



HEAVY ENGINEERING CORPORATION LIMITED
HEAVY MACHINE BUILDING PLANT
MAINTENANCE DEPTT.
Dhurwa, Ranchi- 834004, Jharkhand

Open Tender Notice

LAYING OF RAILWAY TRACKS AND ASSOCIATED CIVIL, ELECTRICAL & STRUCTURAL WORK

ON TURNKEY BASIS

AT SFW SHOP OF HMBP

Heavy Engineering Corporation Limited, Ranchi-834004
(A Govt. of India Enterprise):
An ISO 9001:2008 company

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CHAPTER 1

OPEN TENDER NOTICE

OPEN TENDER NOTICE No. HMB/CM/2018/426 Dtd .: 16.10.2018

1. PURPOSE FOR OPEN TENDER:

Heavy Engineering Corporation Limited (A Govt. of India Enterprise) -Ranchi intends to **LAY TWO NUMBERS OF INTERCONNECTED RAILWAY TRACKS AND ASSOCIATED CIVIL, ELECTRICAL & STRUCTURAL WORK AT SFW SHOP OF HMBP PLANT** as per schematic track layout plan for SFW/Heavy Machine Building Plant (HMBP), drawing number 60.89.100 (enclosed).

HEC is inviting a **Two Part Bid** (i.e. **Part-I** for Techno-commercial Bid & EMD whereas **Part-II** for Price Bid) open tender for work mentioned below from Approved contractor of RAILWAY/RDSO/RITES/WORKING CONTRACTOR OF HEC having experience of Laying Railway Track including point and crossing, construction of inspection pit, structural work etc. in reputed Govt/Pvt. Organization in past.

2. GENERAL INSTRUCTIONS FOR THE BIDDER:

Sealed tender is invited from experienced contractors having sound financial background to undertake the task of Civil, Electrical & Structural work on turnkey basis for "**LAYING OF RAILWAY TRACKS AND ASSOCIATED CIVIL, ELECTRICAL & STRUCTURAL WORK INCLUDING FABRICATION & ERECTION OF PAINTING ROOM AT SFW SHOP OF HMBP** which will be offered on "as is where is basis". The scope of the work also includes all the erection accessories and arrangement of handling attachments, tools & tackles, manpower having requisite experience.

Sl. No	Name of work	E.M.	Cost of tender Paper	Sale of Tender Paper	Last date of submission/ Opening	Completion period	Maint Period
1	2	3	4	5	6	7	8
1.	Laying of two numberS of interconnected Railway Tracks each having one Inspection pit (Civil, Electrical & Structural work)	3,00,000/ (Rupees Three lakhs) only	5000/- (Rupees five thousand)	17 /10/18 To 02 /11/18 (10:30 AM to 4:00 pm)	03/11/18 (up to 3:00pm)	Within 03 months	12 Months from the date of hand over to HEC



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1. Tender documents may be obtained on submission of tender document fees Rs.5000/- from the Office of Dy. Manager, Civil Maintenance, HMBP, HEC Ltd, PLANT PLAZA ROAD, P.O DHURWA, RANCHI -834004 between 10.30 AM to 4:00 PM on all working days from 17th Oct 2018 to 02nd November 2018, both days inclusive.
2. The tender document may also be downloaded from HEC Website www.hecltd.com. Bidders who download the forms from the website will pay for the cost of the tender papers in the form of Demand Draft in favor of “Heavy Engineering Corporation Limited” payable at Ranchi along with completed tender document duly signed. The Demand Draft (DD) of tender fee is to be included in the Part I of the sealed envelop.
3. Tenders, not accompanied with Tender document Fee AND specified Earnest Money in the form of Demand Draft from any nationalized bank in favour of **Heavy Engineering Corporation Ltd payable at Ranchi**, are liable for rejection

FOR & ON BEHALF OF
HEAVY ENGINEERING CORPORATION LIMITED, RANCHI

(S.SINHA)
Sr DGM, RAILWAY PROJECTS



CHAPTER 2

DEFINITIONS

1.0 The word "Company" or "Employer" or "Owner" wherever occurs in the conditions, means the Heavy Engineering corporation Limited, Ranchi represented at the headquarters of the Company by the Chairman Cum Managing Director or his authorised representative or any other officer specially deputed for the purpose.

2.0 The word "Principal Employer" or "Engineer" wherever occurs, means the authorised representative or any other officer specially deputed by the Company for the purpose of contract.

3.0 The word "Contractor"/"Contractors" wherever occurs hereinafter, means the successful Bidder/ Bidders who has/ have deposited the necessary Earnest Money and has/ have been given written intimation about the acceptance of tender and shall include legal representative of such individual or persons composing a firm or a company or the successors and permitted assignees of such individual, firm or company, as the case may be.

4.0 "The Site" shall mean the site of the contract work including land and any building and erections thereon and any other land allotted by the company for contractor's use in the performance of the contract.

5.0 "Consulting Engineer"/ "Consultant" shall mean any firm or person duly appointed as such from time to time by the owner.

6.0 'Accepting authority' shall mean the management of the company and includes an authorised representative of the company or any other person or body of persons empowered in this behalf by the company.

7.0 A 'Day' shall mean a day of 24 hours from midnight to midnight.

8.0 Engineer-in-charge/Designated Officer-in-charge shall be clearly defined in the contract document. Engineer-in-charge/Designated Officer-in-charge who is of an appropriate seniority shall be responsible for supervising and administering the contract, certifying payment due to the contractor, valuing



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variations to the contract, awarding extension of time and valuing compensation events. Engineer-in-charge/ Designated Officer-in-charge may further appoint his representatives i.e. another person/ Project Manager or any other competent person and notify to the contractor who is directly responsible for supervising the work being executed at the site, on his behalf under the Delegation of Powers of the company. However, overall responsibility, as far as the contract is concerned shall be that of the Engineer- in-charge/ Designated Officer-in-charge.

09.0 The 'contract' shall mean the notice inviting tender, the tender as accepted by the company and the formal agreement executed between the company and the contractor together with the documents referred to therein including conditions of contract, special conditions, if any, specifications, designs & drawings including those to be submitted during progress of work, scope of work, billing schedule/schedule of quantities with rates and amounts & other requirements as per the provisions of Indian Contract Act 1872.

10.0 The 'works' shall mean and include the furnishing of equipment, labour, and the services in accordance with the contract or parts thereof as the case may be and shall also include all extra or additional, altered or substituted works or any work of emergent nature, which in the opinion of the Engineer-in-charge, become necessary during the progress of the works to obviate any risk or accident or failure or become necessary for security.

11.0 "Specification" shall mean the technical specifications forming a part of the contract and such other schedules and drawings as may be mutually agreed upon between/among the HEC & successful bidder/s.

12.0 'Contract price' shall mean the total sum for which tender is accepted by the company.

13.0 'Written notice' shall mean a notice or communication in writing and shall be deemed to have been duly served if delivered in person to the individual or to a member of the firm or to an office concerned for this



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purpose of the Corporation/Company for whom it is intended, or if delivered at or sent by registered mail to the last business address known to him who gives the notice.

14.0 "Letter of Acceptance" of the tender shall mean the official notice issued by the company notifying the contractor that his tender has been accepted.

15.0 "Date of Contract" shall mean the date on which both the parties have signed the contract agreement.

16.0 "Manufacturer's Works' or Contractor's Works" shall mean the place of work used by the Manufacturer, the Contractor, their collaborators for the performance of the works.

17.0 "Inspector" shall mean the Owner or any person nominated by the Owner from time to time, to inspect the equipment stores or Works under the contract and/ or the duly authorised representative of the owner.

18.0 When the words "Approved", "Subject to Approval", "Satisfactory", "Equal to", "Proper", "Requested", "As directed", "Where directed", "When directed", "Determined by", "Accepted", "Permitted", or words and phrases of like import are used, the approval, judgment, direction etc. is understood to be a function of the Owner/ Engineer/ Engineer-in-Charge.

19.0 "Test of Completion" shall mean such tests as prescribed in the contract to be performed by the contractor before the Works is taken over by the Owner.

20.0 "Start-up" shall mean the time period required to bring the equipment covered under the Contract from an inactive condition, when construction is essentially complete, to the state ready for trial operation. The start-up period shall include preliminary inspection and check out of equipment and supporting sub-systems; initial operation of the complete equipment covered under the Contract to obtain necessary pre-trial operation data, perform calibration and corrective action; shut down inspection and adjustment prior to the trial operation period.



21.0 "Initial operation" shall mean the first integral operation of the complete equipment covered under the contract with sub-systems and supporting equipment in service.

22.0 "Trial Operation", "Reliability Test", "Trial Run", "Complete Test" shall mean the extended period of time after the "Start-up" period and initial operation. During this trial operation period the unit shall be operated over the full load range. The length of Trial Operation shall be as determined by the Engineer, unless otherwise specified elsewhere in the Contract.

23.0 "Performance and Guarantee Tests" shall mean all operation checks and tests required to determine and demonstrate capacity, efficiency, and operating characteristics as specified in the contract document after trial operation.

24.0 "Final Acceptance" shall mean the owner's written acceptance of the works performed under the contract, after successful completion of performance and guarantee tests.

25.0 "Guarantee Period/ Maintenance Period" shall mean the period during which the contractor shall remain liable for repair or replacement of any defective part of the works performed under the contract.

"Drawings"/ "Plans" shall mean all:

- (a) Drawings furnished by the owner/ consultant as a basis for proposals,
- (b) Supplementary drawings furnished by the Owner/ Consultant to clarify and to define in greater detail the intent of the contract.
- (c) Drawings submitted by the contractor with his proposal provided such drawings are acceptable to the Owner/ Consultant.
- (d) Drawings furnished by the Owner/ Consultant to the Contractor during the progress of the work, and
- (e) Engineering data and drawings submitted by the Contractor during the progress of the work provided such drawings are acceptable to the Engineer,

"Codes" shall mean the following, including the latest amendments, and/ or replacements, if any :



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- (a) Standards of Bureau of Indian Standards relevant to the works under the contract and their specifications.
- (b) Other Internationally approved Standards and/or rules and regulations touching the subject matter of the contract.
 - (i) A.S.M.E. Test codes.
 - (ii) A.I.E.E. Test codes.
 - (iii) American Society of Materials Testing Codes.
 - (iv) Indian Electricity Act and Rules and Regulations made there under.
 - (v) Indian Explosive Act and Rules and Regulations made thereunder.
 - (vi) Indian Petroleum Act and Rules and Regulations made thereunder.
 - (vii) Indian Mines Act and Rules and Regulations made there under.
- (c) Any other laws, rules, regulations and Acts applicable in the country with respect to labour, safety, compensation, insurance etc.

26.0 Words importing “singular” only shall also include the plural and vice-versa where the context so requires.

27.0 Words importing "Person" shall include firms, companies, corporations, and associations or bodies of individuals, whether incorporated or not.

28.0 Terms and expressions, not defined herein, shall have the same meaning as are assigned to them in the Indian Sale of Goods Act, failing that in the Indian Contract Act, and failing that in the General Clauses Act.

29.0 "Commissioning" the plant/ project shall mean completion in all respects of construction rendering the plant/ project ready for Performance test and commercial operation as per xxv.

30.0 "Government Approvals" shall mean all permits, licenses, authorizations, consents, clearances, decrees, waivers, privileges, approvals from and filing with government instrumentalities necessary for the development, construction and operation of the plant/project.

31.0 "Month" shall mean a calendar month according to the Gregorian calendar.

32.0 "Bank Guarantee" shall mean the Bank Guarantee to be provided by the contractor to the company/ owner.



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33.0 “Completion” shall mean the plant is complete in all respect of construction and ready for rendering the plant for Performance and Guarantee Test after successful Trial test.

34.0 ‘Base Date’ shall mean the date the bid is opened.



CHAPTER 3

INSTRUCTIONS TO TENDERER

(I) ELIGIBILITY AND QUALIFYING CRITERIA

(A.) Eligibility criteria:

1. An eligible bidder may be an Individual firm/ contractor or Consortium of firms /contractors fulfilling the **Qualifying Criteria** laid down separately hereinafter.
2. **Consortium** of maximum up to two firms /contractors jointly fulfilling the Qualifying Criteria may jointly apply, one of them acting as lead bidder. The lead bidder shall have to fulfill the financial qualifying criteria. On award of the contract, the consortium members shall be jointly and severally responsible for completion of the work fulfilling all criteria laid down in the contract/ tender document. All the correspondences shall be done with the lead bidder only.
3. Registration with HEC, or any other Government / semi-Government organization / Agencies (Contractor to furnish copy of the registration along with the offer).
4. Labour License as per prevailing rules
5. Permanent Account Number (PAN) of Income Tax department in the name of the firm.
6. GST registration number

(B) Qualification Criteria:

1. Constitution and legal status of the contractor (Individual, Partnership, cooperative society, registered firm etc); existence of joint venture or other tie-ups for technology, equipments, financial backing and / project management.
2. Criteria for the experience is execution of similar nature of work of Railway Track laying pertaining civil, structural and electrical work on turnkey basis. Copy of Purchase order AND completion certificate issued by Client towards execution of work must be furnished as Documentary evidence.
3. Adequate financial standing with supporting documents i.e. Income tax return and turnover of the firm duly certified/verified by CA or submit audited balance sheet for the last three financial years, i.e., 2015-16, 2016-17, 2017-18.

Financial soundness of a bidder will be judged on the basis of given table.

SI	Criteria	Value (Rs. Lakhs)
1	Average annual financial turnover during the last three years, ending 31st March of the previous financial year, should be at least	51 Lakhs



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2	Experience of having successfully completed similar works during last seven years ending last financial year to the one in which tender is invited should be one of the following (such works must have commenced within the aforesaid period of seven years):	
	a) three similar completed works each costing not less than OR	68
	b) two similar completed works each costing not less than OR	85
	c) one similar completed work costing not less than	136
“Similar work” means those works as mentioned in and which consist of performing such work assignment as specified in Bill of Quantity mentioned hereinafter in this tender through Experienced manpower.		

(C.) Evaluation criteria of Bids:

1. Technical Evaluation shall be in consideration of following documents:
 - a) Tenderer's profile
 - b) Declaration of relationship
 - c) Eligibility and Qualification criteria as mentioned above.
2. Corporation reserve the right to ask for any document which may be required for evaluation/ Clarification / Verification of the technical bid.
3. Submission of any document after opening of bid shall not be allowed unless asked for in writing.
4. Availability of key personnel for supervision and management of the work or project. Organisation Chart to be submitted.
5. Information regarding project / work in hand, current litigation, orders regarding execution / expulsion or blacklisting, if any.
6. Capacity of Bidder to take up a new work / project under consideration in addition to his present commitment.

Bid Capacity = (A x N x 2) – B where

A = Maximum value of similar work executed in any one year during last five years taking into account the completed as well as work in progress

N = Number of years prescribed for completion of work for which bid has been invited

B = Value of existing commitment and on going work to be completed during the period of the work for which the bid has been invited

7. Group Insurance under Workmen's Compensation Act 1923.



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8. EPF & ESI registration of all categories of workmen/employee employed by him as per Employee's Provident Fund & Misc provision Act 1952 & Employee's State Insurance Act 1948.
9. Bidders to provide below mentioned information on GST (effective from 1st July'2017)
 - I) State wise, self certified copy of the Acknowledgement received pursuant to migration to GSTN portal
 - II) State wise, self certified statement containing details of principal and additional place of business.
 - III) Copy of GST registration
10. Conditional offer in technical bid and incomplete offer will be liable for rejection.
11. Conditional offer in price bid shall be straight way rejected & EMD shall be forfeited.
12. For evaluation of technical / price bid and for execution of contract, Corporation shall be guided by the Corporation Works and service manual/guidelines as in force at that point of time.

(II) ONE BID PER BIDDER

Each Bidder shall submit only one Bid either individually or in consortium with other firm/contractor. Otherwise, all the proposals with the Bidder's participation will be disqualified.

(III) COST OF BIDDING

The Bidder shall bear all costs associated with the preparation and submission of his/her Bid, and the Employer shall in no case be responsible or liable for those costs.

(IV) AMENDMENT OF BIDDING DOCUMENTS

1. Before the deadline for submission of Bids, the Employer may modify the bidding documents by issuing addendum.
2. Any addendum thus issued shall be part of the bidding documents and shall be communicated in writing to all purchaser.

(V) DATE, TIME AND PLACE OF SUBMISSION OF OFFER

- (A.) Sealed offer will be received through tender box placed at **Administrative Building at HMBP/HEC Ltd., Plant Plaza Road, Dhurwa, Ranchi-834004, Jharkhand** or through Register Post or through Speed Post on or before of scheduled date & time mentioned at Page-3 . For bulky size of the offer w.r.t. tender box, the same will be received in **Marketing Department /HMBP (2nd Floor, Room No.61, Administrative Bldg. of HMBP/HEC Ltd.)** by Deputy Manager/Railway Business, Marketing Department/HMBP or his nominated person based on written request of the bidder.
- (B.) **Submission of tender**
 1. The tenderer shall submit his tender in **one sealed envelop containing two separate sealed envelops** mentioning the heading **Part I - TECHNICAL BID** on one envelop & **Part II - PRICE BID** on the other.



