35
10.	Smooth wheeled Roller 8-10 tonne	Soilcompaction BMcompaction	70cum/hour 25cum/hour	Perhour Perhour	294.78
11.	Sheep foot Roller	Soil compaction		Per hour	56.52
12.	Truck mounted water tanker	Water transport	6kL	Per hour	506.09
13.	Tractor	Pulling	50HP	Per hour	200.87
14.	Rotavator	Mixing	25cum/hour	Per hour	9.57
15.	Ripper	Scarifying	60cum/hour	Per hour	15.65
16.	Air compressor	General purpose	170/250cfm	Per hour	179.13
17.	Diesel Compressor		400cfm	Per hour	744.35
18.	Diesel Compressor		300cfm.	Per hour	618.26
19.	Diesel Compressor		500cfm	Per hour	432.17
20.	Electrical Compressor			Per hour	675.65
21.	Wet Mix Plant 60 TPH	Wet Mix	25cum/hour	Per hour	900.87
22.	Wet Mix Plant 75 TPH	Wet Mix	35cum/hour	Per hour	200.00
23.	Mechanical broom hydraulic	Surface cleaning	1250sqm/hour	Per hour	601.74
24.	Bitumen pressure distributor	Applying bitumen tack coat	1750sqm/hour	Per hour	448.70
25.	Emulsion pressure distributor	Applying emulsion tack coat	1750sqm/hour	Per hour	448.70
26.	Hotmix plant-120 TPH	DBM/BM/SDC/ Premix	40cum/hour	Per hour	13130.43
27.	Hotmix plant-100 TPH	DBM/BM/SDC/ Premix	30cum/hour	Per hour	9710.43
28.	Hotmix plant-60 to 90 TPH	DBM/BM/SDC/ Premix	25cum/hour	Per hour	7765.22
29.	Hotmix plant-40 to 60 TPH	DBM/BM/SDC/ Premix	17cum/hour	Per hour	6217.39
30.	Hotmix plant-8 to 10 TPH	DBM/BM/SDC/ Premix	cum/hour	Per hour	891.30

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30.	Paver finisher Hydrostatic with sensor control 100 TPH	Paving of DBM/BM/SDC/ Premix	40cum/hour	Per hour	1500.00
31.	Paver finisher Mechanical 100 TPH	Paving of WMM /PMC Paving of DLC	40cum/hour	Perhour	642.61
32.	Paver finisher Mechanical	Paving of DLC	40cum/hour	Per hour	1605.22
33.	Hydraulic Chips Spreader	Surface dressing	75cum/hour	Per hour	1478.26
34.	Tandem Road Roller	Rolling of Asphalt surface	1500sqm/hour	Per hour	641.74
35.	Pneumatic Road Roller	Rolling of Asphalt surface	30cum/hour	Per hour	697.39
36.	Pothole repair machine	Repair of potholes	25cum/hour	Per hour	508.70
37.	Bitumen boiler oil fired	Bitumen spraying	4cum/hour	Per hour	111.30
38.	Tar boiler	Bitumen spraying	1500 litre	Per hour	64.35
39.	GSB plant 50 cum	Producing GSB	40cum/hour	Per hour	582.61
40.	Mastic Cooker	Mastic wearing coat	1 tonne	Per hour	1379.13
41.	Batching and Mixing plant 15-20 cum.	Concrete Mixing	13cum/hour	Per hour	1043.48
42.	Batching and Mixing plant 30 cum.	Concrete Mixing	20cum/hour	Per hour	1252.17
43.	Batching and Mixing plant 112.5 cum.	Concrete Mixing	75cum/hour	Per hour	2400.00
44.	Batching and Mixing plant 262.5 cum.	Concrete Mixing	175cum/hour	Per hour	4486.96
45.	Transit Mixer	Transportation of concrete mix to site.	4.5cum/hour 3cum/hour	Per hour Per hour	521.74 478.26
46.	Grout pump			Per hour	56.52
47.	Concrete pump of 45 & 30 cum	Pumping concrete	33cum/hour 22cum/hour	Per hour	143.48
48.	Pump with 5HP diesel engine	Pumping of Water		Per hour	51.30
49.	Pump with 10HP diesel engine	Pumping of Water		Per hour	93.91
50.	Pump with 20HP diesel engine	Pumping of Water		Per hour	144.35
51.	Pump with 40HP diesel engine	Pumping of Water		Per hour	241.74
52.	Pump with 40HP electrical	Pumping of Water		Per hour	129.57
53.	Pump with 50HP electrical	Pumping of Water		Per hour	158.26
54.	Cranes 80 tonnes	Lifting purpose		Per hour	717.39
55.	Cranes 35 tonnes	Lifting purpose		Per hour	478.26
56.	Cranes 3 tonnes	Lifting purpose		Per hour	200.00
57.	Crawler mounted crane(18T)	Lifting purpose		Per hour	1493.04

58.	Tower Crane	Lifting purpose		Per hour	479.13
59.	Welding	Welding		Per hour	70.43
60.	Grouting machine without compressor			Per hour	79.13
61.	Mechanical Winch(10T)			Per hour	194.78
62.	Power Winch(40HP)			Per hour	191.30
63.	Concrete Bucket	For pouring concrete	1cum	Per hour	8.70
64.	Kerb casting machine	Kerb making	80RM/hour	Per hour	173.91
65.	Concrete Mixer 0.4/0.28 cum 1 cum	Concrete Mixing	2.5cum/hour 7.5cum/hour	Per hour Per hour	153.91
66.	Vibrator(3HP diesel)	Compacting concrete		Per hour	92.17
67.	Piling Rig with Bentonite pump	0.75m dia to 1.2m dia boring attachment	2 to 3RM/hour	Per hour	3065.22
68.	Concrete Paver Finisher with 40HP Motor	Paving of concrete surface	20cum/hour	Per hour	1608.70
69.	Integrated stone crusher	Crushing of spalls Crushing of spalls	100TPH 200 TPH	Per hour	4860.87 10226.09
70.	Stone crusher(electrical)	Crushing of spalls		Per hour	160.00
71.	Crushing & processing plant(electrical)			Per hour	204.35
72.	Concrete paver Finisher with 40HP Motor	Paving of concrete surface	175cum/hour	Per hour	14076.52
73.	Prestressing Jack with Pump & Access	Stressing of steel wires / stand		Per hour	72.17
74.	Generator 100KVA	Generation of Electric Energy	100KVA	Per hour	391.30
75.	Generator 250KVA	Generation of Electric Energy	100KVA	Per hour	978.26
76.	Generator 33KVA	Generation of Electric Energy	50KVA	Per hour	208.70
77.	Generator 40KVA	Generation of Electric Energy	KVA	Per hour	369.57
78.	Generator 125KVA	Generation of Electric Energy	KVA	Per hour	786.96
79.	Pneumatic Sinking Plant	Pneumatic sinking of wells	1.5 to 2.0 cum/hour	Per hour	2339.13
80.	Truck 5.5cum per 10 tonnes	Material Transport	4.5cum	Per km. Per ton.km. Per hour	17.39 1.74 484.35
81.	Road Marking machine	Road marking	100sqm/hour	Per hour	52.17



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82.	Mobile slurry seal equipment	Mixing and laying slurry seal	2700sqm/hour	Per hour	565.22
83.	Wagon drill			Per hour	111.30
84.	Dimond drill			Per hour	293.91
85.	Inwell rings			Per hour	62.61
86.	Jack hammer			Per hour	7.83
87.	Pneumatic rammer			Per hour	11.30
88.	Pusher leg			Per hour	4.35

TECHNICAL SPECIFICATION OF CIVIL PORTION OF WORK

Materials of following specification are to be used in work. The Tenderer are expected to possess and be well conversant with the following IS standard and code of practice.