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- **Part I** will comprise of Technical Offer covering all terms and conditions **except the price**. Both the Demand Drafts against Application fee for tender document and Earnest Money are to be submitted in Part – I ONLY.
 - **Part II** will be Price Bid ONLY.
2. The tender without application fee and earnest money with Technical Bid in Part I shall be rejected.

(VI) **DATE, TIME AND PLACE OF OPENING OF BIDS**

- (A.) Sealed envelop of Techno-commercial Bid (Part-I) of the offer will be opened first at Finance Department/HMBP in presence of any bidder or their authorized representative who wish to be present on due date & time of opening of the tender as mentioned at Page 1. In case due date of tender opening falls on declared Holiday/Sunday, envelop of cover of Part-I Bid will be opened on next working day at the same time & venue.
- (B.) The Price Bid (Part-II) of the techno-commercially qualified bidders (after completion of scrutiny of the Technical and Commercial part) will be opened at Finance Department/HMBP on a later date in presence of the bidders or their authorized representatives who wish to be present. The date of opening of the Price Bid (Part-II) will be intimated to all qualified bidders well in advance
- (VII) **Pre-bid meeting is scheduled to be held on 23.10.18 from 11 AM in Conference Hall on First Floor in HMBP Administrative Building of HEC Ltd., Ranchi, Plant Plaza Road, Dhurwa, Ranchi, Jharkhand. The purpose of this pre-bid meet is to discuss the scope of proposed work and address any ambiguity.**
- (VIII) The successful bidder must submit all related detail civil, electrical and structural drawings for approval before start of work as per civil work floor plan & tentative drawing provided by HEC along with NIT.
- (IX) Duration for Completion of work. : 03 (three) months from the date of issue of workorder.
- (X) Maintenance Period : 12 (twelve) months from the date of Hand over of the facility to HEC
- (XI) Method of Quality and Quantity Measurement

The supply/execution will be made as per the schedule/B.O.Q. and as per the Indian standard code of practice. The quantum of work will be evaluated using physical parameters and to be duly recorded in measurement Book.

(XII) **Instruction for quoting price**

Instructions for tenderer regarding price-bid :

1. Incomplete and Conditional tender is liable to be rejected.
2. Offer with erasing/overwriting/cutting will be rejected unless all corrections have been authenticated with bidder's signature & seal.
3. The quoted price of the bidders must be technically feasible, workable, competitive and unconditional.



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4. The quoted rates should be inclusive of all taxes and duties and other statutory levies applicable, if any and the corporation does not take any liability for increase or variation in the prices etc. during the tenure of the contract.
5. The rates are required to be quoted both in words and figures and in case of difference between rates in words & figures, the former will prevail.
6. Bidders are advised to participate in the pre-Bid meeting to be held on 15.09.18 at HEC to take idea about the work as well as to assess the work physically before participating in the bidding process.
7. Any rebate offered whatever should be enclosed within the bid and no separate letter in this regard shall be entertained. The tenderers are advised to consider the possible rebates /concession in the rates itself while submitting the item wise minimum rates in the quotation.
8. The Bidder should apply his mind to financial aspect, whether expressed or implied, of every clause mentioned in this all-inclusive Contract in order to arrive at as per current rates, e.g. for engaging unskilled workers and any other expenditure involved in carrying out the job smoothly. It is the discretion of the Bidder to disclose the complete breakup of the quoted rate. Submission of the breakup of quoted rate will give better understanding of rise and fall of any financial aspects.
9. All statutory Taxes if applicable will be deducted from gross bill as per prevailing rate.
10. These rates shall remain firm and fixed till the total execution of the contract.
11. Bidder will have to submit Aadhar card, medical fitness certificate of his workers before obtaining their gate-pass to deploy them to perform such works at the locations as given in the Contract.
12. Bidder will ensure that he should have proper licence / written permission from the appropriate authorities in order to be eligible to undertake this contract.
13. The Contractor shall be responsible for arrangement of adequate material handling equipment i.e tools, tackles etc as may be required for this work.
14. Interested bidders shall visit and inspect the work site in SFW/HMBP, HEC Ltd and fully understand the scope of the work as specified above of the tender document and satisfy themselves about the scope and conditions of work as well as the general conditions & special conditions of contract which are available for inspection during office hours and ensure that they have taken all factors into account before quoting the rates.
15. After the work order is issued, no cognizance will be taken of any misunderstanding regarding the scope of the work. Interested bidders will be allowed to visit the place specified for **LAYING OF RAILWAY TRACKS AND ASSOCIATED CIVIL, ELECTRICAL & STRUCTURAL WORK INCLUDING FABRICATION & ERECTION OF PAINTING ROOM AT SFW SHOP OF HMBP (work site)** on due permission of the **COP/HMBP** between 09.00 am till 05.00 pm on any working day before submission of bids.
16. **Rates quoted should be exclusive of GST** and all other statutory levies as applicable during the contract period. Applicable taxes to be mentioned separately in percentage and amount.



17. Any others taxes, duties, royalty etc which are not mentioned in the price bid will be in contractor's account and HEC will not be liable in any way to pay such amounts.

(XIII) Taxes and duties applicable

1. The rate should be quoted exclusive of all application taxes. .
2. ***Bidders are advised to get themselves registered with GST and provide below mentioned information(effective from 1st July'2017)***
 - I) State wise, self –certified copy of the Acknowledgement received pursuant to migration to GSTN portal***
 - II) State wise, self certified statement containing details of principal and additional place of business.***
 - III) Copy of GST registration***
3. All statutory Taxes and Duties as per prevailing rates are to be borne by the bidder, however, if any new Tax or Duty is levied after issue of Letter of Acceptance, the same may be considered for compensation on request and submission of evidence.
4. Quoted Price / rate shall have breakup of these elements. Statements like 'inclusive of taxes' or 'taxes and duties extra' will not be acceptable.
5. HEC shall deduct from the bills of contractor any amount deductible under law/order of the appropriate Government Authority and deposit with the respective Government Authorities with the intimation to the contractor.

(XIV) Schedule of Deviations (to be filled in by the bidder)

As per annexure placed at page 115.

(XV) Requirement and mode of depositing Earnest Money

(A.) Non-refundable Application fee for tender paper

The tender document cost is **Rs 5000/- (Rupees five thousand)** only, which will be deposited along with Technical Bid in the demand Draft on any scheduled bank in favour of "Heavy Engineering Corporation Ltd." , payable at S.B.I., Hatia.. Copy of Tender Documents may be down loaded from our website in which case the fee will have to be deposited along with Techno Commercial Bid.

(B.) Earnest Money

Earnest money for tender is **Rs.3,00,000/-(Rupees Three Lakhs)** only. The earnest money can be deposited in the form of Bank Guarantee or Demand Draft drawn on any scheduled bank in favour of "Heavy Engineering Corporation Ltd.", Payable at S.B.I., Hatia. No interest shall be payable on Earnest Money deposit. Tender un-accompanied by E.M. shall be summarily rejected.

(XVI) Payment terms



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1. Payment shall be released to the Contractor only after satisfactory completion of works on R.A. bill basis. Payment of the final bill will be made only after issuance of completion certificate by the concerned office on Engineer-in-Charge recommendation.
2. Paying Authority: Incharge Finance/HMBP will be the paying Authority for making Payment to the Contractor.
3. The payments will be made to the contractor through Account Payee Cheques or any other mode of transaction prescribed by Finance / HMBP only, which will be received by the Contractor.
4. Payment will be made to successful bidder on submission of following documents in Maintenance Department/HMBP:
 - (a) R/A bill based on actual quantity of each & every work being executed by successful bidder duly certified by the site I/c/Executing dept.
 - (b) Measurement book duly certified by the Site I/c/Executing dept. towards completion of actual quantity of each & every work.
 - (c) For supply items: RA Bill along with Tax Invoice, receipted delivery challan, test certificates (if required) is required for payment.
 - (d) Other necessary documents to be submitted if required for payment

The above mentioned documents submitted by the successful bidder along with wage certificate of labour payment and documents towards compliance of PF & ESI in the Maintenance HMBP, will be forwarded to site in-charge for certification and verification. After verification/certification of above two documents, site in-charge will send the R/A bill along with the measurement book to Finance/HMBP through Incharge/Railway Business.

Final payment will be made on production of work completion certificate issued by the Incharge /Railway Business./HMBP along with final bill.

(XVII) Executing Department & Site I/c:

Maintenance./HMBP will be the executing dept. in coordination of Railway Business unit and In charge / Maintenance./HMBP or the person nominated by him and assisted/guided by a person of electrical background will be the Site I/c of this contract. Successful bidder has to give his full contact address with all contact numbers to the site I/c in respect of making contact with him as per requirement. Contractor has to take all necessary working instructions from him after award of contract.

(XVIII) Inspection

Materials and Work related Inspection will be done by a team consisting of members as approved by C.O.P/HMBP.

(XIX) Security Deposit: Shall be 10% of the contract value.



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- a) Security Deposit (10% of the contract amount) shall be submitted within 28 days of receipt of LOA by the successful bidders in any of the form given below after which bid security/earnest money shall be refunded to the contractor.
- A bank guarantee in the form given in the bid document
 - Demand Draft drawn in favour of Heavy Engineering Corporation Ltd. on any scheduled bank payable at its branch at Ranchi.
 - If security deposit is provided by the successful bidders in the form of bank guarantee it shall be issued either-
 - at bidder's option by a Nationalised /Scheduled Indian bank or
 - (b) by a foreign bank located in India and acceptable to the Employer.
- b) The Performance Guarantee shall cover additionally the following guarantees to the Employer:
- The successful bidder guarantees the successful completion of work and satisfactory condition of workmanship under the contract, as per the specifications and documents'.
 - An amount@10%shall be recovered from running bills
 - The Guarantee amount shall be payable to the Employer without any condition whatsoever for non-fulfillment of guaranteed conditions.
 - No interest shall be payable by the employer against security deposit/ Performance Guarantee.
- c) The Performance Guarantee is intended to secure the performance of the entire Contract. However it is not construed as limiting the damages stipulated in the other clauses in the bidding documents.
- d) The Company shall be at liberty to deduct/ appropriate from the Performance Guarantee/Security Deposit such sums as are due and payable by the contractor to the company as may be determined in terms of the contract, and the amount appropriated from the Performance Guarantee/Security Deposit shall have to be restored by Contractor subsequently.
- e) The Performance Guarantee shall be returned to the Contractor without any interest at the end of the Guarantee Period.
- f) Failure of the successful Bidder to comply with the requirements of Sub- Clause XIX a) above shall constitute sufficient grounds for cancellation of the Award and forfeiture of the Bid Security.



- g) Security Deposit shall be released on successful completion of work in accordance with contract and upon satisfactory sustainability of Construction and shall be valid for Ninety (90) days after the end of Guarantee period.

(XX) Risks & Costs Clause

In the event of termination of the contract in part/full due to successful bidder fault, HEC reserves the right to complete the work by any agency at successful bidder's risk & cost.

(XXI) Liquidated Damage

If successful bidder fails to complete the work within the contractual period, LD will be levied @ ½% of unfinished part of the work per week of delay subject to a maximum 10% of total contract value.

(XXII) Escalation

The corporation does not take any liability for increase or variation in the prices etc. occurring during the tenure of the contract.

(XXIII) Tax Deducted at Source (TDS) will be deducted as per rule.

(XXIV) GST TDS will be deducted as per GST rule.

(XXV) Negotiation

- a) Tender Committee shall satisfy themselves regarding the reasonableness of the prices.
- b) Post tender negotiations should not be resorted to as matter of routine, as far as possible should be discouraged. However, if necessary, negotiations with only L1 can be held in certain exceptional circumstances like procurement of propriety items/ STI, with limited source of supply and items where there is suspicion of a cartel formation etc.

Competent authority of HEC should exercise due diligence while accepting a tender or ordering negotiations or calling for a re-tender.

- c) After the negotiation, the committee conducting the negotiation should record the proceeding including revised prices and revised comparative statement thereof. The tender committee would recommend the proposal for approval.
- d) Any major changes in the terms and conditions and specification laid down in Tender Enquiry should not be changed at this stage. In case such change is unavoidable fresh tender to be invited.
- e) In case L1 bidder backs out, there should be a re-tender. AND such bidder will not be allowed to participate in the re-tender.



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(XXVI) Sub contracting of the contract will not be allowed.

(XXVII) **General terms and conditions**

General Condition of Contract of H.E.C. Ltd. will be binding on bidder. General Condition of Contract of HEC can be downloaded from HEC Website www.hecltd.com and can be seen in the office of Civil Maintenance/HMBP/HEC on any working day.



CHAPTER 4

ADDITIONAL & SPECIAL TERMS & CONDITIONS

Additional terms and conditions

1. No-claim situations: No claim on account of idle labour, interruption of work or any other expenses incurred by the contractor for any reasons whatsoever will be entertained.
2. Change in constitution / entity of tenderer: In the case of contract by partnership firm, any change in the constitution of the firm shall forthwith be notified by the contractor to Executing Authorities.
3. Forfeiture of EMD & debarring future participation: In case any tenderer(s) withdraws the offer after submission, or the successful and valid tenderer deliberately withdraw his offer, his EMD shall be forfeited and he may be debarred from submission of tenders as per prevailing rule of corporation.
4. Conduct of Contractor: HEC reserve the right to remove from list of Approved-Contractors or to ban business dealing if a contractor has been found to have committed misconduct and also to suspend business dealing pending investigation.
5. Any disputes arising out of this contract the jurisdiction shall be in the Court of RANCHI alone. All the Statutory Rules & Regulations, Govt. Acts, guidelines etc. issued by the corporation time to time in the matter shall be followed for this tender.
6. The **offer by any bidder will remain valid for 06 months** from the date of its submission of offer.
7. **Forfeiture of EMD & debarring future participation:** In case any tenderer(s) withdraws the offer after submission, or the successful and valid tenderer deliberately withdraw his offer, his EMD shall be forfeited and he may be debarred from submission of tenders as per prevailing rule of corporation.
8. Contractor shall also engage experienced supervisor or engineer to execute the works in professional manner for specialized nature of works at his own cost.
9. Any firm de-barred/blacklisted by any department of the Govt of India or any state government of the Union of India (for example AAI, Railways, Defense, PWD, CPWD, MES, Border Roads) or any Central Govt or State Government Public Sector Undertaking is not eligible to participate in the tender.
10. **Change in constitution / entity of tenderer:** In the case of contract by partnership firm, any change in the constitution of the firm shall forthwith be notified by the contractor to the Executing Authorities. Under such condition, any decision by HEC related to contract is binding on the contractor.

(A.) Special Terms & Conditions Of The Contract

1. **WORKING HOURS:** The contractor shall have to undertake any of the jobs of this tender round the clock regardless of holidays / Sundays/ festivals on verbal/written instructions from In charge-Executing Authorities, though the normal working hours will be as per factory shift



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timings. On completion of the Work the Contractor may inform the same to In charge-Executing Authorities. Contractor or his responsible representative / supervisor must be present during execution of work.

2. RATE: The rate shall remain be fixed and firm during the tenure of the Contract.
3. All **safety norms** will be followed by the contractor and its workmen when working within the premises of the work place. Safety related instructions if issued by HEC Safety Officer will be followed in letter and spirit.
4. The bidders will comply with the **provisions of all applicable labour laws and submission of reports and returns** there under. Failure on this account may lead to termination of the contract. The contractor has to indemnify HEC Ltd for all failures on its part whether in respect of statutory or non-statutory provision and the contractor has to face all legal and penal consequences arising out of such failures.
5. The successful bidder will cover all its employees who work within the premises of work place with an **accident insurance policy** to cover all accidents of any nature which will pay the minimum benefit as per **Workmen's Compensation Act 1923** for any disability or death arising due to any reason while within the premises of work place. The contractor will **keep HEC and its employees indemnified from any criminal, legal or financial liability** that may arise out any accident that may occur due to the negligence on the part of the contractor or its employees. A copy of the accident insurance policy should be available to HEC.
6. The workers of the successful bidder employed should be covered under Group Insurance Scheme and a copy of the same will be available to HEC.

(B.) Other terms and conditions

5. The corporation reserves the right to reject any or all tenders or may split the work between two or more tenderers without assigning any reason thereof.
6. The corporation is not bound to accept the lowest tender.
7. Right is also reserved for sale of Tender Paper.
8. Failure to comply with the instructions may result in rejection of the offer. In the event of any doubt regarding terms & conditions/formats, the bidder may seek clarifications from the authorized officer of HEC. If any tampering/unauthorized alteration is noticed in the bid submitted by the bidders from the tender document available on the HEC Website, the said Bid shall be summarily rejected and HEC shall have no liability whatsoever in the matter. However, deviations, if any, proposed by the bidder(s) may be separately indicated under a heading "DEVIATIONS", quoting the respective clause with justification. Acceptance of such deviations shall be the sole discretion of HEC. Such proposed deviations will not be treated as tampering for the purpose of application of the clause.
5. HEC reserves the right to reduce or increase the quantity of the work within the contract period as per requirement.
6. Any claim on account of extra expenses if any incurred by successful bidder(s) for any reasons whatsoever will not be entertained by HMBP/HEC.



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7. No compensation will be given by HMBP/HEC for any rework or repeat work if done by successful bidder(s) during execution of the work to meet the scope of work.
8. Placement of order will be done on the basis of L-1 quotation and, if required, negotiations will be held only with L-1 bidder. However all the bidders may be required to explain / justify the basis of their quoted price as and when asked for. HEC reserves the right to award the work in full or in part to L-1 bidder as per requirement.
9. If two or more bidders become L-1, the L-1 bidders may be asked to submit revised bid (with document) within a stipulated date & time. In case, still the "overall value/price" received is same, the L-1 (from the tied bidders after revised bid) can be decided by draw of lots in the presence of bidder's representative.
10. The order will be given to technically suitable L-1 bidder(s). However merely by being L-1 does not guarantees that the contract will be awarded to L-1 bidder(s).
11. Submission of any document by the bidder after opening of bids shall not be allowed unless asked for to do so.
12. Before submitting the tender the contractor shall visit the site of work and get himself satisfied about the modalities and conditions of work.
13. The tender will remain valid for six months from the date of opening of Technical Bid. Tender cost will not be refunded.

14. **Termination of Contract:**

The contract can be terminated in part/full under the following conditions in consultation of Legal Dept:-

- a) If successful bidder fails to start the work within 15 days from the date of issue of work order without assigning any reason.
- b) If successful bidder fails to follow statutory provision of Contract Labour (Regulation & Abolition) Act-1970, Payment of Wages Act-1936, Minimum Wages Act-1948, Workmen Compensation Act-1923, Maternity Benefit Act-1961, Employees Provident Fund & Miscellaneous Provision Act-1952, Employee State Insurance Act-1948 or any other Act.
- c) If successful bidder fails to follow safety rules as per statutory provision of safety act. towards safe execution of the contract as well as fails to satisfy the executing dept. with progress of the job.
- d) If any act of malpractices likes pilferage, corruption, harming/misusing company's property, ill- treating company's employee or any one related to the company by successful bidder or his deployed workmen including supervisor at any stage of the contract is detected.
- e) Any other reasons for which company thinks it fit to terminate the contract will be terminated with assigning the proper reason. The determination and termination of the contract at any stage is the sole discretion of the employer and binding on successful bidder.
- f) The contract can also be terminated or Work Order can be cancelled if the contractor do not follow statutory rules, safety rules and fail to improve even serving notice to improve. The contract will be snapped/ Work Order cancelled if the contractor or his employee found



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involved in pilferage, corruption, harming/misusing company's property, ill treating company's employee or any one related to the company. (Refer to General Terms & Conditions of Works Contract for detail)

15. **Agreement:**

An agreement will be signed between HEC & the successful bidder within 20 days from the date of issue of the work order on Non-Judicial Stamp Paper of requisite value as per provision of Indian Stamp Act. on the Performa prescribed by HEC Ltd. available on Civil Maint.Deptt./HMBP. The cost of stamp paper is to be borne by the contractor. The General Condition of Contract along with Work Order and the Tender Documents will be the part of Agreement and binding on the successful bidder. Unless and until agreement is prepared and executed, the Acceptance Letter Cum Work Order shall be deemed as an agreement of this contract between HEC & the successful bidder.

16. **Arbitration:** Any dispute arising out of the work order / Contract will be referred to arbitration as per the clause mentioned in General Conditions of Contract (G.C.C.) of HEC. Arbitration & Conciliation Act 1996 shall be guideline to resolve all dispute issues.

The parties to the contract at the first instance shall endeavour to settle by mutual discussion all the questions of disputes or differences arising out of, or relating thereto, or in connection with the contract. In the event of failure of settlement, the aggrieved party with prior written permission of the other party, shall refer the unresolved dispute(s) or difference(s) to the Chairman-cum-Managing Director of the Company (HEC Limited) for adjudication by a Sole Arbitrator to be appointed with mutual consent, by him (CMD of the Company) who (Sole Arbitrator) shall adjudicate the matter in accordance with the Arbitration and Conciliation Act, 1996 (For short "Act") and publish the award. The parties shall have no objection if the Sole Arbitrator so appointed is an ex-employee, superannuated before 3 (three) years from the services of HEC Ltd. If the Sole Arbitrator for any reason, whatsoever, becomes unable to proceed with the arbitration, the Chairman-cum-Managing Director of the Company, with mutual consent of both the parties, shall appoint his successor arbitrator who may proceed with the reference from the stage it was left by his predecessor or subject to the provisions of the Act. The venue of the Arbitration proceeding shall be at Ranchi in the State of Jharkhand alone.

The other provisions of Arbitration and Conciliation Act, 1996 (Amendment made in 2015) specially as per the provisions of Schedule V and Schedule VII and sections 6, 11(2), 12(5) should be considered during the appointment of Sole Arbitrator.

(C.) JURISDICTION OF COURT

For any or all type of disputes arising out of the contract, the exclusive jurisdiction of the Court(s) shall be Ranchi in the State of Jharkhand alone.

(D.) Compliance of statutory provisions

All the Statutory Rules & Regulations, Acts, Government.guidelines etc. issued by the corporation time to time in the matter shall be followed for this tender.

(E.)Contractor's Responsibilities:

1. The successful bidder has to keep all necessary workmen of various trades and categories as per requirement of the work.



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2. To complete the above work as mentioned in the scope of works, the required number of workmen are to be deployed on all execution days by successful bidder and certificate to this effect be obtained from site I/c or executing dept.
3. To complete the work as mentioned in the scope of work all necessary safety clearances and necessary safety instruction to be taken from Safety Engineering Department/HMBP prior starting the work.
4. The successful bidder will have to submit daily report for engagement of labour on every execution day to the site I/c with effect from the date of commencement of the work and will continue up to completion of the work.
5. The successful bidder will be responsible for the safety of all workmen engaged by him for the above contract and he will provide necessary safety appliances like Hand Gloves, First Aid items, Safety Shoes, Safety Helmet, Protective clothing's, additional PPE's etc. to his deployed workmen as per suggestion of safety department of HMBP/HEC. The nature and types of safety appliances to be supplied to different workmen may be different based on their actual position in the workplace and accordingly it is to be ascertained from the safety dept. of HEC at the very beginning of the contract. If successful bidder is failed to provide safety appliances to his workmen, the same shall be supplied by the corporation at successful tenderer's cost and such cost will be recovered from his bill.
6. The successful bidder will give strict instruction to his deployed workmen in order to follow the safety rules and to use safety appliances during execution of the contract towards safe working. He will also give instruction to his workmen for not to smoke/spit/gossip at the work premises during working hours. If any workman of successful tenderer is found that he is smoking/spitting/gossiping at the work premises during working hours, necessary action may be taken against successful bidder.
7. The Successful bidder will give instruction to his deployed workmen that every workman will wear neat & clean suitable clothing towards safe execution of the work inside the factory area. If any workman is found not conforming to this, he may not be allowed to enter inside the plant and a suitable penalty may be deducted from the bill of successful bidder.
8. The Successful bidder should either physically present himself every day or by his supervisor during working hours and he/his supervisor will report to site I/c daily for taking instructions and for coordinating the work and maintaining the various records i.e. quantum of work done, workmen engaged etc.
9. The Successful bidder will pay wages to his deployed workmen as per the wage rates in force from time to time for job contracts in HEC.
10. The Contractor also will have to pay CPF/EPF to all categories of workers / employee employed by him as per prevailing rules.
11. In case of an accident during execution of the work whether resulting in any injury or disability or death of successful bidder's workmen, he will report immediately to the site I/c as well as P&A Dept./HMBP about the accident of his workman and will be liable to pay compensation to such worker in accordance with the provisions of Workmen Compensation Act 1923. Such compensation shall be paid to the concerned worker within one month from the date of accident failing which HEC will pay the requisite compensation along with the payment so made to such worker and the same shall be adjusted against his bill by HEC later.



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12. A notice showing the wage period and the place and time of disbursement of wages shall be displayed at the place of work and a copy will be sent by successful tenderer to P & A dept./HMBP and Civil Maint.Deptt./HMBP for acknowledgement.

13. Payment to successful bidder's deployed workmen shall be made on a fixed working day at the work premises and during the working time and on date notified in advanced and in presence of authorized representative of the P & A Dept./HMBP in respect of taking specific certificate regarding the payment on the wage sheet as follows:

“Certified that amount shown in the column no..... has been paid to the workmen concerned in my presence on.....”

In case the work is completed before the expiry of the wage period, final payment shall be made within 48 hours of the last working day. If payment is made to bank account of his workmen directly, the aforesaid requirement will be avoided on submission of proof.

14. The successful bidder will inform the date and time when he will make the payment of wages to his workers in HMBP at the respective places of work in two days advanced.

15. Successful bidder will also paste the notice about disbursement of payment to his workers at the respective places of work and endorse a copy to the authorized personnel officer of HMBP in respect of witnessing of wage-payment to his workers.

16. The payment towards running bill will be made once in a month depending upon the work done by him and would cover the attendance period from 1st of the month to 30/31th of the current month. Successful bidder is required to render all the possible service for the preparation of bills on or before 10th of the succeeding months even if payment by corporation has not been made to them. The bills complete in all respect should reach to the Finance Dept by 6th of the following month.

17. The successful bidder shall obtain the requisite license for engaging labour {if applicable on successful bidder as per provision of Contract Labour (Regulation & Abolition) Act, 1970} from the concerned authorities clearly setting out the number of persons to be engaged for this work.

18. The successful bidder will regularly read the notice board and refer display of information made at the entrance of HMBP and he shall also issue employment card and wage slip to all workers engaged by him.

19. In the case of change in the entity of successful tenderer as he has mentioned in the bidder's profile submitted by him alongwith his tender and the said change has taken place during the running of the contract, the successful bidder will submit revised bidder's profile attaching therewith all relevant documents in support of the change such as individual/property business concern/partnership firm/co-operative society etc. Any change in the constitution of the aforesaid body shall forthwith be notified by him to executing dept. and accordingly he will replace them and re-engage them only when they acquired such competency.

20. The successful bidder will be informed about the display of below average level of awareness about safety and work by his workers and accordingly he will replace them and reengage them only when they acquired such competency.



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21. The successful bidder will maintain all records namely Attendance Register of deployed workmen, Register of Wages (FORM-XVII), Register of workman (Muster Roll) FORM-XIII), EPF deduction of each & every deployed workmen with EPF A/c no, bank A/c no. at ready reference for producing the same as per needs of the corporation.
22. The Contractor will take adequate precautions to avoid damage or loss to the Corporation's property and injury to any person. In case of any damage or loss or injury, the Contractor will be fully responsible and will have to compensate the damage at their own cost and risk. This will be without any prejudice to such other action, which the Management of the Corporation may take depending on the circumstances of the loss or damages or injury as well. The Contractor will report immediately to the In charge Maintenance./HMBP or the person nominated by him will be the Site I/c of this contract, Head of P&A department, Safety department and the office of Plant Chief about the accidents of his workmen.



CHAPTER 5

SCOPE OF WORK

Major scope and responsibility is described below.

Description of works including scope of work and responsibility

The site (CD Bay of SFW of HMBP) for the work for “**LAYING OF RAILWAY TRACKS AND ASSOCIATED CIVIL, ELECTRICAL & STRUCTURAL WORK INCLUDING FABRICATION & ERECTION OF PAINTING ROOM**” will be offered on “as is where is basis” .

5.0 DESCRIPTION AND MAJOR SCOPE OF THE PROJECT

5.1 Civil & Structural work:

- a) Demolishing of concrete by mechanical means including disposal of material within 50 meters lead as per direction of Engineer-In-Charge. Nominal concrete 1:3:6 or richer mix.
- b) Earth work in excavation by Mechanical means (Hydraulic excavator) over area (exceeding 30 cm in depth, 1.5 meter in width as well as 10 sq.m on plan) including getting out and disposal of excavated earth lead upto 50 m and lift upto 1.5 m, as directed by Engineer-in-charge (E/I).
- c) Earth filling in foundation trenches and plinth in layers not exceeding 150mm.Thick well watered ,Rammed, fully compacted and fine dressed with earth obtained from excavation of foundation trenches with in a lead of 50 m and lift of 1.5m or complete as per building specifications and direction of E/I.
- d) Providing PCC M 15 in nominal mix of (1:2:4) in foundation with approve quality of stone chips 20 mm to 06 mm size graded and cleaned coarse sand of F.M 2.5 to 3.0 including screening ,shuttering ,mixing cement concrete in mixer and placing in position , vibrating, striking, curing ,taxes and royalty all complete as per building specification and as per direction of E/I
- e) Filling of Morrrum
- f) Providing coarse clean sand in filling in foundation trenches or in plinth including ramming and watering in layers not exceeding 150 mm thick with all leads and lifts including cost of all materials, labour, royalty and taxes all complete as per building specifications and direction of E/I (Mode of measurement compacted volume)
- g) Providing and laying in position ready mixed M-25 grade concrete for reinforced cement concrete work, using cement content as per approved design mix, manufactured in fully automatic batching plant and transported to site of work in transit mixer for all leads, having continuous agitated mixer, manufactured as per mix design of specified grade for reinforced cement concrete work, including pockets as per drawing, pumping of R.M.C. from transit mixer to site of laying , excluding the



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cost of centering, shuttering finishing and reinforcement, including cost of admixtures in recommended proportions as per IS : 9103 to accelerate/ retard setting of concrete, improve workability without impairing strength and durability as per direction of the Engineer-in-charge

- h) Providing Tor steel reinforcement of 10 mm,12 mm,16 mm and above dia bars (TMT coil Fe 500) (Only valid for SAIL & TATA steel) as per approved design and drawing including carriage of bars to work site ,cutting, bending and binding with annealed wire with cost of wire, removal of rust ,placing the rods in position all complete as per building specifications and direction of E/I
- i) Centering and shuttering including strutting, propping etc. and removal of form for all heights for Walls (any thickness) including attached plasters, buttersesses, plinth, string courses ,Foundations, footings, bases of columns, etc. for mass concrete
- j) Providing 25 mm thick water proof cement plaster 1:3 with clean coarse sand o F.M 1.5 with 5% cico or any other approved water proofing compound including screening curing including all leads and lifts of water , scaffolding taxes and royalty all complete as per building pacification and as per direction of E/I
- k) Extra for providing and mixing water proofing material in cement concrete work in doses by weight of cement as per manufacturer's specification.
- l) 62 mm thick cement concrete flooring with concrete hardener topping, under layer 50 mm thick cement concrete 1:2:4 (1 cement : 2 coarse sand : 4 graded stone aggregate 20mm nominal size) and top layer 12mm thick cement hardener consisting of mix 1:2 (1 cement hardener mix : 2 graded stone aggregate, 6mm nominal size) by volume, hardening compound mixed @ 2 litre per 50 kg of cement or as per manufacture's specifications. This includes cost of cement slurry, cost of nosing of steps etc. complete.
- m) Supply Structural steel such as tees, angles channels and R.S. joists, mild steel plates
- n) Fabricating, erecting, hoisting and fixing in position structural steel work in R.S joist, channel, Angle, Tee. flate, plate, lattice member, builtup compound section in column girder, stair case or truss including cost of gusset plates, holding down bolts, anchor plates at all heights and depths, bolting, welding (machining wherever necessary) with applying a priming coat of red lead paint all complete as per approved drawing, building specification and direction of E/I

5.2 Electrical Work for Inspection pits and Painting room: Supply of wires of appropriate sizes including appropriate electrical fittings & fixing & commissioning of Electrical lightings, plugs, sockets and switches, circuit breaker, proper wiring etc in inspection pits, painting room, tracks etc where ever required as directed by E/I.

5.3 Permanent Way work:

Rail will be provided as free issue from HEC. Except rail all fittings & accessories with complete material to be procured by the contractor for the proposed work from RDSO approved vendors.



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- a) Supply of Track Laying fittings with all accessories such as fish plate, ERC, Resilience pad, nuts and bolts of appropriate sizes etc.
- b) Supply of Pre stressed Sleepers roughly 600 in numbers of length 2750 mm.
- c) Supply of Point and crossing pre stressed sleepers , 02 sets
- d) Supply of Point & Crossing complete with all accessories, 02 sets
- e) Laying of railway track over inspection pit of length 40 m (02 numbers), two railway track of roughly 170 m with straight and curve section
- f) Laying of 02 sets of Point and Crossing such that both the rail tracks are interconnected for operation of rolling stock on either of the tracks.
- g) The railway tracks complete in all respect should be connected to existing rail track
- h) Electrical wiring and fittings where ever required in the newly developed Railway tracks, inspection pits etc.