1.	Cement	Will be as per I.S. 269/455 (However the grade of cement to be selected by the Engineer-in-Charge of work and complex cube test before commencement of work in eachbatch).
2.	Steel	I.S. 432 (Plain) and 1786 (Tor)
3.	Vibrator	I.S. 7246
4.	Aggregate	I.S. 383, I.S. 515
5.	Water for mixing and curing	Shall be clean, free from injurious amount of oil, salt, acid, vegetable materials and other substances and harmful to concrete in conformity to I.S. 456 and I.S.3025.
6.	Sand / Fine Aggregate	I.S. 2116, 383
7.	Binding wire	I.S. 280 (galvanised minimum 1 mm)
8.	Rain water pipe	I.S. 2527
9.	Construction joints	I.S. 3414
10.	Steel Window Frame	I.S. 1038/83
11.	Steel Door Frame	I.S. 4351/75
12.	Fitting & Fixtures for journey works	Conforming to I.S. 7452/82 strictly conform to I.S. specification and as per direction of Engineer-in-Charge.

Note: For road work (Approach Road) specification as per road and bridges (latest edition) published by I.R.C & M.O.S.T. shall be followed. In case of any doubt and absence of provision, regarding specification I.S. shall be referred (Indian standard).

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ITEM OF WORK

1. Concrete shall be with conformity to I S 456
2. Foundation shall be with conformity to I S 1080
3. Stone masonry (R.R.) shall be with conformity to I S 1597 (Part-I)
4. C.R. Masonry shall be with conformity to I S 1597
5. Brick masonry shall be with conformity to I S 2212
6. Cement plastering shall be with conformity to I S 9103 & 6925
7. Mortar shall be with conformity to I S 2250
8. White and colour washing shall be with conformity to I S 8278
9. CC in foundation shall be with conformity to I S 2571
10. Anti-Termite Treatment shall be with conformity to I S 6813 (Part - I & Part -II)
11. Painting to all surfaces shall be with conformity to I S 2395 (Part - I & Part -II)
12. DPC shall be with conformity to I S 3067
13. Tarfelt treatment shall be with conformity to I S 1346
14. Mosaic flooring with conformity to I S 2114
15. Steel painting shall be with conformity to I S 1477 (Part - I Part - II) I S. 1661
16. Pile Foundation shall be with conformity to I S. 2911 (Part I & Part 2)

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TECHNICAL SPECIFICATION OF ELECTRIFICATION INSTALLATION WORKS

PART-II (EI)

The details of internal wiring, the position of fittings, fans, switches and plug sockets etc. indicated in the layout drawings. The position of light fittings, fans, switchboards etc. indicated in these drawings are only for the guidance of the supplier and the actual position of these shall be mutually decided between the supplier and the purchaser. The supplier shall submit the purchaser of his consideration and approval all runs of wiring and the exact position of the points and the switch boxes first marked on the points buildings.

All internal wiring shall be done in conformity to the latest Indian standard specification/Rules code of practice adopted by CPWD and other standard practices prevalent in the part of the country. For the purpose of the specification the terminology used shall be as defined in IS:732 and IS:1356 of the definition of points wiring. The installation shall be carried out in conformity to all requirements of IE Act, 1910 and IE Rules 1956.

- a) Ceiling rose in (in case of ceiling and exhaust fan).
- b) Ceiling rose or connector (in case of pendants except stiff pendant points)
- c) Bank plate (in case of stiff pendant).
- d) Socket outlet (in case of socket outlet points)
- e) Lamps holder (in case of wall Bracket, batten holder bulk head fitting and similar other fittings)
- f) Call bell / buzzer (in case words 'via' the switch shall be read 'via' the ceiling rose / socket outlet for bell push, where no ceiling rose / socket outlet its provided.

The following shall be deemed to be included in the point wiring

- a) Switch and ceiling rose are required
- b) In case of wall brackets, bulk head fittings, cables as required up to the lamp holders]
- c) Bushed conduit for porcelain tubing where cables pass through walls.
- d) All wood or metal blocks, boards and boxes, R.J. Boxes sunks or surface type including those required for fan regulator but excluding those under the distribution board and main control switch.
- e) Earth wire from 3 pin socket point to the common earth including connection to the earth dolley.
- f) Earth wire of 18SWG/H.D.B.C. wire for loop earthing of the fixture
- g) All fixing accessories such as clips, nails, screw, plug, rawl plug, wooden plug, round blocks etc. as required
- h) Joint for junction boxes and connecting the same as required
- i) Connections to ceiling rose or connection socket outlet, lamp holders, switch, fan regulators etc

The point wiring in case of fan and light points shall mean the distance between the control switch and ceiling rose, connect or back plate, socket outlet or lamp holder depending upon the fittings measured along the runs of wiring irrespective of the number of wires in run. In the case of socket outlet points, the length shall mean the distance between the socket outlet and the tapping point of live wire on the nearest switchboard or junction box, as the case may be.

In the case of exclusive socket outlet circuits wired on 'Joint Box' system of wiring, any junction provided for extending the wiring beyond the point referred to, shall be treated as the nearest tapping point. In case of call bell / buzzer points the length shall mean the distance between the call bell and the ceiling rose / socket outlet or the bell push (when the ceiling rose / socket outlet is not used).

Sub main shall include the earth wire of adequate size main distribution Board up to sub distribution board B.B. such wiring has been classified on the basis of length. For the internal lighting, either surface conduct wiring system or recessed conduit or batten wiring system shall

be provided as specific in the bill of quantities and working drawings.

Conduit wiring

For recessed conduit wiring system the conduit shall be placed in the ceiling / columns etc. before the casting of the slab or column. The conduit pipes shall be properly positioned and fixed so that it will not be displaced at the time of concreting. The junction boxes provided shall be so arranged that its cover will be flushed with the finished surface of the ceiling or column.