5.4 Design, Drawing & Survey

- a) Supply of Design & Drawing of concrete work in the form of footings, pedestals, beams with pockets, H.D. bolts etc for supporting of straight and curve rail tracks including points & crossings etc. as per tentative layout drawing/sketch (enclosed with tender document) with loads as per Railway norms and as per approval by RPD/HMBP/HEC and as per instruction of Engineer-in-Charge at site and including soil investigation and test, if required.
- b) Providing service for survey and alignment of straight and curve rail tracks including point & crossing and fixing the locations of all auxiliary structure, i.e., inspection pits, painting room, etc.

5.4.1 Design & Drawing

4.4.1.1 The scope shall include preparation of complete design, detailed drawing, civil construction, fabrication and erection of all civil and structural works including supply of all materials (except 52 Kg rail which will be only free issue item from HEC) connected with the construction of railway line in the CD bay of SFW/HMBP. The scope of works broadly covers the following:

- a) Design & engineering of all civil, electrical & structural works
- b) Preparation of detailed drawings, Bill of quantity etc.
- c) Preparation of construction site
- d) Supply of all materials required for construction, fabrication and erection including transportation to the site.



e) Construction of two nos. of interconnected railway track, each having one inspection pit.

One painting room complete in all respect and ready to use is also to be made.

f) Construction of transformer/control/ MCC room, if required

g) Drainage system for necessary disposal

The scope of work shall be deemed to include all above as well as any other work including material required to be organised for completing the job, final commissioning etc. whether specifically mentioned herein or not. General Arrangement Drawing specifying the outer limit and tentative sketch is enclosed with this document.

5.4.1.2 In the event of varying or conflicting provisions in any of the documents or drawings forming part of the contract, the most appropriate provision in respect of requirement for the work and site condition shall be adopted by the contractor however, Engineer-in-charge's decision/clarification shall hold good with regard to the intention of the document or contract as the case may be.

5.4.1.3 Design & drawing, submitted by the contractor, shall be scrutinised by HEC.

Out of seven sets of drawing submitted by the successful bidder, one copy will be sent to contractor after scrutiny with comments, modification or approval as

the case may be. The contractor shall carry out the necessary rectification in drawings in a reasonable time as agreed upon mutually and re-submit seven copies of such revised drawings for approval. Revised drawings shall then be scrutinized and approved if the comments made by the HEC are incorporated / taken care of. One copy of such drawing will be sent to the Contractor after approval.

After final approval of the same, the contractor shall submit Ten copies of approved drawings to HEC. In addition to this, two copies in ink on RTF (Reproducible Tracing Film) of approved quality and two copies of CD shall also be furnished. Final drawing/literature shall be presented in the form of document. All drawings shall comply with Indian Standard specifications of Indian Railways and shall be clear and legible.

5.4.1.4 After award of work the successful bidder shall submit design calculations along with the drawings as mentioned above. The bidder shall submit related input files mentioning clearly the design and load considerations etc and output files mentioning all related moments, shear force, torsional moments etc.(as applicable) in print out forms.



5.4.1.5 **As Built Drawings:** Contractor shall make necessary correction/modification in the drawing as per actual work and shall prepare "As built drawing". The Contractor shall supply such 3 (three) sets of prints of "As built drawing" to HEC along with three sets of reproducible drawings in ink on RTF. The same will hold good for other documents also to be supplied by the Contractor under the heading of basic scope. All drawings should be prepared on Auto CAD in standard format and CD (two nos.) containing such drawing shall also be supplied along with hard prints.

5.4.1.6 HEC will provide G.A. drawing showing major dimensions. The Plot Survey drawings with contour and soil investigation report will be generated at their own cost by successful bidder and submitted to HEC for final clearance.

5.4.2 SURVEY & SOIL INVESTIGATION AT SITE

5.4.2.1 Survey & soil testing report to be generated by the successful bidder, if required for determining type of foundation, load bearing capacities, method of deep

excavation, probable settlement for foundations, etc. The said report shall be adopted for design and engineering. If desired, the tenderer may conduct the soil investigation in the presence of the Owner or his representative. No extra claim shall be made over contract price for variation in soil reports, which may result in change of design and type of foundation unless otherwise stated. All works related site survey should be conducted as per standard practice and also as per system requirement.

5.4.2.2 Before carrying out the tests, approval shall be taken from the Owner regarding the location of the test to be carried out. While investigation of soil by the tenderer, the Owner shall be associated during field exploration, laboratory testing and report finalisation.

5.4.2.3 Survey and necessary rectification for proper alignment of rail tracks to the satisfaction of HEC is also included in the scope.



CHAPTER 6

TECHNICAL REQUIREMENTS

6.0 ADHERENCE TO INDIAN STANDARDS

All designs, drawings, construction, fabrication, erection, testing, operation, materials etc. shall be in strict conformity as per relevant and latest BIS Code of practice and CPWD/NBO and Indian Railways provisions & guidelines. Wherever no Indian Standard is available, other International Standards may be followed only on approval from the Owner.

6.1 DESIGN & DRAWINGS

5.1.1 All detailed design and working drawings shall be developed with proper co-ordination and inter-relations with the equipment and electrical system design drawings. The detailed design should take into account the design of superstructure with lifting tackles and tools wherever necessary and should reflect the detailed specification so the engineering materials and their properties. All final design calculations shall be based on soil characteristics data obtained from detailed soil investigation. The details of all RCC and steel structures shall be based on full supporting design calculation as per IS codes of practice. These details inter alia shall provide all construction parameters including identification of reinforcement bars in respect of number and diameters. Bar bending schedule, detail material list and specifications of work shall be provided. Design calculation in A-3 size shall be neatly documented to enable scrutiny and approval.

5.1.2 Detailed working drawings shall inter alia include GA drawings showing plans at different levels with sectional elevations of different sections. All working drawings should be associated with complete design calculations. Working drawings for steel structures should give complete details of all joints, gusset plates, welding, riveting/ bolting etc. The drawing should also show weights of each sub-assembly/assembly. The drawings shall be made along with sub-drawings, item-wise material list, details of fasteners with sub-assembly/assembly, erection units for proper identification in GA drawings.

5.1.3 Details of hoisting/ erection and fixing arrangement of steel structural members shall also be provided. Tenderer shall prepare architectural design for all sections and Colour schemes (both for internal and external surfaces) including painting for doors, windows etc. if any.



6.1.4 All modifications made in structure during various stages of constructions shall be duly incorporated in the working drawings and after completion of work 'As Built Drawings' of all the structures in reproducible shall be submitted by the tenderer.

6.1.5 The design should take into consideration the effects of wind and seismic forces as per local conditions; in conformity with relevant IS code in design calculation.

6.1.6 Horizontal forces due to unbalanced dynamic load and effect for blasting etc. should be taken into account in design calculation.

6.1.7 All foundations supporting vibratory machines and equipment shall be separated from adjoining portions by providing properly designed joints/ cushions as per relevant IS code and joints should be waterproof. Amplitude of vibration must be kept within permissible limit.

6.1.8 All underground structural members shall be so designed that they are free from ingress of moisture. Suitable drainage and sumps shall be provided for all underground structures. All underground structures are to be designed as water retaining structures.

6.1.9 The design should cater for surcharge effect on U/G structural members due to moving loads of dumpers, surcharge effect of coal or any other factor, which may contribute to surcharge.

6.1.10 Expansion/construction-joints whether envisaged in system design/drawings or as per detailed design requirements shall be provided in accordance with relevant IS code.

6.1.11 The Civil and structural design of the all plant buildings and structures shall conform to all safety regulations as provided in the factories act. rules, regulations, bye-laws etc. All openings and open terraces must be provided with

proper railing for proper safety. No member of the structure (RCC/ Steel) shall be used for the purpose of lifting or pulling any equipment. Opening in Structure shall be so provided that no surface drainage water is allowed through these openings into the structures.

6.2 BASIC NOTE ON PREPARATION OF DRAWINGS

6.2.1 All drawings shall be sufficiently detailed and dimensioned to help in speedy construction, fabrication, erection of structure and equipment installation and commissioning. Wherever the same drawing is presented in parts in more than one sheet the same scale shall be adopted in each sheet and notations or linking drawings with each other shall be established.



6.2.2 Design and drawings of all works shall conform to all relevant Indian Standard Specification. Where no Indian Standards are available BSS/DIN or equivalent International Standards and generally accepted sound engineering practice should be followed. Deviation from BIS (Indian Standard) recommendations and adoption of other code of practice shall require approval of the Owner.

6.3 CIVIL ENGINEERING WORK SPECIFICATIONS

All designs, drawings, construction, fabrication, erection, testing, operation, materials etc. shall be in strict conformity as per relevant and latest BIS Code of practice and CPWD/NBO provisions & guidelines. Wherever no Indian Standard is available, other International Standards may be followed only on approval from the Owner.

6.3.1 The tenderer shall construct Bench mark and baseline pillars at various places in the site as per BIS codes and as per instruction of Engineer in charge. Carrying the levels and line to these pillars from benchmarks and baselines shown, as well as their correctness shall be tenderer's responsibility.

6.3.2 Excavation work for site preparation and foundation trenches shall be carried out in any kind of soil and disposal of excavated soil, necessary shoring, dewatering, removal of slush etc. whatever met with, shall be considered to be included in the contract. The work shall include all lift sand leads. If during actual construction a change in soil strata is encountered, design and construction shall be modified by the tenderer at no extra cost. Wherever excavation in foundation is done in excess of the depth required, the tenderer shall at his own expense fill up to the designed level with compacted lean concrete (M-5) and filling for site preparation shall be done in layers of 20 cm from the approved excavated earth and to the line sand levels as directed by the Engineer in charge. Each layer has to be compacted as to the satisfaction of Engineer in charge only. After compaction of first layer to the satisfaction of Engineer in charge, second layer is to be laid. The contract includes transporting and dumping of surplus excavated soil and all other rubbish arising out of constructions anywhere within 2KM as directed by the Engineer in charge. Tenderer shall take all the precautions during excavation to avoid interference with or damage to underground pipes, cables, drains etc. whether shown in drawing or not and provide all possible precautions to these works at his own cost. The tenderer should take adequate safety measure during the excavation to avoid collapse by providing necessary shoring, shuttering and temporary supports and provide adequate fencing around excavated pit. All foundation should be taken to the adequate and safe founding level (minimum 600mm) below the original GL.



6.3.4 After award of work, if required, tenderer shall undertake soil and hydrological investigation at his own cost. If required the tenderer shall also undertake chemical testing of construction water (for corrosive action of chemicals and other deleterious material) at his own cost. The tenderer shall take formal approval from Engineer in charge before starting the work.

6.3.5 Plinth filling shall be done with earth in layers not exceeding 15cm. All clods of earth shall be broken or removed, watered and compacted with approved compacting machine or manually if specifically permitted by the Engineer in charge for each layer before laying the next. The finished level of the filling shall be dressed to the slope intended to be given to the floor.

6.3.6 The backfilling in foundation and even filling in plinth may be done with local sand if directed by the Engineer-in-charge. The sand used shall be clean, medium grained and free from impurities. The filled in sand shall be kept immersed in water for sufficient time, and mechanical vibration of ramming as directed by Engineer-in-charge to ensure maximum compaction.

6.3.7 The use of admixture in concrete for promoting workability, improving strength or for any other purpose may be used only with the approval of Engineer-in-charge.

6.3.8 Number, Size, form and position of all these reinforcement bars & spacer bars shall be strictly in accordance with drawings unless otherwise modified by the Engineer-in-charge. Bars shall be secured one to the other with approved soft black annealed wire of 18 SWG.

6.3.9 Adequate concrete cover blocks shall be used at bottom and sides of the form work to ensure correct cover of concrete over the bars. Cement and sand ratio for these spacer blocks shall be at least equivalent to that used in concrete being cast.

6.3.10 The inspection of complete work shall be done immediately after execution at various stages which shall include checking of dimensions variations, obvious or visible defects. No honey-combing or unevenness shall be allowed in concrete of any description. Rejected members shall be dismantled/ broken and removed. Where the structure in the opinion of Engineer-in-charge is not properly executed according to the specifications and drawings and where the test cubes shall give lower strength not acceptable as per "Acceptance Criteria" of IS 456 and if the load testing is decided by the Engineer-in-charge, the same shall be done by the tenderer as per IS at his own cost. In case the structure or part fails under the load test, the same shall be treated as rejected and shall be removed at the



expenses of the tenderer. But if it is felt by the Engineer-in-charge under special circumstances (with the approval of designer) that the defective part of structure shall carry the designed load after giving additional support or otherwise, the additional work for safety at that structure or part shall be carried out by the tenderer at his own cost. The detailed procedure shall be decided by the Engineer-in-charge. If the member shows evident failure, such changes as are necessary to make the structure adequately strong shall be made by the tenderer at his own cost. If it is felt that the structure is safe with lower value of concrete or otherwise, the work will be proportionately devalued & accepted.

6.3.11 Unless otherwise specified 1000 mm high railing shaving angle iron as posts (65x65x6mm), top runners of 40 mm dia black steel pipe and 40 mm wide 6 mm thick MS flat as middle runner should be provided. Clear width of stairs shall not be less than 1000 mm while that of ladders 800 mm with suitable protective railings/caging.

6.3.12 Roofing on all steel structure shall be provided with 22 gauge CGI/COLOUR sheets. There shall be full side cladding (unless otherwise specifically mentioned) with 22 gauge CGI/COLOUR sheet, with adequate no. of windows, doors, ventilators/louvers for ventilation. Translucent sheets shall be provided in roof and side coverings wherever required for illuminations by natural lights as per standard practice.

6.3.13 RCC structures, below sub-soil and water level and liquid retaining structures shall be tested for leakage or seepage of water before the concrete surface is rendered with the finishing coat.

6.3.14 Steel doors, windows & ventilators shall be of the best material and workmanship. The frames should also be made with steel. The sizes of frames & shutters of doors, windows and ventilators shall be as per the relevant IS code unless otherwise specified. Three(3) lugs of MS flat of size 15x3 mm and 10 cm long shall be fixed on each side of the door frame, while 2 lugs of the above size shall be fixed on each side of the window frame. The lugs shall be embedded in cement concrete blocks 15x10x10 cm made of cement concrete 1:3:6. Steel doors/gates, windows & ventilators shall be provided, as envisaged during detailing. Grills/grating bars shall have to be provided in windows and ventilators for safety. All the steel surfaces shall be painted with two coats of synthetic enamel paint of approved make & Colour over a coat of red oxide primer.

6.3.15 All brickwork shall be provided with plaster. Unless otherwise mentioned, plaster shall be in cement mortar of following thickness and proportion:

- i) Outside Plaster : 18 mm thick (1 cement: 6 sand)



ii) Inside Plaster : 12 mm thick(1cement:6sand) iii)Ceiling
Plaster : 6 mm thick (1cement: 4 sand)

- 6.3.16 All internal surfaces of Control/MCC/Transformer rooms, shall be finished with two coats of oil bound distemper (unless specified otherwise) of approved shade and quality. Before starting the work of oil bound distemper, the surface shall be prepared with plaster of paris punning. On the exterior surfaces of building two coats of Snowcem or any other equivalent cement based paints of approved shade and make shall be applied.
- 6.3.17 Concrete surfaces, corners, edge, nosing etc. wherever required, shall be protected with MS rolled section sand/or plates of suitable size anchored in concrete at regular intervals.
- 6.3.18 Portions of steel structures falling regularly in contact with coal, fines and moisture shall be properly encased with PCC(M-10)for protection against corrosion. The RCC pedestals below steel columns shall be at least 600 mm above finished GL.
- 6.3.19 The tenderer shall be responsible for site preparation including necessary earth work and leveling of the plant site. Extra earth, rubbish etc. shall be removed to a reasonable distance from the plant site, as required by the Company.The construction site shall be handed over by the owner to the tenderer. Any building or other structures which might interfere with site are to be dismantled, as per the direction of Engineer in Charge.
- 6.3.20 Plinth protection around the building shall be 50 mm thick of cement concrete 1:3:6 over 75mm bed of dry brick ballast 40mm nominal size well rammed and consolidated and grouted with fine sand including finishing the top smooth.

6.4 MATERIAL

- 6.4.1 Samples of all materials shall be got approved by the Engineer-in-charge before placing order and the approved sample shall be deposited with him.
- 6.4.2 If directed, materials shall be tested in any approved testing laboratory and the test certificates in original shall be submitted to the Engineer-in-charge and the entire charges connected with sampling and testing including charges for repeated tests, if ordered, shall be borne by the tenderer.
- 6.4.3 All materials shall be so stored as to prevent deterioration and intrusion of foreign matter and to ensure the preservation of their quality and fitness for the work. Any material which has deteriorated or has been damaged or is otherwise considered defective by Engineer-in-charge shall not be used for work and shall be removed from site immediately, failing



which the Engineer-in-charge shall be at liberty to get the materials removed and the cost there of shall be realized from the tenderer's dues.