For placing the conduits in the walls, chases of ample dimension shall be made neatly to fix the conduit in a desired manner. The conduit pipe shall be fixed by means of staple or saddles not more than 600mm apart. Fixing of standard bends or elbows shall be avoided and all curves maintained by bending the conduit itself with a long radius will permit easy drawing of the conductors. Suitable inspection boxes shall be provided to permit periodical inspection and removal or replacement of wires if necessary. There shall be mounted flush with the wall with holes in the cover of the box.

The switch or regulator box shall be made of metal on all sides except on the front where backlight sheet or Perspex cover painted to match the colours of the wall shall be used in case of surface wiring system. For recessed wiring system, these boxes shall be made flush with the conduit of each conduit or section shall be completed before conductors are drawn in. The entire system of conduit after installation shall be tested for mechanical strength and electrical continuity throughout the earthing of the entire installation shall be carried out in accordance with I.E. Rules and standards.

The number of wires drawn in the conduits shall not exceed the numbers those specified in Indian standard specification No.732.

Main and Sub distribution Boards:

The position of main boards for lighting and sub distribution board for different buildings are approximate and the exact location shall be given to the successful tenderer at the time of installation.

The scope of this specification includes installation of the panel boards and distribution boards and making necessary connections. The installation of the boards shall be done strictly in accordance with the details supplied with the specifications; the instructions supplied by the switchgear manufacturer, Indian standard specifications and H.E. rules.

The supplier shall submit the details of installations to the purchaser for his consideration and approval, prior to installation.

When the switchboards are wall / column mounted top, they shall, be mounted on a suitable angle iron framework. All the metal supports etc. shall be protected against corrosion. The mounting height for such switchboards shall be such that it can be conveniently operated.

Earthing

Earthing shall generally be carried out in accordance with the requirements of Indian Electricity Rules and the relevant rules and regulations of electrical supply authorities. The complete earthing work for the installation covered by this specifications shall also be provided taking into account Indian Standard Specification No.IS:732 and IS:3043. The earthing system adopted shall also have adequate mechanical strength.

The work shall include earthing of noncurrent carrying metallic parts of all the equipment, light fittings, conduit pipes, cable and cable supports and earth strips (the design to be approved by the purchaser) and all the inter connection between the earthing system to a value mutually agreed upon between the purchasers and the supplier.

Installation, testing and Commissioning:

The supplier shall be responsible for the installation testing the commissioning of all the equipment and materials supplied by him against this specification. This shall also include the provision of miscellaneous wiring and supports and earthing in compliance with Indian Electricity rules and to the full satisfaction of the Government Electrical Inspector. All small items such as clamps, bolts, nuts, racks, supports, miscellaneous wiring etc. required to make

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the installation complete, shall constitute the part of major items specified in the bill of quantities and the tenderer should quote for each item taking these into consideration.

The responsibility of the supplier shall include receiving all the equipment and materials at site, storage for required period, handling the same at the site of erection, final execution, erections, revisions of equipment, if any, testing and commissioning and handing over the installation complete in all respect to the entire satisfaction of the purchaser's authorized representative. The supplier shall make good of all the damaged equipment and materials during this period at his own expense.

The supplier shall submit sample of each and every equipment and materials for the final approval of the purchaser's representatives immediately after the acceptance of offer. All the equipment's and materials shall be supplied exactly as per to the approved samples. If at any stage the purchaser brings to the notice of the supplier any discrepancy or defect the supplier shall replace the same at his own expense.

The supplier shall render all reasonable assistance to the purchaser in getting the installation approved by the Government Electrical Inspector prior to the energisation and supply necessary drawings, test certificates and both for tests carried out at the factory and site as well as the tests which the inspector may demand. In case any addition of alternations are required, to be made in the installation or in the equipment as per the directive of the Government Electrical Inspector / Local Authorities, he same will have to be carried out by the supplier, at his own expense.

The position of light fittings, main board, switches, sockets and routes of pipes and cables shown in the drawings are only indicative. The actual position of these shall be decided at site at the time of execution joints by the supplier and the purchaser's authorized representative. The position of light fittings, pipes and board if required, to be changed / shifted due to the change in the building design etc by the purchaser's authorized representative, the same shall be carried out at no extra cost.

All the materials supplied to the contractor according to the Contract condition will be subject to inspection and approval of the officer or his representative from time to time. The contractor will provide all facilities of such inspections free of cost. At the time of inspection, the owner of his representative will have full liberty to reject any such materials, which does not conform to the specification / requirement. No claim for any rejected materials will be entertained by the owner. The contractor will remove all rejected materials from site at his own cost.

No surplus materials procured by the contractor will be accepted by the owner. The contractor will be responsible to get the Electric installations cleared by the Electrical Inspector of Orissa Government. Only the inspection fee will be reimbursed by Department on production of challan copy

Installation and Maintenance Tools:

The supplier along with the tender shall furnish a complete list of tools, appliances and accessories required for the installations of switch grass, light fittings, pipes cables and wires.

Drawings:

All drawings, test certificates, instructions manuals etc. shall be in English Language and all dimensions and weights shall be in metric units.

The tenderer shall submit with the tender general arrangement drawings for the installations work, typical methods and cabling and cables supports pipe work and pipe supports, typical methods of earthing and fixing of light fittings earthing etc. as offered by him in the tender.

The contractor shall submit for the purchaser's approval all layout, the general arrangement drawings as well as the typical details of all types of installation work in three sets before commencing the manufacture and the site installations work well in advance so that the site work shall not suffer.

After obtaining approval of the above drawings the contractor shall supply three sets of the following drawings.

- (a) The arrangement and support of conduit pipe

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- (b) The position of light fittings, switches / plug socket and switch boards
- (c) Earthing installations
- (d) Layout plan showing the entire cable network

On completion of work, the successful tenderer shall supply one set of tracing in transparent linen and five sets of prints of all drawings incorporating all the changes / modifications affected during the execution of the contract. All wiring diagrams shall indicate clearly, the switch board, the runs of main and sub main wiring and the position of all the points with their controls. All the circuits shall be clearly indicated and numbered in accordance with IS:375.

The technical literatures and operating instructions and the maintenance manuals shall also be supplied in triplicate to the purchasers after the completion of the installations work.

Test:

Manufactures standard tests in accordance with Indian Standard and other standards, adopted shall be carried out on all the equipment and accessories covered by this specification so as to ensure efficient and satisfactory performances of all the components and also the equipment as a whole under working conditions at site. The tenderer shall submit a complete list of all such tests. If the purchaser, if so desired for special tests, to be carried out, under certain conditions the same shall be made by the successful tenderer at his own expenses.

All equipment shall be tested at site before the commissioning in accordance with the adopted standard and Indian Electricity Rules. Voltage test shall be carried out on each circuit on completion of wiring and cabling.