- 6.4.4 It shall be obligatory for the tender to furnish test certificate, if demanded by the Engineer-in-charge from manufacturer of the material/supplier, that the work has been carried out by using their material and as per their recommendations.
- 6.4.5 All materials supplied by the Company/any other specialist firms shall be properly stored and the tenderer shall be responsible for its safe custody till the completion of work and handing over the same to the Company.
- 6.4.6 Unless otherwise shown on the drawings or mentioned in the "Schedule of Quantities" or special specifications, the quality of materials, workmanship, dimensions etc. shall be as specified hereunder.
- 6.4.7 All equipment and facilities for carrying out field tests on materials shall be provided by the tenderer without any extra cost.

6.5 MATERIALS SPECIFICATION

6.5.1 CEMENT

Cement shall comply in every respect with the requirements of the latest publication of IS. Cement used shall be ordinary Portland cement conforming to IS:269 (for 33 grade cement)/IS:8112 (for 43 grade cement)/IS:12269 (for 53 grade cement)/ Portland slag cement conforming to IS:455/ Portland Pozzolana Cement conforming to IS:1489(part I & Part II), latest revisions and as approved by the Engineer-in-charge. Cement shall be measured by weight and in whole bags, and each undisturbed and sealed 50Kg. bag being considered equivalent to 1.2cft. in volume. Care should be taken to see that each bag contains full quantity of cement. When part bag is required cement shall be taken by weight or measured in measuring boxes. No other make of cement but that approved by the Engineer-in-charge shall be allowed on works and the source of supply shall not be changed with out approval of the Engineer-in-charge in writing. Test certificates to show that cement is fully complying with the specifications shall be submitted to the Engineer-in-charge and notwithstanding this, the Engineer-in-charge may at his discretion, order that the cement brought on site and which he may consider damaged or of doubtful quality for any reason, whatsoever, shall be tested as per relevant IS code in an approved testing laboratory and fresh certificates of its soundness shall be produced. Cement ordered for such testing shall not be used for any work pending results of the test.

6.5.2 LIME



Lime shall comply in every respect with the requirements of IS:712 and shall be made from approved Lime Stone or Kankar and properly burnt. It shall be free from excess of unburnt kankar or limestone as well as other extraneous materials and shall be stored in weather proof sheds. Lime which has been damaged by rain, moisture or air slaking shall not be used but shall be removed from the site of work forth with. Lime shall be slaked with fresh water and screened through appropriate screens and stored and used within 14 days provided it is protected from drying out. Field tests according to IS:1624 shall be carried out from time to time to determine the quality of lime.

6.5.3 FINEAGGREGATE

Fine aggregate shall conform to IS:383. It shall pass through an IS sieve 4.75 mm (3/16B.S.) test sieve, leaving a residue not more than 5%. It shall be from natural source and chemically inert, clean, sharp, hard, durable, well graded and free from dust, clay, shale, large pebbles, salt, organic matter, loam, mica or other deleterious matter. The sum of percentage of all deleterious materials in sand shall not exceed 5% by weight. It shall be washed if directed to reduce the percentage of deleterious substances to acceptable limits. Sand shall not contain any trace of salt and it shall be tested and sand containing any trace of salt shall be rejected. The fine aggregate for concrete shall be graded within limits as specified in IS:383 and the Fineness Modules may range between 2.60 to 3.20.

6.5.4 COARSEAGGREGATE

Coarse aggregate shall consist of crushed or broken hard stone 95% of which shall be retained on 4.75 mm IS test sieve. It shall be obtained from crushing Granite, quartzite, trap, basalt or similar approved hardstones from approved quarry and shall conform to IS:383. Coarse aggregate shall be chemically inert when mixed with cement and shall be cubical in shape and free from soft, thin, porous, laminated or flaky pieces. It shall be free from dust and any other foreign matter. For all RCC works the size of coarse aggregate shall be 20 mm nominal size.

6.5.5 REINFORCEMENT

Reinforcement steel shall be clean and free from loose mill scales, dust, loose rust and coat so paints, oil, grease or other coatings, which may impair or reduce bond. It shall conform to the following I.S. Specifications:

- a) Mild steel and medium tensile steel bars and hard drawn steel wire conforming to IS:432;
- b) High strength deformed steel bars & wires conforming to IS:1786



c) Structural steel sections conforming to IS:2062.

All steel reinforcements including and above 6mm diameter shall necessarily be of tested quality.

6.5.6 WATER

Water for mixing Cement/ Lime mortar or concrete shall not be salty or brackish and shall be clean, reasonably clear and free from objectionable quantities of silt and traces of oil, acid and injurious alkali, salts organic matter and other deleterious materials which will either weaken the mortar or concrete or cause efflorescence or attack the steel in reinforced cement concrete. Water shall be obtained from source approved by Engineer-in-charge. Potable water is generally considered satisfactory for mixing and curing concrete, mortar, masonry etc. Where water other than main source is used, this shall be tested in an approved testing laboratory to establish its suitability. All charges connected here with shall be borne by the contractor.

6.5.7 FLUSHDOOR

All flush doors shall be solid core exterior grade unless otherwise specified and it shall generally conform to IS: 2202 and shall be fabricated as described under relevant item of work.

6.5.8 STEEL WINDOWS, DOORS & VENTILATORS

Steel windows, doors and ventilators shall be fabricated out of steel sections conforming to IS:1038. Unless otherwise specified, the details of construction etc. shall be as described under relevant item of work.

6.5.9 CGI/COLOURSHEETS

CGI/ COLOUR sheets shall be of the gauge specified in the description of the item and shall conform to IS: 277. The sheets shall be free from cracks, split edges, twists, surface flaws etc. They shall be clean, bright and smooth. Galvanising shall be uninjured and in perfect conditions. The sheets shall show no signs of rust or white powdery deposits on the surface. The corrugations shall be uniform in depth and pitch and parallel. GI Hooks, GI Washers & bitumen washers etc. should also conform to relevant IS code.

6.5.10 PAINTS



Lime for lime wash, dry distemper, oil bound distemper, cement primer, oil paint, enamel paint, fat oil paint, plastic emulsion paint, anti-corrosive primer, red lead, water proof cement paint shall be from approved manufacturers and shall conform to their relevant IS code. Ready mixed paints as received from the manufacturer without any admixture shall be used, except for addition of thinner, if recommended by the manufacturer.

6.5.11 CEMENTMORTAR

Cement Mortar shall be of proportions as specified for each type of work. It shall consist of Portland Cement and sand. The ingredients shall be accurately measured and shall be well and evenly mixed together in a mechanical pan mixer, care being taken not to add more water than is required. No mortar that has begun to set shall be used. River sand shall be used unless otherwise specified. If hand mixing is allowed then it shall be done on pucca water proof platform. The measured materials shall be put on the platform and mixed dry. Water shall then be added and the whole mixed again until it is homogeneous and of uniform Colour. Not more than one bag of cement shall be mixed at one time and which can be consumed within half an hour of its mixing.

6.5.12 STRUCTURALSTEEL

Standard quality mild steel of various designation shall be used for different works conforming to specifications given in IS codes listed below. They may be used for bolted / riveted steel work and steel work where welding is done for fabrication provided that the thickness of material does not exceed 20mm. When material conforming to this standard is more than 20mm thick, special precaution shall be taken in case the material is to be welded.

- IS: 808: Dimensions for Hot Rolled steel beams, channels and angle sections.
- IS: 2062: Steel for general structural purposes-Specification
- IS: 1148: Specification for hot rolled Rivet bars (upto 40mm dia) for structural purpose.



- IS: 1363: Hexagonal head bolts, screws and nuts
- IS: 814: Specification for covered (Part I & II) Electrodes for Metal Arc welding of structural steel.
- IS: 816: Code of practice for use of Metal Arc welding for general construction in mild steel
- IS: 800: Code of practice for the use of structural steel in general building construction in steel
- IS: 817: Code of practice for training and testing of metal arc welding.
- IS: 1477: Code of practice for painting of Ferrous metals in building and allied finishes.

6.5.13 HIGHTENSILEBOLTS

The material used for the manufacture of structural quality high tensile bolts, shall have a minimum strength of 58 Kg./Sq.mm. Other mechanical properties shall conform to grade St-58-HT of IS: 961. Bolts, nuts and washers and other fastening materials shall be stored in racks with coating of suitable protective oil.

6.5.14 ELECTRODES

The electrodes required for metal arc welding shall be 'Covered Electrodes' and shall conform to IS: 814 (Part-I) for welding products other than sheets and IS: 814 (Part-II) for welding sheets.

6.5.15 WELDING EQUIPMENT

The welding plant and equipment shall be of modern design and shall be got approved by the Engineer-in-Charge.

6.6 WORKMANSHIP

6.6.1 PREPARATION OF SITE, SETTING OUT AND EARTH WORK IN FOUNDATION & TRENCHES

The area to be dressed and excavated shall be cleared out of fences, trees, logs, stumps, bush, vegetation, rubbish, slush etc. and levelled up. Trees upto 30 cm girth shall be uprooted. Trees above 30 cm girth to be cut shall be approved by the



Engineer-in-charge and then marked. Felling of trees shall include taking out roots upto 60cm below ground level or 15 cm below formation level whichever is lower, After the tree is cut and roots taken out the pot holes formed shall be filled with good earth in 25 cm layers and consolidated unless directed by the Engineer-in-charge otherwise. The trees shall be cut in suitable pieces as instructed by the Engineer-in- charge.

Before earthwork is started, all the spoil and unserviceable materials and rubbish shall be burnt or removed from site to approved disposal areas as may be specified. Ashes shall be spread or removed. Useful materials, saleable timber, firewood etc. shall be property of the Owner and shall be stacked properly at the worksite in a manner as directed by the Engineer-in-charge.

The tenderer shall be responsible for the true and proper setting out of the works in relation to original points, lines and levels of reference given by the Engineer-in-Charge in writing and for the correctness of the position, level dimensions and alignment of all parts of the works and for the provisions of all necessary instruments, appliances and labour in connection therewith. If at any time during the progress of the work, an error shall appear or rise in the position, levels dimensions or alignment of any part of the work, the tenderer on being asked by the Engineer-in-Charge to rectify the same, shall do so and in which case the expense of rectifying the same shall be borne by the tenderer. The checking or any setting out of any line or level by the Engineer-in-Charge or his representative shall not in any way relieve the tenderer of his responsibility for the correctness thereof and the tenderer shall carefully protect and preserve all permanent grid marks, bench marks, sight rails, pegs and other things used in setting out the works.

Trenches for wall foundations, column footings, raft foundation pile caps, plinth beams, water ranks, cess pits, pipe line, drains, roads etc. shall be excavated to the exact length, width and depth shown or figured on the drawing or as may be directed by the Engineer-in-Charge. The sides and beds should be properly dressed. If taken out to greater length, width or depth than shown or required the extra work occasioned thereby shall be done at tenderer's expense. Extra depth



shall be brought up by plain cement concrete filling 1:4:8 proportion and extra length and width filled in by rammed earth or moorum or if the Engineer-in-Charge thinks it necessary for the stability of the work by 1:4:8 concrete, as may be directed at the tenderer's cost.

Excavated material shall be used for filling in plinth on each side of the foundation blocks or trenches or it shall be spread elsewhere on or near the site of work including watering, ramming and consolidating or carted away from site, free of charge as may be ordered.

The tenderer shall at his own expense and without extra charges make provision for supporting all utility services, lighting the trenches, separating and stacking serviceable materials nearby, shoring, timbering, strutting bailing out water either sub-soil or rain water including, pumping at any stage of the work and removal of sludge etc. Trenches shall be kept free of water while masonry or concrete works are in progress and till the Engineer-in-Charge consider that concrete is sufficiently set.

6.6.2 EXCAVATION EXCLUDING IN HARD ROCK

Excavation shall be carried out in any type of soil, moorum (soft or hard), soft rock, boulders, old foundations, concrete, asphalt or stone paved surfaces, old masonry or concrete (plain or reinforced).

6.6.3 EXCAVATION IN HARD ROCK

Rock in solid beds, which can only be removed either by blasting or wedging or chiselling, shall be treated as hard rock. A boulder or detached rock measuring one cubic meter or more shall also be treated as hard rock if the same can not be removed without blasting, wedging or chiselling.

Where hard rock is met with and blasting operations are considered necessary, the tenderer shall intimate the same to the Engineer-in-charge.

In case blasting is required, services of licensed blaster and blasting material shall be supplied by the company on recoverable basis at the rates prevalent during the time of execution. Necessary arrangement that is drilling of holes and providing sand bags if any shall be made by the tenderer. The blasted material shall be



removed by the tenderer and properly stacked by the tenderer as per the instruction of Engineer-in charge.

6.6.4 BACK FILLING AROUND FOUNDATIONS IN PITS TRENCHES, PLINTH OR UNDER FLOORS

a) Earth

Earth used for filling shall be free from salts, organic or other foreign matter. All clods of earth shall be broken or removed. Material for back filling shall generally be obtained from the spoil of excavation. But, the Engineer-in-charge shall have the option, in case of shortage of good selected earth obtained from excavation, to direct the tenderer to get the filling materials from approved borrow pits.

b) Filling in pits & trenches around structures

As soon as the work in foundations have been accepted and measured, the spaces around the foundation structures in pits and trenches shall be cleared of all debris, brick bats, mortar dropping, etc. and filled with earth in layers not exceeding 15 CM each layer being watered, rammed and properly consolidated before the succeeding one is laid. Each layer shall be consolidated to the satisfaction of the Engineer-in-charge. The final surface shall be dressed and levelled to proper profile as desired by the Engineer-in-charge. In case of black cotton soil the back filling shall be done with sand at the direction of the Engineer- in-Charge.

c) Plinth Filling

The plinth shall be similarly filled with earth as described here-in-before in layers not exceeding 15 CM watered and consolidated. The finished level of the filling shall be dressed to the slope intended to be given to the floor. In case of black cotton soil replacement of top 1 M soil with approved soil/ sand shall be done.

d) Sand Filling in Trenches & other Places

At places back filling shall be done with local sand if directed by the Engineer-in-Charge. The sand used shall be clean, medium grained and free from impurities. The filled-in-sand shall be kept immersed in water for sufficient time to ensure maximum consolidation. The surface of the consolidated sand



shall be dressed to required level or slope. Construction of floors or other structures on sand fill shall not be started until the Engineer-in-Charge has inspected and approved the fill.

e) Trenches for water pipes & drains

Filling in trenches for pipes and drains shall be commenced as soon as the joints of pipes and drains have been tested and passed. Where the trenches are excavated in soil, the filling shall be done with earth on the sides and top of pipes in layers not exceeding 15cm, watered, rammed and consolidated, taking care that no damage is caused to the pipe underneath.

In case of excavation of trenches in rock the filling upto a depth of 30 cm or the diameter of the pipe whichever is more, above the crown of pipe or barrel shall be done with fine material such as earth, moorum, pulverised decomposed rock or ash according to the availability at site. The remaining filling shall be done with rock filling of boulders of size not exceeding 10 cm mixed with fine material as available to fill up the voids, watered, rammed and consolidated.

6.7 PLAIN & REINFORCED CEMENT CONCRETE

6.7.1 Except where they are varied by the requirement of this specification due provision of IS specification IS-456 for plain and reinforced cement concrete and IS- 432 (Part I & II) for mild and medium tensile steel bars and hard drawn steel wire for concrete reinforcement and other relevant IS code applicable together with the latest amendments shall be held to be incorporated in this specification. It shall be intent of these specifications to ensure that all concrete placed at various locations of the job should be durable, strong enough to carry the design loads and practically be impervious to water. It should be free from such defects as shrinkage, cracking and honeycombing.

Nominal Mix Concrete may be used for concrete of M-20 or lower and the ratio of cement to fine aggregates and coarse aggregate shall be corresponding to the various grades of concrete as specified in IS 456 clause 9.3 (table 9). The concrete grade for RCC structural elements shall be of minimum M-20 grade. The proportions are based on the assumption that aggregates are dry. Necessary allowance shall be made for the bulking of the fine aggregate in accordance with IS:2386. Allowance shall also be made for surface water present when computing water content, surface water shall be



determined by one of the field methods described in IS:2386 (Part-III). In the absence of exact data, the amount of surface water may be estimated, from values given in Table 10 of IS: 456.

The water-cement ratio shall not be more than those specified above. The cement content of any nominal mix proportion specified above shall be increased if the quantity of water in a mix has to be increased to overcome the difficulties of placement and compaction, so that the water-cement ratio specified above for a particular mix is not exceeded. No extra payment shall be made to the tenderer for use of the extra cement.