Technical Data:

The tenderers shall submit with their tender all such technical data, which are required for complete evaluation of the equipment offered. The suppliers shall give complete technical information of the equipment as detailed in Annexure and relevant Indian standards. The tenderer should supply such details of all equipment and materials offered specially with regard to the following.

- a) Fuse switch board and distribution boards
- b) Light fittings
- c) Conduits and the accessories for them
- d) Switches / plug sockets
- e) Cable and wires

The tender shall give along with his tender the following details:

- a) Complete details of earthing electrodes, earthing station and earthing conductors
- b) Details of conduit supports
- c) Details of all the equipment and accessories to be supplied

Exception to Specifications:

The object of this specification is to have all tenderers quote for equivalent materials and workmanship. It is, however, understood the certain manufacturers may not be able to offer as specified in every case, where the tenderer may find it necessary to deviate from the exact letter and not the intent of the specification, he must specifically state what these deviations may be at the time he submits the tender. All deviations must be grouped in one statement.

No deviations other than those included in the tender will be permitted. These deviations should be listed as per Annexure.

PVC insulated Cables and Wires:

For 415V Distribution system, cables of voltage grade not less than 1000V shall be used. These cables shall be heavy-duty class, PVC insulated and PVC sheathed with aluminium conductors. The wires used in the lighting installation shall be PVC insulated and sheathed in case of conduits wiring and of 660V grade. Wires of different colours shall be made use of for

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quick identification of phase wire / neutral wire etc. All cable of wires shall comply with the requirements regarding the manufacture and testing etc as specified in India Standard Specification IS:1554 and IS:694.

The length of cables indicated in the bill of quantities and drawings are only indicative and the successful tenderer will be paid for the exact length of cables laid at site. No joint shall be allowed in a run of cables, which can be covered by a possible drum length of cables.

Fuse switch / switch fuse shall be metal clad dust and vermin proof suitable for use under climatic conditions prevailing at site. Switch fuse / fuse switch units shall comply in general to IS:1567/4064 with regard to design and constructional / features.

The 'ON' and 'OFF' position of the switch handles shall be distinctly indicated and interlocks shall be provided to ensure that the switch cover cannot be opened unless the switch is in the 'OFF' position. Means shall, however, be provided for releasing the interlock to permit closing of switch with cover open for testing purposes. Designs with normal conventional position of switch handles, i.e. with switch handle up in the 'ON' position and down in the 'OFF' position shall be preferred. All live parts inside the switch shall be properly surrounded and inter phase barrier shall be provided.

Switch fuse / fuse switch units, distribution boards shall be provided with necessary metal frame work so that they can be mounted on wall / columns structure etc. as desired. The panel boards, shall be wall mounted type or floor mounted type as specified in the bill of quantities or drawings. Necessary supporting metal frame of approved design shall be provided for all panel boards.

The arrangements of work boards shall be such that the operational handle of the top mounted switches are within the convenient of operators (about 1.2 M from the finished floor level) and proper space shall be provided for the termination of the cable in the switches provided below the bus-bars.

The bus-bars within the bus-bar chamber shall be liberally spaced for taking the riser connection. The bus bars with aluminium conductors shall be provided and PVC sleeves of different colour shall be mounted on them for easy identification, Clamped joints for taking the riser connections, instead of bolted type shall be preferred.

Two bolted type earthing terminals shall be provided on the switch boards. All individual switches shall be connected with suitable size earth wire to the main earthing terminals of the switchboard.

Hanger Board and shock treatment / charts shall be supplied wherever required.

At the incoming side of each pen phase, 3-neon type indicating lamps should be provided at the main board.

Switches and Plug Sockets

Switches provided for control of light points shall conform to IS:1087 and shall be rated for 5A/15A 250V

Ceiling Fans and Exhaust Fans:

Ceiling fans shall conform to Indian standard specification IS: 374-1960. The fans shall be supplied with all standard accessories like regulator and capacitors etc.

The performances rating of the propeller fans shall in accordance with stipulations of IS: 2312. All fans shall be robust in design and construction and shall be supplied complete with wall brackets / clamps etc.

Fluorescent Fittings:

All fluorescent fittings supplied shall conform in general to IS: 1913 and shall be complete with all standard accessories like choke, starter and capacitor etc

The type of enclosure provided for the fittings shall be of that specified in the bill of quantities and the working drawings. The materials of construction for fittings used for outdoor installations and for use in the work anodes shall be such that they shall withstand the atmospheric condition in that area.

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Lamp holders used shall be fully shock proof, spring-loaded rotary type to ensure positive lamp locking. It should also be not possible to touch live parts of the lamp holder both after the lamp has been taken out and during the insertion or removal of the lamp. The starters shall be designed to give designed starting characteristics that shall promote full lamp life. Starter shall have high mechanical strength and topic proof construction. It should be incorporated with radio suppression capacitor o adequate rating and capacity. Power factor improvement capacitors are provided with hermetically sealed housing to ensure long and trouble free service. Terminal soldering tango shall be provided for easy electrical connections. The capacitors in general shall confirm to IS:1569-1963 and P.F improvement up to 0.95 for twin fluorescent light fittings and 0.9 for single fluorescent light fittings is to be maintained.

The ballast provided in the fluorescent fittings shall generally be in accordance to IS: 1534. The ballast should incorporate the following design features.

- i) Low working temperature
- ii) Correct pre heating current for the electrodes
- iii) Proper wave foam
- iv) Small in dimensions
- v) Correct power supply to the lamp
- vi) No hum.
- vii) Easy connection leads.

All the metal construction of the fittings shall be such that they shall:

- 1) Withstand the atmospheric condition prevailing in the area
- 2) Provide maximum mechanical protection to the tubes and fittings accessories. Assists in maximum and uniform light distribution.

All fittings shall be provided complete with florescent lamps. All lamps shall confirm to IS:2418.

Incandescent Fittings:

The incandescent fittings shall be supplied strictly as per the details given in the enclosed annexure and bill of quantities, deviation if any regarding designs, construction of materials should be specified clearly.

All the metal parts used in construction of the fittings shall have no effect due to dust / fumes / gases likely to exist in the atmosphere. All the bolts, clamps, nuts and guard wire etc shall be galvanized.

The wall fittings shall be provided with necessary hooks / clamps / supports etc for fixing the light fittings on wall / ceiling etc as detailed in the bill of quantities and the working drawings.

Light fittings shall be suitable for connection with 19mm dia. Conduit pipe as required. If fittings are to be connected through PVC cables, glands of adequate size and capacity shall be provided.

The lamp holders provided in the fittings shall confirm to IS:1528.

C O D E S

Codes shall mean the following including the latest ascendants and / or replacement if any.