If concrete made in accordance with the proportions given above for a particular grade does not yield the specified strength and fails to satisfy the requirements of 'Acceptance Criteria for concrete' as specified in IS: 456, the cement content shall be increased as directed by the Engineer-in-charge to obtain a specified strength at no extra cost to the Owner. This richer mix shall continue until the Engineer-in-charge instructs otherwise.

Ordinary concrete proportioned for a given grade specified above shall not, however, be classified as a higher grade on the ground that the test strengths were found higher than the minimum specified.

In case of higher grade of concrete more than M-20 is used, only Design Mix Concrete shall be used. The tenderer shall carry out the mix design and the mix so designed shall be approved by the Owner within the limitations of parameters and other stipulations laid down by IS 456.

The mix shall be designed to produce the grade of concrete having the required workability and characteristics strength not less than the appropriate value given in table 2 of IS 456.

6.7.2 MIXING

Concrete shall be mixed in a mechanical concrete mixer and in accordance with IS: 456.

6.7.3 CONSISTENCY



Quantity of water for making reinforced cement concrete shall be sufficient so as to ensure that concrete shall surround and properly grip all the reinforcement. The best consistency shall be that which shall flow sluggishly without flattening out and without separation of coarse aggregate from the mortar.

The degree of plasticity shall depend upon the nature of work and atmospheric temperature and whether the concrete is vibrated or hand compacted.

The slump shown in Table - 1 contained by the standard slump test carried out in accordance with IS: 1199 shall be adopted for different types of work.

Table - 1 Standard slump

Sl. No.	Type of work	Slumps	
		When vibrated	When not vibrated
1	Mass concrete in RCC foundation footings, retaining wall and road slabs	2.5 cm	5 cm
2	Beams, slabs, columns with simple reinforcement	2.5cm to 5cm	5 cm to 10 cm
3	Thin section with congested reinforcement	5cm to 10 cm	10cm to 15 cm

Note: Should conditions governing slumps and workability change pointing to advisability of an increased slump, this shall only be done by decreasing the amount of aggregate and not by increasing the amount of water.

6.7.4 FORM WORK

The form work shall conform to the shape, lines and dimensions as shown on the drawing and be so constructed as to remain sufficiently rigid during the placing and compaction of the concrete and shall be sufficiently water tight to prevent loss of cement slurry for concrete.

Shuttering shall be of steel plates or of shuttering plywood supported on steel/wooden framework. The props shall be either mild steel tubes or sal ballies 150mm dia.



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The form work shall be so designed as to support the full weight of wet concrete as well as the working load without deformation. All props shall be true and rigid and thoroughly braced both horizontally and diagonally. Where staging is required extra care shall be taken to use bigger diameter props and bracings at maximum 3 M interval. All props shall be supported on sole plates and double wedges. At the time of removing props these wedges shall be gently eased and not knocked out.

All rubbish, chippings, shearing and saw dust shall be removed from the interior of the forms before the concrete is placed and the form work in contact with the concrete shall be cleaned thoroughly wetted or treated with non-staining mineral oil or any other approved material. Care shall be taken that oil or such approved material is kept out of contact with the reinforcement.

All form work shall be removed without shock or vibration and shall be eased off carefully in order to allow the structure to take up its load gradually. Forms shall not be removed until the concrete has adequately hardened to take up the superimposed load coming on it and in no circumstances shall form be struck until the concrete reaches a strength of at least twice the strength to which the concrete may be subjected at the time of working.

In normal circumstances where ordinary Portland cement is used, form may be removed at the expiry of such period as mentioned in Clause 11.3 of IS: 456. However, the above period may be increased if found necessary by the Engineer-in-Charge. Special care shall be taken while striking the centring of cantilevered slab, canopies, portal frames, folded plate construction etc. and period of striking shall be determined by the Engineer-in-Charge.

Surface that becomes exposed on removal of the forms shall be carefully examined of any fins, burrs, and projections etc. that are detected shall be removed. In case honeycombs are found in the concrete the same shall be closely examined by the Engineer-in-Charge. If the honeycomb is of minor nature the loose portion should be removed and finished with cement mortar 1:1. But in case of large honeycombs, the same shall have to be redone or



made good by gunniting etc.

The **tenderer** at his own cost shall reconstruct any work showing signs of damage through premature or careless removal of centring and shuttering.

Before re-use of forms, it shall be thoroughly scrapped, cleaned, joints etc. examined and if necessary repaired and inside surface treated. Framework shall not be used/ re-used if declared unfit by the Engineer-in-Charge.

Anchor bolts, anchors, openings, sleeves, inserts & other Built-in-Fixtures: The **tenderer** shall provide openings, grooves, chases etc. in concrete work as required for erection of equipment and structures. He shall also build into concrete work the materials like inserts, hanger, anchors opening frames, manhole cover,

frames, floor clips, sleeves, conduits, anchor bolts and plates for machinery/ equipment and for structural steel work, dowel bars, lugs, joints or any other built -in fixtures as may be required and instructed. Correct location, exact alignment, etc of all these shall be entirely the responsibility of the **tenderer**. Exposed surfaces of embedded materials are to be painted with one coat of approved anti-corrosive paint and/ or bituminous paint without any extra cost to the owner.

6.7.5 STEEL REINFORCEMENT

Reinforcement should be accurately fabricated, bent to shape, placed and adequately maintained in position as shown on drawings or as directed by the Engineer-in-Charge. All finished bars shall be free from cracks surface flaws, laminations, jagged and imperfect edges. Cement mortar block (1:1) shall be used to give requisite cover as shown on the drawing or as directed and all intersections of bars shall be firmly tied with binding wire of 18 gauge. Reinforcement shall be bend cold in accordance with the procedure stipulated in IS: 2502 and shall not be straightened in a manner which shall injure the material.



All reinforcement shall immediately before placing in concrete be thoroughly cleaned of loose mill scale, loose rust, oil and grease or other deleterious matter that would destroy or reduce bond.

Reinforcement in reinforced concrete members shall not be connected by welding or coupling except in accordance with relevant IS code and with the previous approval of the Engineer-in-Charge. Overlaps and joints shall be staggered and located at points, along the span where neither shear nor bending moment is a maximum.

Reinforcement shall have cover as shown in the drawings and where not specified, the thickness of cover shall be as per IS:456.

6.7.6 TRANSPORTATION

Concrete shall be handled from the place of mixing to the place of final deposit as rapidly as practicable but latest within 30 minutes by methods which shall prevent the segregation or loss of any of the ingredients. If segregation occurs during transport the concrete shall be re-mixed before being placed.

6.7.7 PLACING

- a) Concrete shall be placed in position and compacted before initial setting commences and when once compacted it shall not be subsequently disturbed. Method of placing shall be such as to prevent segregation.
- b) Concrete shall not be dropped into position from a height greater than 1 meter.
- c) Before the concrete is actually placed in position, the insides of the forms should be inspected to ensure that the shuttering is watertight and the surface treated with approved composition. All debris, sand, dust, etc. shall be removed from shuttering before concrete is placed in position.
- d) Concrete shall be placed in suitable layers depending upon the nature of work and generally layers of 30 CM for thick concreting. Placing shall be confined to a layer of 30 cm thick.
- e) When concrete is required to be placed under adverse conditions viz. extreme weather conditions, under water, in alkali soils and in alkaline water, the requirements as stipulated in IS:456 shall be complied with.

6.7.8 COMPACTION



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- a) Concrete shall be thoroughly compacted during the operation of placing and thoroughly worked around the reinforcement, around embedded fixtures and into corners of the form work. Means of compaction shall be mechanical vibration followed by the light tapping of the form work on the external face. To ensure proper compaction at corners, junctions, underneath insert and thick reinforcement etc. placing by steel rods is also to be done before mechanical vibration. All concrete work whether plain or reinforced shall be mechanically vibrated by needle plate vibrator as the case may be.
- b) Beams and columns shall be vibrated using immersion vibrator as per IS: 3558, thin sections like water tanks walls shall be vibrated using surface vibrators. The tenderer shall at all times have in reserve sufficient vibrators of each type to guard against shut down of the work occasioned by the failure of the equipment. No concreting shall be permitted in the event of power failure.
- c) The intensity and duration of vibration shall be sufficient to ensure complete settlement and compaction without any stratification of successive layers or separation of ingredients or formation of laitance. Needle vibrators shall
be immersed vertically and not at an angle at regular interval not more than 45 CM apart from withdrawn very slowly when air bubbles no longer come on the surface. It is better to vibrate at smaller intervals for shorter periods of time, rather than at wider intervals for longer period of time. To avoid trapping of air the thickness of layer of concrete to be vibrated shall not be less than 15 CM and maximum advisable shall be 45 CM. The vibrator shall be used only to aid compaction and shall never be used to push concrete laterally in the forms and it shall never be used nearer than 10 CM to the form surface in order to obtain a uniform appearance.

6.7.9 CURING

Concrete shall be carefully protected during first stage of hardening from harmful effects of excessive heat, drying winds, running down of surface water and shocks. Concrete shall be prevented from drying out by proper curing at least for a period of 14 days and thereafter the surface kept moist for another 7 days. The method of curing shall be that horizontal



surfaces shall be kept covered with ponded water for a continuous period of 14 days and vertical surface like columns walls, fins etc. and inclined surfaces shall be covered with straw, hessian etc. and kept constantly wet by water spray. Mere sprinkling of water on vertical and inclined surface shall not be allowed.

6.7.10 JOINTS ETC.

a) Expansion and Isolation Joints

Expansion joints in concrete structures shall be provided at specified places as indicated on the drawings. The materials and types of joints shall be as specified below. In case of liquid retaining structures, additional precaution shall be taken to prevent leakage of liquids as may be specified on the drawings or as directed by the Engineer-in-charge.

All materials shall be procured from reliable manufacturers and shall have approval of the Engineer-in-charge. The Engineer-in-charge may demand test certificate for the materials and/ or get them tested.

i) Bitumen Board

Bitumen impregnated fibre boards of approved manufacture as per IS: 1838 shall be used as fillers for expansion joints. It must be durable and waterproof. It shall be compressive and possess a high degree of recovery after compression is released. At the exposed end, the joint shall be sealed with approved sealing compound to a depth of 25 mm after application of an approved primer. The sealing compound and the primer shall be applied as specified by the manufacturer.

ii) Bitumen Compound

The gap for expansion joints shall be thoroughly cleaned and the bitumen compound laid as per manufacturer's specifications. The compound to be used shall be of approved manufacture and shall conform to the requirements of IS: 1834.

b) Separation Joints

Strong and tough alkathene sheet or equivalent of about 1 mm thickness as approved by the Engineer-in-charge shall be used. It shall be



stuck by an approved sticker to the cleaned surface of the already set concrete to cover it fully. Fresh concrete shall be laid against the sheet, care being taken not to damage the sheet in any way.

i) Rubber Pad

Hard foundation quality rubber pads of required thickness and shape shall be put below machine or other foundations where required as shown on the drawings or as desired by the Engineer-in-charge. The rubber shall be of best quality of approved manufacture, durable, capable of absorbing vibration and must be chemically inert when in contact with moist or dry earth under normal conditions.

6.7.11 PRESSURE GROUTING

Pervious rock, fissures etc. under foundations shall be grouted and sealed, if required as per design & drawings. Grout shall be composed of cement and water, except that for wider seams, sand or 6 mm down stone chips may have to be used in the mixture. The mix for grouting shall be 1 part cement and 1 part sand. The location and depth of grout holes shall be as directed by the Engineer-in-charge. Grout shall be placed at pressures upto 14 Kg./Cm² or as required for approved grouting machine.

6.7.12 PRE-CAST CONCRETE

The specification for pre-cast concrete shall be exactly similar as for the cast- in-place concrete. All pre-cast work shall be carried out in a yard made for the purpose. This yard shall have a hard and levelled platform made of concrete or grouted brick soling finished smooth with neat cement plaster overlaid by a layer of G.I. plain sheets and shall have curing tank and such other facilities. The moulds shall preferably be of steel or of wood lined with G.I. sheet metal. The yard shall preferably be fenced.

Lifting hooks shall be embedded in correct position of the unit to facilitate erection, even though they may not be shown on the drawings and shall be burnt off and finished after erection.



Pre-cast concrete planks after 28 days of casting and curing ready for erection shall be transported to site by suitable means approved by Engineer-in-charge. All care shall be taken so that no damage occurs during transportation. All adjustments, levelling and plumbing shall be done by providing instruments, materials and men to the Engineer-in-charge for checking the proper erection of the pre-cast units. The joint between pre-cast planks shall be pointed with 1: 2 cement: sand mortar where called for on the drawing.

6.7.13 WATERPROOFING OF CONCRETE STRUCTURES

The materials and design shall conform to the respective IS Code wherever applicable. The Engineer-in-charge's approval to the materials shall be obtained by the tenderer before procurement. If desired by the Engineer-in-charge, test certificates for the materials shall be submitted by the tenderer and samples for testing if required to be done by the Owner, shall be supplied free. The materials shall be of best quality available indigenously, fresh and thoroughly clean.

- a) Water Stops
 - i) Ribbed Rubber Water Stop

The material must be very durable and tough. The ribs shall be sufficient to ensure bond with concrete. The width shall be minimum 100 mm and thickness minimum 3 mm. The rubber water stop must be used in long lengths to avoid splicing as far as possible. Each shall have at least 230 mm overlaps and stuck with a reliable sticker compound or vulcanised.

- b) G. I. Strips

G.I. strips shall be of minimum 22 gauge and 230 mm in width. It shall be strong and durable. Longest lengths available shall only be procured. At joints, strips shall be lapped 150 mm and brazed thoroughly to prevent any leak. These shall be placed in position very securely so as not to get dislodged or distorted during placing of concrete. G.I. strips to be used in construction joints.



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c) PVC Sealing Strips

PVC sealing strips shall be used for Expansion joints. The minimum thickness of PVC sealing strips shall be 5 mm and the minimum width 150 mm. The actual size and shape shall have to be specified in drawings. The material should be of good quality Polyvinyl chloride highly resistant to tearing, abrasion and corrosion. The physical properties shall generally be as follows:

Sp. Gr.	-	1.3 to 1.35
Shore hardness	-	60 A to 80 A
Tensile Strength	-	100 -150 Kg/Cm ²
Min. safe continuous Temp.	-	-70°C
Ultimate elongation	-	Not less than 27.5%

d) Admixtures in

i) Plaster

The plaster shall be made of cement, sand and water proofing admixtures as per manufacturer's specification if required. The admixture shall be 'IMPERMO' or equivalent as approved by the Engineer-in-charge. The Concrete surface shall be plastered shall be hacked to form a key to Engineer-in-charge's satisfaction. If desired by the Engineer-in-charge, the HEC shall have the work supervised by the manufacturer's supervisor at no extra cost to the owner.

ii) Concrete

The admixture shall be of right variety of Lilax, Silvicon, "ICICO" or equivalent water proofing cement additive, which conforms to IS: 2645. Water proofing additive shall be as far as possible free from aggressive chemicals like chlorides, sulphides etc. which can cause corrosion of steel reinforcement in R.C.C.

iii) Other Admixture in Concrete

The Engineer-in-charge may at his discretion instruct the HEC to use any admixture in the concrete.

e) Surface Treatments

i) Bituminous Coating



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Surface to be waterproofed shall be absolutely dry, clean and dust free. The surface shall be completely coated with hot coal tar pitch as per IS : 216 (not heated above 375°F) using not less than 2 Kg per M² or with hot asphalt i.e. bitumen according to IS : 73 (not heated above 400°F) using not less than 1.5 Kg per M². When the first coat has completely dried up and passed by the Engineer-in-charge, the second coat shall be applied in the manner using not less than 1.25 Kg per M² in case of coal tar and 1 Kg per M² in case of asphalt. Immediately after application of the second coat and before it is dried up, sand shall be spread on the surface to cover it completely. Sufficient time shall be allowed after spreading of sand before backfilling is done in order to allow the final coat to dry up completely. Coal tar or asphalt to be used shall be of approved manufacture and of the best quality available.

ii) Bitumen Felt

If specified or desired by the Engineer-in-charge, structures shall be made damp proof by courses of bitumen felt and blown bitumen. The tenderer shall entrust the work to a specialist firm approved by the Engineer-in-charge.

The materials shall conform to IS: 1322 and the workmanship to IS: 1609. The bitumen felt shall be of hessian based. If demanded by the Engineer-in-charge, tests as specified in IS Codes shall be organised by the tenderer without charging any extra to the Owner.

Cleaning the surface, keeping it dry, providing necessary corner fillets and cement rendering and cutting chases shall be carried out. Protective brickwork, concrete sub-bases or walls are to be included in the bid.

The specification shall cover laying the damp-proof course on the outside and inside of the walls and bases of structures. Unless otherwise specified elsewhere, a 20 years 'guarantee for perfect performance' shall be given by the tenderer individually and collectively.



iii) Damp-Water Proofing

Multiple layer damp-water proofing treatment for basement and structure below G.L. shall be done in accordance with IS: 1609 and 3067. The type of treatment shall depend upon the depth of the structures below subsoil water level and shall be as shown on the drawing or as decided by the Engineer-in-charge.

6.7.14 SAMPLING AND STRENGTH TEST OF CONCRETE

Sampling and strength test of concrete shall be carried out in accordance with relevant Clause of IS: 456. The cost of sampling, testing etc. shall be completely borne by the tenderer. A site laboratory having the following equipment/ facilities has to be installed by the tenderer for carrying out various strength test:

- a) Compression testing machine of min. capacity of 100Te
- b) Slump cones.
- c) Adequate number of standard moulds.
- d) Curing bank
- e) Weighing balance
- f) Oven or other apparatus to dry aggregates.

6.7.15 ACCEPTANCE OF CONCRETE

The criteria for acceptance of a concrete shall be in accordance with IS: 456 and subject to stipulations and/or modifications stated elsewhere in this document and the consequences of rejection shall be at the expense of the tenderer.

6.8 FABRICATION & ERECTION OF STEEL STRUCTURES

6.8.1 GENERAL

All structural steel works shall be carried out strictly as per relevant IS code codes and standard practices. This shall cover fabrication, transportation to the required location and erection including hoisting, grouting and site welding/ bolting/ riveting etc. all complete.

6.8.2 NAMES OF MANUFACTURER AND COPIES OF ORDERS



Before ordering structural steel the tenderer shall submit, for the approval of the Engineer-in-Charge the names of the proposed makers or suppliers together with the specification of the materials and shall thereafter, send copies of the orders to the Engineer-in-charge. When a supplier or sub-contractor orders materials for the execution of his sub-contract, he shall also comply with the aforesaid requirement by the submission of the names of makers proposed and by sending to the Engineer-in- Charge copies of the order.

6.8.3 MATERIALS & WORKMANSHIP

All structural steel shall be of tested quality and shall comply with the requirement of IS: 2062. Mild steel nuts and bolts shall be made from steel of round bar quality and not from rivet bars. All rivets shall comply with IS: 1148-1973 or latest for "Rivet bars for structural purpose". The maker's test certificates shall be made available by the tenderer to the Engineer-in-charge or his representative when called for.

If the tenderer has difficulty in obtaining the IS section specified or shown on the drawing he may submit for approval to the Engineer-in-Charge the nearest section available.

The use of alternative section may be permitted only under extreme circumstances and only when approved in writing by the Engineer-in-charge.

All bolts and nuts shall be made in accordance with relevant IS code specification and unless shown or specified otherwise, shall be hexagonal. All nuts are to be fit tight. Washers shall be used wherever necessary.

6.8.4 FABRICATION

All steel sections to be used in the work shall be of tested quality and shall be approved by the Engineer-in-Charge before use. After proper marking to the required shape and size as per approved design and drawing, the steel section shall be cut to the required shape and size and cut edges, shall be finished smooth by grinding. No two pieces shall be welded or otherwise jointed to make up the required shape and size of a member except as indicated in the drawing or directed by the Engineer-in-Charge.



All structural steel work shall be in accordance with IS:800 code of practice for use of structural steel in general building construction and loading shall be in accordance with IS:875 code of practice for structural safety or building loading standards, where applicable. The templates for the connections between interchangeable parts shall be of steel and steel bushed in such cases as the Engineer-in-Charge may consider necessary. In case where actual materials have been used as templates for drilling similar pieces, the Engineer-in-Charge shall decide whether they are fit to be used as parts of finished structure.

All smithy work shall be clean and sound and the metal shall not be burnt or injured in anyway.No drifting shall be allowed except for bringing together several parts forming a member but the drifts must not be driven with such force as to disturb or damage the metal about the holes.

Particular care must be taken to ensure free expansion and contraction wherever provided for in drawings or specifications.

All members must be so formed that they may be accurately assembled without unduly packing straining or forcing into position, and when built the same shall be true and free from any twist, kink buckles or open joints between component pieces. Any failure in this respect shall involve rejection of the member.

Greatest accuracy shall be observed to facilitate erection at site and all corresponding parts must be made similar and interchangeable.

6.8.5 BOLTING

The material used for the manufacture of structural quality high tensile steel bolts shall have a minimum tensile strength of 58 Kg/mm². Other mechanical properties shall conform to grade St-58-HTof IS: 961.

Bolts, nuts and washers and other fastening materials shall be stored in racks off the ground with coating of suitable protective oil. All bolts, nuts and washers shall conform to the relevant Indian Standards.

Bolts shall be inserted in such a way that they may remain in position under gravity even before fixing the nut. Bolted parts shall fit solidly



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together when assembled and shall not be separated by gaskets or any other interposed compressible materials. When assembled, all joint surfaces, including those adjacent to the washers, shall be free of scales except tight wall scales. They shall be free of dirt, loose scales, burns and other defects that prevents solid sitting of the parts. Contact surfaces shall be free of oil, paint, lacquer or galvanising.

All high tensile bolts conforming to HT-58 of IS:961 shall be tightened to provide, when all fasteners in the joint are tight, at least the minimum bolt tension as mentioned below:-

Nominal Bolt Dia (mm)	Minimum Bolt Tension(kgf)
20	8300
22	10200
25	11900

6.8.6 RIVETING

Riveting shall be done by hydraulic or pneumatic machines. No hand riveting shall be allowed.

All loose, faulty or defective rivets must be cut out or replaced. Screwed ends of the rods and anchor bolts or machined surfaces shall be protected from injury during transit.

Dummy pieces shall be prepared where necessary during fabrication and shop assembly to check the accuracy of work to the satisfaction of the Engineer-in- Charge or his representative at no extra cost.

The parts of riveted members shall be well pinned and firmly drawn together with bolts before riveting is commenced. The drifting done during assembling shall be such as to bring the parts into position and shall not be such as to enlarge the holes or distort the metal. Contact surfaces inaccessible after riveting shall be painted before assembly prior to riveting. Rivets shall be heated uniformly to a light cherry red and driven while hot. Rivets when heated and ready for driving shall be free from slag, scale and carbon deposit. When driven, they shall completely fill the hole. Rivet head shall be full, neatly made, concentric with the rivet holes and in full contact with the surface of the member, gripping the member firmly. Loose, burnt or otherwise defective rivets shall be replaced free of cost. In



removing rivets, care shall taken not to injure the adjacent metal and if necessary, they shall be drilled or cut with a rivet buster or chisel.

6.8.7 WELDING

Electrodes complying with IS:814-1974 or latest "Covered Electrodes for Metal Arc Welding of Structural Steel". Arc welding shall be used. The bidder shall state in his bid the specifications and all relevant particulars of the electrodes which he proposes to use.

Welding of mild steel shall be in accordance with IS: 816-1969 or latest "Code of Practice for use of Metal Arc Welding for general construction in Mild Steel".

All welding operation shall be carried out by skilled welders (who would satisfy the requirement of engagement in welding structures other than pipes) working under constant competent supervision in a properly organised manner with quality welding sets and with automatic welding machines as far as possible and with suitable electrodes, all to the approval of Engineer-in-Charge and to his satisfaction.

Number of welding sets both automatic and hand operated proposed to be used in fabrication in workshop with all the relevant specifications is to be submitted to the Engineer-in-Charge before execution of work.

Special attention shall be given to a suitable sequence of welding to keep the internal stresses within permissible limits.

6.8.8 INSPECTION

The Engineer-in-Charge and his authorised representatives shall have free access at all reasonable times to all places where the work is being carried out and shall be provided by the tenderer, at the expense of the tenderer, with all the necessary facilities and labour for inspection during fabrication and erection. The Engineer-in-Charge and his authorised representative shall be at liberty to reject in whole or part any work or material that does not conform to the terms of these specifications and may order the same to be removed, replaced or altered at the expense of the tenderer.



No part of the work shall be oiled, painted (except contact surfaces as stated) taken down, packed, bundled, crated or dispatched until it has been finally inspected and approved by the Engineer-in-Charge or his representative. No filling or other obliteration of surface defects shall be carried out prior to such inspection by or without the consent of the Engineer-in-Charge or his representative.

6.8.9 MARKING AND DISPATCHING

Every portion of the work shall have its erection letters or numbers distinctly stencilled on it with paints and marked with a punch for guidance in erection at site and every piece, bundle or packing case shall also be clearly marked in accordance with a marking diagram and shall bear such other marks as will facilitate erection.

The work shall be despatched to such portions as may be found convenient for erection or as ordered by the Engineer-in-Charge and shall be unloaded and stocked neatly in the space allotted to the tenderer.

All bolts, nuts, rivets, plates under 25mm square and small articles generally are to be packed in cases of adequate strength for safe transit. All bolts, nuts rivets and washers of different sizes are to be packed securely in separate bags, each bag having a label indicating its contents.

6.8.10 PAINTING

All steel works shall be provided with two coats of synthetic enamel paints of approved make and shade over primer.

The whole of the fabricated steel works before being dispatched from fabrication yard shall be dry and after being thoroughly cleaned free from rust, mill scale, dust, etc. to the satisfaction of the Engineer-in-Charge or his representative and shall be given one coat of red oxide paint. Paint shall be applied by brush and not by spraying. Surfaces, which are to be held in contact by riveting or bolting, shall not be painted before assembly.

Unless specified otherwise all surface inaccessible after riveting, bolting or intermittent welding shall be given two coats of red oxide paint before assembly. Welds and adjacent parent metal shall not be painted prior to removal of flakes inspection and approval.



All bolts, nuts, rivets and washers etc., shall be thoroughly cleaned and dipped in boiled linseed oil before dispatch from tenderer's works.

6.8.11 BEDDING

The bedding shall be carried out with Portland cement grout or mortar having a compressive strength of 250 Kg. per Sq.cm at 28 days for all column bases. The bedding shall not be carried out until a sufficient number of columns have been properly aligned, levelled and plumbed and sufficient girders, beams and trusses are in position to the satisfaction of the Engineer-in-Charge. Immediately before grouting the space under steel shall be thoroughly cleaned and left free from excessive moisture. The grout or mortar shall be fixed as thickly as possible consistent with fluidity and shall be poured under pressure with pressure grouting machine until the space has been filled with mortar.

6.8.12 ERECTION & SETTING OUT

The erection of steel work shall be in accordance with IS:800-1984 or latest and IS:816-1969 or latest. The tenderer shall be responsible for the suitability and capability of all plant and equipment used for erection.

The tenderer shall give to the Engineer-in-Charge not less than twenty four hours notice of his intention to set out or give levels for any parts of the work with a view to enable the Engineer-in-Charge to make arrangements for checking.

The tenderer shall, as a contingency of the contract, provide all necessary assistance which the Engineer-in-Charge may require for checking the setting out.

The dimensions and levels of the site and of existing works shown upon the drawings should be verified before starting the erection work and in case of any error, omission or discrepancy the same should be rectified.

The setting out and levelling of the whole of the works shall be made from two reference lines/points and two datum marks which will be given at site.



The tenderer shall take care to see that the component parts fit correctly and according to the distinguishing match marks. No interchangeable pieces shall be made unless absolutely necessary.

6.8.13 CLADDING

CGI/ COLOUR sheets shall be in accordance with latest IS specifications. All fixing accessories shall conform to IS: 730. Workmanship shall be according to best construction practices to give a watertight finish to the satisfaction of the Engineer-in-charge. Fixing of gutters and down pipes shall be according to IS. 2527.

a) CGI/ COLOUR Sheeting

Side laps shall be 2 corrugations for roof and one corrugation for side sheeting. End laps shall be minimum 150 mm for roof and 100 mm for side sheeting. In ridges and hips where plain sheets are used, the end laps shall be minimum 100 mm. Holes in CGI/ COLOUR sheets shall preferably be made on the ground, the sheets should be placed on trestles and holes punched in the ridge of the corrugation from the outsides inward for obtaining proper seating of limpet washers. Sheets shall be secured to sheet framing by 8 mm dia galvanised iron hooks of J- bolts and maximum 305 mm apart. The length of the hook of J-bolts shall be to suit the sections of the bearer. Sheet shall also be bolted at the ends at every third corrugation with 6 mm dia galvanised iron seam bolts and GI flat washers and bituminous washers.

6.8.14 GUTTERS & DOWN PIPES

All gutters shall be designed to suit the diameter and spacing of down pipes as shown in the drawing and for rainfall of maximum intensity in the area and shall include a factor of safety of two. All gutters shall be of GI sheet 16 gauge thick. All joints shall be lapped in the direction of flow and shall be made watertight with suitable caulking compound. The slope of the gutter shall be considered in relation to the area of roof drained.

6.8.15 FIBRE GLASS REINFORCED PLASTIC SHEETING



These shall be of thickness and profile as mentioned in the schedule of items. Colour and light transmittance shall be as mentioned in drawings and/or schedules. Where used in conjunction with C.G.I. or asbestos cement sheeting, the end and side laps and fixing device shall be same as used for general sheeting. Where used in lieu of glass, the fixing shall be by means of timber or metal glazing beads as mentioned in schedule of items. In all cases, the installation shall be completely watertight and able to withstand the designed wind pressure as mentioned in schedule.

Acceptance Criteria

The installations shall present a neat appearance and shall be checked for water tightness. The following shall be checked:

- a) Side and end laps.
- b) Absence of cracks, holes or damages in sheets.
- c) Spacing of bolts.
- d) Provision of double washer (GI & asbestos or bituminous washers).
- e) Proper installation of flashing.

6.9 BRICK AND STONE MASONRY

All brick work shall be carried out as shown on the drawings with set backs, projections, cuttings, toothings etc. Wherever the proportion of cement mortar has not been specifically mentioned, cement mortar in proportion of 1:6 shall be used. Flat brick arches shall be provided wherever required without any extra cost. Brick work shall be kept wet while in progress, till mortar has properly set. On holidays or when work is stopped, top of all unfinished masonry shall be kept wet. Should the mortar become dry, white or powdery, for want of curing, work shall be pulled down and rebuilt at the tenderer's expense.

Bricks shall be thoroughly cleaned, well wetted and soaked for at least twelve hours in fresh water before being used on the work. Bricks shall be of locally available best quality.

English bond shall be used throughout in walling. A good bond shall be maintained throughout the work, both laterally and transversely. In walling the



courses shall be kept perfectly horizontal and in plumb with the frogs facing upwards. Vertical joints shall not exceed 10mm thickness and shall be full of mortar. No broken bricks shall be used except as closers. After day's work all joints shall be raked to 12mm depth to provide for proper key to plastering.

Mortar used shall be specified in respective items and every third course of brickwork shall be flushed with mortar grout.

Whole of the masonry work shall be brought up at one uniform level throughout the structure, but where breaks are unavoidable, joints shall be made in good long steps. All junctions of walls and cross walls shall be carefully bonded into the main walls. The rate of laying masonry may be upto a height of 60 CM per day if cement mortar is used and 45 CM per day if lime mortar is used. Greater heights may be built only if permitted by the consultants.

During rains, the work shall be carefully covered to prevent mortar from being washed away. Should any mortar or cement be washed away, the work shall be removed and rebuilt at the tenderer's expense.

6.9.1 HALF BRICK MASONRY

Half brick masonry shall be set in cement mortar as specified and where not specifically mentioned cement mortar in proportion of 1:4 shall be used. Hoop iron bands of 2.5 CM x 0.16 CM (1" x 1/16") shall be embedded in every fourth course with thick mortar band or 2 No. 6mm (1/4") dia bars shall be used in every 6th course (irrespective of it being shown in drawings or not).

6.10 PLASTERING, PUNNING, PLASTER OF PARIS

6.10.1 PLASTERING (AS PER I.S. 1661)

a) Preparation of Surface

All pot log holes in brickwork and junction between concrete and brickwork shall be properly filled in advance. Joints in brickwork shall be raked to 12mm and concrete surface hacked to provide the grip to the plaster. Projecting burrs of mortar formed due to gaps at joints in shuttering



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shall be removed. The surface shall be scrubbed clean with wire brush/ coir brush to remove dirt, dust etc. and the surface thoroughly washed with clean water to remove efflorescence, grease and oil etc. and shall be kept wet for a minimum of six hours before application of plaster.

b) Mortar for plastering shall be as specified in the schedule of items. For sand cement plaster, sand and cement in the specified proportion shall be mixed dry on a watertight platform and minimum water added to achieve working consistency. For lime gauged plaster, lime putty or hydrated lime and sand in the required proportion shall be mixed on a watertight platform with necessary addition of water and thoroughly ground in mortar mill. The mix shall then be transferred to a mechanical mixer to which the required quantity of cement is added and mixed for at least 3 minutes. No mortar which has stood for more than half an hour shall be used, mortar that shows tendency to become dry before this time, shall have water added to it.

c) Application of Plaster

Plaster, when more than 12mm thick, shall be applied in two coats - a base coat followed by the finishing coat. Thickness of the base coat shall be sufficient to fill up all unevenness in the surface. No single coat shall however exceed 12mm in thickness. The lower coat shall be thicker than the upper coat. The overall thickness of the coats shall not be less than the thickness as specified in the schedule of items. The undercoat shall be allowed to set and shrink before applying the second coat of plaster. The under coat shall be scratched or roughened before it is fully hardened to form a mechanical key and thoroughly levelled. The method of application shall be 'thrown on' rather than 'applied by trowel'.