- a) Indian Boiler Act, 1923 and Rules and Regulations made there under
- b) Indian Electricity Act, 1923 and Rules and Regulations made there under
- c) Indian Factories Act, 1948 and Rules and Regulations made there under
- d) The minimum wages Act
- e) The Women's Compensation Act
- f) The Payment of Wages Act
- g) The Fatal Accident Act
- h) The Industrial Employment Act



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- i) The Employment provident Fund Act
- j) Indian Explosive Act 1984 the Rules and Regulations made there under
- k) Indian Petroleum Act 1934, and Rules and Regulations made there under
- l) A.S.M.E. Test Codes
- m) AIRE Test, Codes
- n) American Society of Materials Testing Codes
- o) Standards of the Indian Standards Institution
 - 1) Low Tension Circuit Breakers: IS 2516-1955 Part I Sec.1
 - 2) Switchgear Bus Bars IS 375-1963
 - 3) HRC fuse links IS 2208-1962
 - 4) Distribution fuse boards IS 2675-1966
 - 5) Enclosure for Low Voltage switchgear IS 21470-1962
 - 6) PVC Cables IS 1554-1975
 - 7) Tabular fluorescent lamps for Cameral lighting service IS 2418-1963
 - 8) Tungsten Filament Lamps for cameral service IS 415-1963
 - 9) Ceiling Fans IS 274-1966
 - 10) Flood lights IS 1947-1961
 - 11) Wall Glass flame-proof electric light fittings IS 2206-1962 (Part 1)
 - 12) Water Tight Electric Light Fittings IS 3553-1956
 - 13) Steel Boxes for Enclosure of Electrical Accessories IS 5133-1969
 - 14) Fittings for Rigid Steel conduit IS 2667-1979
 - 15) Rigid steel circuits for electrical wiring IS 3837-1966
 - 16) Accessories for Rigid Steel Conduits for Electrical Wiring IS 3837-1966
 - 17) Switch Socket Outlets IS 3837-1966
 - 18) PVC Wiring IS 694-1977
 - 19) Switches for domestic and similar purpose IS 3854-1966
 - 20) PVC wiring IS 694-1977
 - 21) Call Bell and Buzzers IS 2268-1966
 - 22) Straight through joint boxes and leads sleeves or paper insulated cables-EID-0032-1964
 - 23) Earthing IS 3043-1966
 - 24) Electrical Wiring installations IS 732-1963
 - 25) Switchgear IS 3072-1965 (Part I)
 - 26) Lighting protection IS 2309 -1969
 - 27) Public Address system IS 1882-1962
 - 28) Low Tension switch use units IS 4064-1978
 - 29) Code of Practice for Automatic FIRE ALAM system IS 2189-1970
 - 30) Specification for Heat Sensitive Fire Detectors IS 2175-1977
 - 31) Guide for Safety procedure in Electric work IS 5216-1969
 - 32) Rubber Mats for Electric works IS 5424-1969
- p) Other internationally approved standards and / or Rules and Regulations touching the subject matter of the contract.

PART-III
ADDITIONAL APPENDIX TO BILL OF QUANTITY:
(For P.H. Items of Work)

CONSTRUCTION OF DAY CARE SUB-CENTRE CUM HEALTH & WELLNESS CENTRE AT BANAIMUNDA UNDER PATNAGARHBLOCK FOR THE YEAR 2023-2024 OF BALANGIR Dist. (Civil, EI, PH)

1. The quantities of items mentioned in the tender schedule may increase or decrease during execution of works but the contractor will complete the work as per his tendered rates in accordance with the instruction of Engineer in charge.
2. **Specification:** The standard PHD and PWD specification will be followed for execution of work. During the course of execution of work, the instructions of the Engineer in charge shall be final and binding.
3. The Sales Tax element should not be added to the analysis of rates and the previous practice should be followed as per the Works Department letter No. IIT.22-89-18170 dt. 18.7.1989
4. There should be no clause either in the tender or in agreement for payment of any additional claim on account of Sales Tax on completed works which will be deemed to be recovered by existing omnibus stipulation as per the works Department letter No. TIT 22/89-18170 dt. 18.7.89/
5. It is the responsibility of the Contractor to arrange watch and ward to the installations until testing commissioning and handing over for which no extra payment towards watch and ward will be paid,
6. The contractor shall maintain a separate site order book for P.H. portion of work.
7. The P.H. portion of work shall be open for inspection by the authorities of engineer in charge and the higher authorities and instructions imparted during the course of inspection should be binding on the contractor.
8. Materials not covered by any of the above categories of items in the bill of quantity have to be approved by the competent authorities before utilising the same in works. In such event, the payment of such item will be made as per actual on due approval by the competent authority. All materials required for the work shall be supplied by the contractor as per standard specifications appended with due approval by the Engineer in charge.
 In case the material as per make specified is not available, the materials of equivalent make and as per I.S. Specifications or of best quality when not covered by I.S. Specifications.
 Can be utilised on prior approval of Addl.E.O(Tech.) ZP or the officers duly authorised by him. It is binding on the part of the contractor to use such items of materials which are available in the Departmental store and in such case the deduction from the bills will be made at stock issue rates.

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**TECHNICAL SPECIFICATION FOR P.H PORTION OF THE WORK:
CONSTRUCTION OF DAY CARE SUB-CENTRE CUM HEALTH & WELLNESS CENTRE AT
BANAIMUNDA UNDER PATNAGARH BLOCK FOR THE YEAR 2023-2024 OF BALANGIR
Dist. (Civil, EI, PH)**

A. WATER SUPPLY PIPES AND FITTINGS

1. Materials

All galvanized iron pipes are to be of mild steel, continuous welded, screwed tubes, medium quality confirming to IS & bearing ISI Marks, manufactured by reputed firms and approved brands as specified. The pipes shall confirm to I: S 1239 (Part - I) -1975.

All G.I. fittings shall be manufactured by Registered firm.

All PVC pipes are to be of medium quality (Schedule-80) manufactured by reputed firms and approved brands as specified. The pipes shall confirm to ASTM- D-1785

2. Weight of G.I. pipes for a Metre length:

The per meter weight of different diameters of G.I. pipes for medium class is indicated in the following table.

SI No.	Pipe size in mm	Medium class (in kg)
1	15mm	1.22
2	20mm	1.57
3	25mm	2.43
4	32mm	3.13
5	40mm	3.60
6	50mm	5.10

3. Laying of Pipes

The layout of the mains and service Pipes etc will be done in accordance with the drawings. The Contractor is to mark out the exact position of the pipes and fittings at site and take approval of the consultant /Engineer In-charge, before taking up the work.

4. Where the pipes are laid, underground these must not be laid less than 450mm below ground level

and coated with one coat of approved black bituminous paint. For laying the G.I. Pipes and Fittings below ground level, the width and the depth of the trenches for different dimensions of the pipes shall be given as below:

Dia of pipe	Width of Trench	Depth of Trench
15mm to 50mm	300mm	600mm
65mm to 100mm	450mm	750mm

The pipes shall be laid on a layer of 75mm thick sand and filled up with sand upto 75mm above pipes and the remaining portion of the trench shall then be filled up with excavated earth with proper ramming as described in "Excavation and refilling". The surplus earth shall be disposed of as directed.

Thrust or anchor blocks of cement concrete 1:2:4 in hard granite chips shall be constructed on bends or branches to transmit the hydraulic pressure without impairing the ground and spreading it over a sufficient area. Pipes shall not be laid top as through manholes, catch drain. Where it is unavoidable the pipes shall be carried in sleeve pipes of M.S./G.I., as approved by the consultant/Engineer-in-charge. The rates should include such a situation

5. Where pipes run along walls, these are to be fixed to the wall with holder bat clamps/M.S. Hooks as below

Dia of pipe in mm	15	20	25	32	40	50

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Horizontal Line	2m	2.5m	2.5m	2.5m	3m	3m
Vertical Line	2.5m	3m	3m	3m	3.5m	3.5m

Where the pipes are passing through the R.C.C./Masonry wall/Column/beam or pillars, these must pass through the appropriate higher sizes of C.I. /G.I. Sleeve Pipes and are to be included in the rates.

In case the Pipes are embedded in walls and floors it should be painted with one coat of anticorrosive paint of approved quality.

All pipes should be fixed horizontal and vertical. For taking the Pipes through the walls and floors

and roof slab etc. The holes shall be made by filling with chisel or jumper and not by dismantling the brick work or concrete. After fixing, the holes shall be made good with cement concrete 1:2:4 and properly finished with cement plaster 1:4 to match the adjacent surface.

Union Nuts are to be provided in each of the Vertical riser or drop on and from G.I. Tank and near the Valve and as and where necessary.

The long screw fittings of 8cms are to be provided for long horizontal lines and inside the lavatory/ Kitchen etc.

6. After laying and jointing the Pipes and fittings shall be inspected under working condition of pressure and flow. Any joint found leaking pipes should be removed and replaced without extra cost. The Pipes and Fittings after they are laid shall be tested to hydraulic pressure of 6 Kg/ cm². The test pressure should maintain without loss of for at least half an hour.

7. **Painting**

On completion of the test, the exposed pipes and fittings are to be painted with two coats of synthetic enamel paint of approved colour and brand over a coat of priming.

8. **Measurement**

The length shall be measured in running meter correct to centimetre for the finished work, which shall include the Pipes and fittings such as Bends, Tees, Elbows etc., but excludes Brass or Gun-metal fixture like Tap, Cocks, Valves, PVC connection Pipes etc.

9. **Jointing**

The jointing of G.I. tubes/pvc pipes and fittings etc. will be done as per the provisions stipulated in the B.I. Specification.

10. **Bib cock and Stop Cock**

These shall conform to I: S 781 - 1967 and bear ISI Mark. The Bib cock is a draw off tap with a horizontal inlet and free outlet and stop cock is a valve with a suitable means of connection for insertion in a pipeline for controlling or stopping the flow. This shall be of screw down type. The cocks shall open in anti-clockwise direction. The stop cocks should be C.P concealed stop cocks and C.P angle valve type as specified in tender schedule. Bib cocks should be also C.P Brass bibcocks.

11. **Full way Valve (Brass)**

Full way valve is a valve with suitable means of connection for insertion in a pipeline for controlling or stepping the flow. The valves shall be of brass fitted with a cast iron wheel and shall be of gate valve type conforming to I: S 780-1960 brass rod late stone, opening full way and of the size as specified. The approximate weight of the valves is indicated below for guidance.

Pipe size in mm	Flanged End valves in Kg	Screwed End valve in Kg
15mm	1.021	0.567
20mm	1.503	0.68
25mm	2.498	1.077
32mm	5.232	1.559
40mm	6.082	2.268
50mm	6.691	3.232

12. **Gun-Metal Full way Valve**

This shall be of the Gunmetal fitted with wheel and shall be of Gate-Valve type opening full way.

This shall conform to I: S 778-1971. Class I. The valves should bear I.S.I. Mark

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13. **Ball Valve**

The ball valve shall be high or low pressure class as stipulated in the Tender Schedule and shall conform to IS 1703 - 1968. The nominal size of ball valve shall be that corresponding to the size of pipe to which it is used. Ball valves shall be of brass or gun metal and the float for low pressure in Polyethylene and for high pressure in copper.

Each and every ball valve while in closed position shall withstand an internally applied hydraulic pressure of 20 Kg/Cm² for a minimum period of two minutes without leakage or sweating.

Every high pressure ball valve when assembled in working condition, with the float immersed to not more than half its volume shall remain closed against a test pressure of 10.5 Kg/Cm². Polyethylene floats shall be watertight and non-absorbent and shall not contaminate water and with no jointing adhesive jointing parts.

14. **CUTTING HOLES UP TO 30 CM X 30 CM IN WALLS INCLUDING MAKING GOOD THE SAME;**

The minimum thickness of the copper sheet used for making copper floats shall be of 0.45 mm. The thickness of materials of the float shall be uniform throughout. General:- Square holes of size as specified or as directed by the Engineer-in-charge shall be cut in the masonry or taking pipes. Any damage to the adjoining portion or to any other item shall be made good as directed by the Engineer-in-charge. All dismantled material shall be removed from the site.

Masonry works: - Bricks work etc, shall be made good by using the same class of brick, tile or stone masonry as was cut during the execution of the work. The mortar to be used shall be cement mortar (1:4) as directed by the Engineer-in-charge.

Finishing: - Cement mortar in 1:4 mix shall be used for plastering or pointing as may be required. The surface shall be finished with two or more coats of white wash/colour wash/ distemper/ painting as required but where the surface is not to be whitewashed, colour washed, distempred or painted; it shall be finished smooth with a floating coat of neat cement or is required to match with the surrounding surfaces.

The specifications for brickwork, stonework and finishing etc. shall be the same as detailed under relevant standards of State P.W.D. specification.

15. **CUTTING HOLES UP TO 15 CM X 15 CM IN RCC FLOORS INCLUDING MAKING GOOD THE SAME;**

General:- Square holes of size as specified shall be in R.C.C. floor and roofs/chajjas for passing pipes etc. Any damage to the adjoining portion or to any other item shall be made good as directed by the Engineer-in-charge. All the dismantled material shall be removed from the site.

Cement Concrete: - After insertion of pipes etc. the hole shall be repaired with cement concrete 1:2:4 and the surface finished to match the existing surface. The top and bottom shall be finished properly to make the joint leak-proof. The specifications for cement concrete work and finishing etc. shall be the same as detailed under relevant sub-heads of State P.W.D. specifications.

16. **Shower rose**

The shower rose:- The shower rose shall be of chromium-plated brass of specified diameter. It shall have uniform performance. The inlet size shall be 15 mm or 20 mm as required.

The chromium plating wherever specified shall be of grade-B type conforming to IS No. 1068 - 1958. The chromium shall never be deposited on brass unless a heavy coating of nickel is interposed. In the case of iron, a thick coat of copper shall first be applied, then one of nickel and finally the chromium. In finish and appearance, the plated articles, when inspected shall be free from plating defects such as blisters, pits, roughness and unplated areas and shall not be stained or discoloured.

A stopcock of the specified size shall be provided to control the inlet water supply to the showerrose.

(a) Height of shower 1850 to 2000 mm from floorlevel.

(b) Height of tap:-

450mm from floor level projecting 150mm from wall.

Flushing Cistern:

17.

The flushing of the Indian water closet (Orissa closet) shall be done by C.I. or polystyrene high level valve less syphonic flushing cistern (PVC low level cistern) of approved brand and quality I.S.I. marked and capacity as specified. The connection between the cistern and water closet shall be made by 32mm dia G.I. flush pipe, made from G.I. pipe (Light quality) or 32mm dia PVC pipe as specified in the tender schedule. The flush pipe with an offset should be fixed to wall using C.I. holder bat clamps. The capacity of the cistern should be 10ltrs. As per I.S.S. The cistern shall be fixed on cast iron or rolled steel/PVC cantilever brackets (built in type), which shall be firmly embedded screwed in the wall, with C.C. M20. The cistern shall be provided with 20mm dia PVC. Overflow pipe with fittings, which shall terminate into mosquito proof coupling secured in a manner that will permit it to be readily cleaned or renewed.

The 32mm dia flush pipe shall be connected to the water closet by means of approved type joint. The flush pipe shall be fixed to the wall by using C.I. holder bat clamps. The bend and the offset as required in the flush pipe shall be made cold. The inside of the C.I. Cistern shall be painted with two coats of approved black bitumen paint. The outer face of the C.I. cistern, bracket, overflow pipe and flush pipe etc., shall be painted with two coats of any synthetic enamel paint of approved shade and make, over a coat of priming. The cost of the painting shall be included in the rate quoted for the flushing cistern.

The inlet connection to the cistern shall be made with 450mm long 15mm dia PVC heavy type connection pipe.

B. SOIL AND WASTE PIPES AND FITTINGS

(a) These should conform to IS: 1729-1964 or its latest revision.

(b) The pipes and fittings should be true to shape smooth, cylindrical, inner and outer surfaces being concentric, free from cracks and pinholes and neatly dressed. The ends of the pipes and fittings shall be square to their axes.

(c) Pipes are available with or without ears, single socketed or double socketed. These should be procured as per requirement. Usual length of the pipes are 1.8m but available in specific lengths, if so, ordered.

(d) Weights and other physical criteria including tolerances are stated in Table-1.

(e) **LAYING:** - The laying is done by spigot - socket joints. The exact lengths are measured at the site, pipes are cut to sizes, if exact lengths of cut pieces are not readily available. In the stack lines, pipes with ears are used. The stack line is fixed to the wall with the help of 100 mm stout nails driven into wooden blocks fixed in the walls properly secured.

(f) **JOINTING:** - Jointing is made with the help of spun yarn and cement mortar (1:2). In certain places molten lead is used instead of cement mortar. Where molten lead is used, caulking is done after lead gets cooled.

(g) **VENTILATION PIPES:** - It should be carried up above the roof (at least 1 m above the parapet) and guarded with provision of a cowl. The stack lines must be secured to the walls by means of M.S. stay and clamps.

(h) Provision of doors in the fittings is a must so as to clean the line wherever required. The doors must be fitted along with rubber insertion and brass bolts.

(i) The lavatory waste stack shall be connected directly to the inspection chamber/Manhole where the wastes from kitchens, basins, sinks, baths are to discharge through gully traps, the gully traps being connected ultimately to inspection chamber/Manhole.

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(j) Pipes and fittings must be internally painted with a coat – tar and externally with enamel paint of approved colour. All soil-waste, vent and anti-siphonage pipes and fittings shall conform to I.S. 1729-1964 or revised from time to time. The pipes shall have spigot and socket ends with bends on spigot end. The pipes and fittings shall be true to shape, smooth and cylindrical, their inner and outer surface being as near as practicable concentric. They shall be sound and nicely cast and shall be free from cracks, laps, pinholes or other imperfections and shall be neatly dressed and carefully fettled.

The ends of pipes and fittings shall be reasonably square to their axes. The sand cast iron pipes shall be of the dia as specified in the description of the item and shall be in length of 1.5m, 1.8m and 2m including sockets ends of the pipes unless shorter lengths are either specified or required at junction setc. The pipes and fittings shall be supplied without ears unless specified or directed otherwise.

All pipes and fittings shall ring clearly when struck over with a light hand hammer, and shall be capable of being easily worked with drill orbit.

TOLERANCES: - The standard weights and thickness of pipes shall be as shown in the following table. A tolerance up to minus 10% may however, be allowed against these standard weights.

TABLE 1

Table showing the standard weight and thickness of SCI / HCI pipes

Sl. No.	Nominal dia of (inKg) No.	Thickness in Bore (Inmm)	Overall weight of pipe excluding ears		
			mm.	1.5m	1.8m
	2.0m				
01	100	5.00	18.14	21.67	24.15
02	50	5.00	9.50	11.41	12.67

A tolerance up to minus 15 percent in thickness and 20mm in length will be allowed. For fittings, tolerance in length shall be plus 25 mm minus 10 mm.

The thickness of fittings and their socket and spigot dimensions shall conform to the thickness and dimensions specified for the corresponding sizes of straight pipes. The tolerances in weights and thickness shall be the same as for straight pipes.

The access door fittings shall be designed so as to avoid dead spaces to avoid accumulation of filth. Door shall be provided with 3mm rubber insertion packing and when closed and bolted these shall be watertight.

SAND CAST IRON FLOOR TRAP: - Sand cast iron floor trap shall be P' or S' type with minimum 50 mm seal and shall be of self-cleansing design.

FIXING AND JOINTING: - The pipes and fittings shall be fixed in vertical alignment unless otherwise specified and shall be secured to the walls at all joints with M.S. holder butt 6 clamps. The

clamps shall be made from 1.6mm thick M.S. sheet of 30mm width, bent to the required shape and size so as to fit tightly on the socket of the pipe, when tightened with screw bolts. It shall be formed out of two semi circular pieces hinged with 6 mm dia M.S. pin on one side and provided with flanged ends on the other side with hole to fit in the screw bolt and nut 40mm long. The clamp shall be provided with a hook made out of 275 mm long 10 mm diameter M.S. bar riveted to the ring at the centre of one side. The clamp shall be fixed to the wall by embedding their hooks in cement concrete blocks 100mm x 100mm x 100mm, 1:2:4 mix for which necessary holes shall be made in the wall at proper places. The clamps shall be kept about 25mm clear off in face of wall, so as to facilitate cleaning and painting of the pipes.

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The pipes shall be fixed vertically. The spigot of the upper pipe shall be properly fitted in the socket of the lower pipe such that there is uniform annular space for filling with the jointing material. The annular space between the spigot and socket shall be filled with a few turns of spun yarn soaked in cement slurry or blown bitumen grade 85 / 25 or lead caulked. Caulking tools shall press these home. More skins of yard shall be wrapped, if necessary, and shall be rammed home. The joint shall then be filled with stiff cement mortar (1:2) well pressed with caulking tools and finished smooth at top at an angle of 45 degree sloping up. The joint shall be kept wet at least for seven days by tying four folds of gunny bag to the pipe and keeping it moist constantly.

Where pipes are embedded in masonry these shall be fixed in the masonry work as it proceeds. The pipes shall be kept vertical or to the lines directed by the Engineer-in-charge. The pipes shall have a minimum surrounding of 12mm thick cement mortar at every portion of external surface. The mortar shall be of the mix as used in masonry work. The length shall be caulked in with lead as soon as the next length of pipe is placed in position. The open-end (socket end) of the pipe shall be kept closed till; the next length of pipe is fitted and jointed to prevent any brick or concrete or pieces of wood falling in and chocking the pipe.

The spigot end shall butt the shoulder of the socket and leave no gap in between. The annular space between the socket and spigot will be first well packed in with spun yarn leaving 25mm from the lip of the socket for the lead.

The joints shall then be lead caulked as described in detail under jointing of C.I.

S/S pipes with lead joints in public W/S section of this specification. Pipes with ears shall be secured with 40 mm bore steel or iron barrel distance pieces or bobbins and stout C.I. / M.S. nails 10 cm long driven into hard wood plugs fixed in walls. Access doors to fittings shall be provided with 3 mm thick rubber insertion packing and received with screw to make them air/watertight.

All soil pipes shall be carried up above the roof and shall have a wire baboonguard or aowlas specified.

HEIGHT OF VENTILATION PIPES: - All soil pipes shall be carried up above the roof and shall have sand cast iron terminal guard. The ventilating pipe or shaft shall be carried to a height of at least 1 mtr. above the outer covering of the roof of the building or in the case of a window in a gable wall or a dormer window it shall be carried up to the ridge of the roof or at least 2 metres above the top of the window. In the case of a flat roof to which access for use is provided, it shall be carried up to a height of at least 1 mtr. above the parapet or 2 metres above the roof whichever is greater and shall not terminate within 2 metres measured vertically from the top of any window or opening which may exist up to horizontal distance of 5 metres from the vent pipe into such building and in no cases shall be carried to a height less than 3 metres above plinth level.

Where ventilating pipes are carried in pipe shafts, the shaft shall be of a minimum size of 1 metre x 1 metre. If shafts are also used to give light and air to rooms, the ventilating pipe must be carried to a horizontal distance at roof level of not less than 5 metres from the side of the shaft. The payment for the shaft be made separately.

The pipes above the parapet shall be secured to the wall by means of M.S. stay and clamps as explained below.

M.S. STAYS AND CLAMPS: - Sand cast iron pipes above parapet shall be fixed with M.S. clamps and stays. The clamps shall be made from 1.5mm thick M.S. flat of 32 mm width, bend to the required shape and size to fit tightly on the socket, when tightened with screw bolts. It shall be formed of two semicircular pieces with flanged ends on both sides with holes to fit in the screw bolts and nuts, 40 mm long. The stay shall be minimum one meter long of 10mm dia M.S. bar. One end of the stay shall be bent to form a hook to be fixed with the clamps by means of bolt and nut cm x 10 cm x 10 cm in 1:2:4 mix. The concrete shall be finished to match with the surrounding surfaces.

OTHER DETAILS: - The connection between the main pipe and branch pipes shall be made by using branches and bends with access door for cleaning.

Floor trap shall be provided with 25mm dia puff pipe where length of the waste is more than 180 cm or the floor trap is connected to a waste stack through bends.

The waste from lavatories, kitchens, basins, sinks, baths and other floor traps shall be separately connected to respective waste stack of inspection chamber / upper floors. The waste stack of lavatories will be connected directly to manhole while the waste stack of others shall separately discharge over fully trap.

Every starting manhole shall have a 100 mm sand cast iron vent, terminating at 1 mtr above the parapet of the building.

The main anti-siphonage pipe shall be of 50 mm internal diameter. When more than one branch from water closet / sink are connected with the soil pipe and discharge into it, anti-siphonage lowest one should pass through the wall and be carried up outside the building parallel to the soil pipe to a point 1.5 metres minimum above the highest branch. It can then be connected to the soil pipe or it can be carried in dependently. The anti-siphonage pipes of all the intermediate floors, water closets should be joined with the main anti-siphonage pipe. The ventilating pipes shall have internal diameter of not less than 50 mm in all parts and shall be connected with arm of soil pipe on trap through a 45 degree branch, at a point not less than 7.5cm and not more than 30cm from the highest part of the trap and on the side of the water seal which is nearest to the soil pipe the jointing shall be done according to the specification for piping materials used in soil, vent or waste pipes.

Joints shall be filled and caulked as described under sub-head "water supply". The depth of lead from the lip of the pipe socket shall be 25 mm.

TESTING:- All sand cast iron pipes and fittings including joints shall be tested by a smoke test to the satisfaction of the Engineer-in-charge and left in working order after completion. The smoke test shall be carried out as stated under.

Smoke shall be pumped into the pipe at the lowest end from a smoke machine, which consists of a bellow and burner. The material usually burnt is greasy cotton waste, which gives out a clear pungent smoke, which is easily detectable by sight as well as by smell if there is leakage at any point of the drain.

PAINTING:- All the sand cast iron pipes and fittings shall be painted with colours with two coats of paint over a coat of primer on exposed surfaces as directed by the Engineer-in-charge. Besides, the sand cast iron pipes and fittings shall be painted with a coat of coal tar to the inside surfaces before laying and jointing of pipes and fittings. The specification for painting as described in the relevant sub-heads of Orissa State P.W.D. specification and revised from time to time shall apply in this case also.

REQUIREMENTS OF JOINTING MATERIALS FOR H.C.I. BUILDING PIPES AND FITTINGS:

The requirement of jointing materials like cement, gasket for Hard Cast Iron pipes and fittings is indicated in the table below.

TABLE

Table showing the requirement of jointing materials for HCI building pipes and fittings.
1. REQUIREMENT OF LEAD AND GASKET CEMENT FOR JOINTING H.C.I. PIPES (EACH JOINT)

Dia of pipe In mm	lead in Kg.	Gasket In Kg (same for Lead and cement Joints)	Cement in Kg.
100	1.2	0.13	0.12
50	0.36	0.06	0.06

Contractor


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