To ensure even thickness and true surface, patches of plaster about 100mm to 150mm square or wooden screed 75mm wide and of the thickness of the plaster, shall be fixed vertically about 2M to 3M apart, to act as gauges. The finished wall surface shall be true to plumb and the tenderer shall, without any extra cost to the owner, make up all irregularities in the brick work with plaster. All vertical edges of brick pillars, doors jambs etc. shall be chamfered or rounded off as directed by the Engineer-in-Charge. All drips, grooves, mouldings and cornices as shown on drawings or instructed



by Engineer-in -charge shall be done with special care to maintain true lines levels and profiles. After the plastering work is completed all debris shall be removed and holes left during plastering shall be repaired and left in good condition after completion of the job.

d) Finish

Generally the standard finish shall be used unless otherwise specified. Whenever any special treatment to the plastered surface is indicated, the work shall be done exactly as specified to the entire satisfaction of the Engineer-in-Charge regarding the texture, Colour and finish. Whenever punning is indicated, the interior plaster shall be finished rough. Otherwise, the interior plaster shall generally be finished to a smooth surface. The exterior surface shall generally be finished with a wooden float.

6.10.2 NEAT CEMENT FINISH

Immediately after achieving a true plastered surface with the help of a wooden straight edge, the entire area shall be uniformly treated with a paste of neat cement at the rate of 1Kg. per Sq.m. and finished smooth with a trowel.

6.10.3 CURING

All plastered surfaces, after laying, shall be watered for a minimum period of seven days, by an approved method and shall be protected from excessive heat and sunlight by suitable means. Moistening shall commence as soon as the plaster has hardened sufficiently and not susceptible to damage.

6.10.4 PLASTER-OF-PARIS PUNNING

Plastered surfaces, where specified, shall be finished with plaster-of-paris punning. The material shall be from approved manufacturers and as approved by the Engineer-in-charge. The thickness of the punning shall be 2mm and shall be applied by skilled workman. The finish shall be smooth, even and free from undulations, cracks etc. Before bulk work is taken in hand a sample of punning shall be done on roughly 10 Sq.m. area and



approval of the Engineer-in-charge obtained. The work shall then be taken in hand as per approved sample.

Finish to masonry and concrete shall fully comply with the drawings, specifications approved samples and instructions of the Engineer-in-charge with respect to lines, levels, thickness, Colour, texture pattern and any other special criteria as mentioned in the body of the specification or as shown on drawings.

6.11 PAINTING, WHITE WASHING ETC

This specification covers painting, white washing, polishing etc. of both interior and exterior surfaces of masonry, concrete, plastering, plaster of Paris, false ceiling, structural and other miscellaneous steel items, rain water down pipes, floor and roof drains, soil, waste and service water pipes and other ferrous as well as non-ferrous metal items as shown on drawings or as directed by the Engineer-in-charge. If surface to be finished can not be prepared in suitable condition for painting by customary preparatory methods, the tenderer shall notify the Engineer-in-charge in writing or assume responsibility for and rectify any unsatisfactory finishing that results. Before commencing painting, the tenderer shall obtain the approval of the Engineer-in-charge in writing regarding the scheduling of work to minimise damage, disfiguration or staining by other trades. He shall also undertake normal precautions to prevent damage, disfiguration or staining to work of other trades or other installations.

6.11.1 EXECUTION

a) Painting

Materials shall be highest grade products of well known approved manufacturer and shall be delivered to the site in original sealed containers, bearing brand name, manufacturer's name and Colour shade, with labels intact and seals unbroken. All materials shall be subject to inspection and approval by the Engineer-in-charge. It is desired that materials of one manufacturer only shall be used as far as possible and paint of one shade be obtained from the same manufacturing



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firm. All paint shall be subjected to analysis from random samples taken at site from painters bucket, if so desired by Engineer-in-charge.

All prime coats shall be compatible to the material of the surface to be finished as well as to the finishing coats to be applied. All unspecified materials such as shellac, turpentine or linseed oil shall be of the highest quality available and shall conform to the latest IS. All such materials shall be made of reputed and recognised manufacturers and shall be approved by the Engineer-in-charge. All Colour shall be as per painting schedule and tinting and matching shall be done to the satisfaction of the Engineer-in-charge. In such cases, where samples are required, they shall be executed in advance with the specified materials for the approval of the Engineer-in-charge.

b) White Washing

White washing shall be done from pure slaked lime or fat lime or a mixture of both as instructed by the Engineer-in-charge and shall conform to IS:712-1984 latest edition. Samples of lime shall be submitted to the Engineer- In-Charge for approval and lime as per approved samples shall be brought to site in un-slaked condition. After slaking, it shall be allowed to remain in a tank of water for two days and then thoroughly stirred up until it attains the consistency of thin cream. 100 gram of gum to 6 litres of white wash water and a little quantity of indigo or synthetic ultramarine Blue shall be added to the lime.

c) Water-Proof Cement Paint

Water-proof Cement paint shall be made from best quality white cement and lime resistant Colour s with accelerators, waterproofing agents and fungicides. The paint shall conform to IS:5410 latest edition.

d) Acrylic Emulsion Paint

Acrylic Emulsion Paint shall be water based acrylic polymer emulsion with rutile titanium dioxide and other selected pigments and



fungicide. It shall exhibit excellent adhesion to plaster and cement surface and shall resist deterioration by alkali salts. The paint film shall be able to withstand washing with mild soap and water without any deterioration in Colour or without showing flaking, blistering or peeling.

e) Synthetic Enamel Paint

Synthetic Enamel Paint shall be made from synthetic resins and drying oil with rutile titanium dioxide and other selected pigments to give a smooth, hard, durable and glossy finish to all exterior and interior surfaces. White and pastes shades shall resist yellowing and darkening with ageing. The paint shall conform to IS:2932 & IS:2933.

6.11.2 STORAGE

The tenderer shall arrange for safe and proper storage of all materials and tools. Paints shall be kept covered at all times and mixing shall be done in suitable containers. All necessary precautions shall be taken by the tenderer to prevent fire.

6.11.3 PREPARATION OF SURFACE

Before starting the work the tenderer shall obtain the approval of the Engineer-in-charge regarding the soundness and readiness of the surface to be painted.

a) Masonry, Concrete & Plastered Surface

Surface shall be free from all oil, grease, efflorescence, mildew, loose paint or other foreign and loose materials. Masonry cracks shall be cleaned out

and patch filled with mortar similar to the original surface and uniformly textured. Where this type of resurfacing may lead to the finishing being different in shade from the original surfaces, the resurfaced area shall be treated with minimum one coat of cement primer which should be continued to the surrounding area with an overlapping of minimum 100mm. Surface with mildew or efflorescence shall be treated as below:

Mildew : All mildew surfaces shall be treated with an approved fungicide such as ammoniacal wash consisting of 7 Gm. of copper



carbonate dissolved in 80 ml liquid ammonia and diluted to 1 litre with water or 2.5% magnesium silico fluoride solution and allowed to dry thoroughly before paint is applied.

Efflorescence: All efflorescence shall be removed by scrubbing affected surfaces with a solution of muriatic acid in water (1:6 to 1:8) and washed fully with clear water and allowed to dry thoroughly.

b) Metal

All metal surfaces shall be absolutely clean, dry and free from wax, grease or dried soap films. All steel and iron surfaces shall be free from rust. All galvanised iron surface shall be pre-treated with a compatible primer according to the manufacturer's direction. Any abrasion in shop coat shall be touched up with the same quality of paint as the original coat.

6.11.4 APPLICATION

a) General

The method of application shall be as recommended by the manufacturer. In case of selection of special shades and Colour (not available in standard shades) the tenderer shall mix different shades and prepare test panels of minimum size 1 M square as per instruction of the Engineer-in-charge and obtain his approval prior to application of finishing paints.

Proper tools and implements shall be used. Scaffoldings if used shall be independent of the surface to be painted to avoid shade differences of the freshly repaired anchor holes.

Painting shall be done by skilled labours in a workman like manner. All materials shall be evenly applied, so as to be free of sags, runs, crawls or other defects. All coats shall be of proper consistency. In case of application by brush no brush marks shall be visible. The brushes shall be clean and in good condition before application of paint. All priming undercoats for painting



shall be applied by brush only and rollers, spray equipment etc. shall not be used.

No work shall be done under conditions that are unsuitable for production of good results. No painting shall be done when plastering is in progress or is drying. Application of paint which seals the surface to moisture shall only be done. All coats shall be thoroughly dry before being sand papered or before the succeeding coat is applied. Coats of painting as specified are intended to cover surface perfectly. In case the surface is not covered properly by applying the specified number of coats, further coats shall be applied by the tenderer at his own cost when so directed by the Engineer-in-Charge.

All primers and undercoats shall be tinted to approximate the Colour of the finishing coat. Finishing coats shall be of exact Colour and shade as per approved samples and all finishing shall be uniform in Colour and texture. All parts of mouldings and ornaments shall be left clean and true to finish.

b) White Washing

The surface where white washing is to be applied shall be cleaned of all loose materials and dirt. All holes and undulations of the surface shall be filled up with lime putty and shall be allowed to dry up before application of the lime solution.

One coat of white wash shall consist of one stroke from up to downwards and another from bottom upwards over the first stroke and then from left to right before the previous one dried up. Second coat shall be applied similarly after the first coat dried up completely and similarly third coat shall be applied and in case the Engineer-in-charge feels that more coats are required the tenderer shall do so without any extra cost to owner. No brush marks should appear on the finished surface. The inner plastered surfaces of walls shall be given 3 or more coats of white washing.

c) Water-Proof Cement Paint



Surface to be coated with cement paint shall be washed and brushed down. As soon as the moisture has disappeared, the surface shall be given one coat paint. Care shall be taken so that the paint does not dry out too rapidly. After 4 to 6 hours of painting the water shall be sprinkled over the surface to assist curing and prevent cracking. After the first coat has dried (24 to 48 hours, the second coat shall be applied in similar manner. The finished surface shall be kept moist by occasional sprinkling with water for seven days after final painting.

d) Acrylic Emulsion Paint

Lime gauged cement plastered surface shall not be painted for at least one month after plastering. A sample patch shall be painted to check alkali reaction if so desired by the Engineer-in-charge. Painting shall be strictly as per manufacturer's specifications.

e) Synthetic enamel paint

Synthetic Enamel paint shall be applied on properly primed surface. Subsequent coat shall not be applied till the previous coat is dry. The previous coat shall be lightly sand papered for better adhesion of subsequent coats.

CLEANING UP

The tenderer shall, on completion of painting etc. remove all marks and make surfaces good, where paint has been applied, splashed or splattered, including cleaning all equipment, fixtures, glass furniture, fittings etc. to the satisfaction of the Engineer-in-charge.

ACCEPTANCE CRITERIA

- a) All painted surfaces shall be uniform and pleasing in appearance.
- b) The Colour, texture etc. shall match exactly with approved samples.
- c) All stains, splashes and splatters of paints shall be removed from surrounding surfaces.

6.12 FLOORING, SKIRTING, DADO ETC

All flooring, skirting, dado, etc. shall be executed strictly as per relevant IS Specification and in workmanship manner.



CEMENT CONCRETE FLOORING

Selection of materials, method of mixing, placing and compacting shall generally conform to the specifications under plain and reinforced cement concrete described earlier. A concrete of stiff consistency with workability shall be used.

a) Preparation of surface

Before the operation for laying topping is started, the surface of base concrete shall be thoroughly cleaned of all dirt, loose particles cocked mortar droppings and laitance if any, by scrubbing with coir or steel wire brush. Where the

concrete has hardened so much that roughening of surface by wire brush is not possible, the surface shall be roughened by chipping or hacking at close intervals. The surface shall then be cleaned with water and kept wet for 12 hours and surplus water shall be removed by mopping before the topping is laid.

b) Laying

The screed strips shall be fixed over the base concrete dividing it into suitable panels. Before placing the concrete for topping, neat cement concrete just ahead of the Finish. Concrete of specified portion and thickness shall be laid in alternate panels to required level and slope and thoroughly tamped.

c) Finishing the surface

After the concrete has been completed it shall be finished with a floating coat of neat cement. Finishing operations shall start shortly after the compaction of the concrete and surface shall be trowelled so as to produce an uniform and hard surface. The satisfactory resistance of floor towards depends largely upon the care with which trowelling is carried out. The time interval allowed between successive trowelling is very important. Immediately after placing cement punning only just sufficient trowelling shall be done to give a levelled surface. Excessive trowelling in the earlier stages shall be avoided as this tends to bring a layer rich in cement to the surface. Some time, after the first trowelling, the duration depending upon



the temperature, atmospheric condition and the rate of set of cement used, the surface shall be trowelled to close any pores in the surface and to bring to surface and to scrap off any excess water in concrete or laitance. No dry cement shall be used directly on the surface to absorb moisture or to stiffen the mix. The final trowelling shall be done well before the concrete has become too hard but at such a time that considerable pressure is required to make any impression of the surface.

IRONITE FLOORING

Ironite flooring shall consist of two layers, the bottom layers of plain cement concrete and shall be laid in the same manner as per cement concrete flooring. The mix proportion of the concrete used in the bottom layer and its thickness shall be as specified in the item of works.

The top layer shall be finished with 12mm thick ironite topping, unless otherwise specified, 5Kg of ironite per bag of cement each containing 50Kg shall be mixed with, dry thoroughly. This dry mixture shall be mixed with stone grit 6mm (1/4") and down size or as otherwise directed in the ratio 1:2 by volume and well turned over. Just enough water shall be added to this dry mix and mixed thoroughly well and laid to uniform thickness of 12mm and compacted. After initial set has started the surface shall be finished as directed.

PLAIN & COLOUR ED CEMENT TILES, MARBLE, MOSAIC & TERRAZZO TILES FLOORING

The tiles shall conform to IS:1237 having the Colour approved by the consultant and the rate shall include provision of border tiles and tiles of different Colours in pattern if directed. The mosaic topping of lighter shade tiles shall be made of white cement with an approved shade pigment and neutral shade tiles shall be of grey cement with an approved shade pigment. The type of tiles shall be as specified in respective items. The sub-grade shall be thoroughly wetted after cleaning of all dirt, laitance and loose material. A bed of lime mortar consisting of one part of lime and two part of sand shall be laid and properly levelled to an average thickness of 25mm and the surface shall be kept slightly rough to form a satisfactory key for tiles. Neat



cement paste of honey-like consistency shall be spread over mortar bed, over such area at a time as would accommodate about 20 tiles. Tiles shall be soaked in water for 15 minutes and allowed to dry for the same duration. Tiles shall then be fixed with a thin coat of cement paste on back of each tile and then each tile being gently tapped with a wooden mallet till it is properly bedded in proper line & slope and in level with adjoining tiles. Joints shall be fine and as imperceptible as possible.

After tiles have been laid in a room or day's fixing work is completed, surplus cement grout that may have come out of the joints may be wiped off gently and joints cleaned. A thin slurry of Coloured cement matching to the Colour of tiles shall be spread over it and rubbed so as to seal even the thinnest joint between the tiles and make it impervious and the flooring cured for 7 days. Tiles shall be polished and finished according to IS:1443 & instruction of Engineer-in-charge.

a) Dado, Skirting and Risers

The tiles shall conform to IS:1237 and shall be of approved design. The tiles shall be fixed with neat cement grout on backing coat consisting of 1:4 cement sand plaster of 15mm to 20mm thick. The top and bottom junctions of tiles shall be rounded off neatly as directed. The joints shall be filled with matching shade Coloured cement slurry. The surface shall be kept wet for 7 days, and then polished with carborundum stone to obtain smooth surface and fine polish. The tiles shall be polished & finished according to IS:1443 & instruction of Engineer-in-charge.

MARBLE, MOSAIC/TERRAZZO IN-SITU WORK IN FLOORING,
DADO, SKIRTING ETC

The terrazzo/mosaic finish shall be laid on an under layer of thickness as specified in the respective items. In addition to the under layer, unless otherwise specified, a cushioning layer of lime mortar or lime concrete with brick bat aggregate of specified proportion shall also be provided to the specified thickness. The topping shall consist of a layer of marble chips of



selected sizes, Colour and design approved by shall be mixed with cement with desired shade of pigment. For lighter shade mosaic/terrazzo white cement shall be used and for neutral shade, grey cement shall be used. The proportion of terrazzo mix shall be three parts of cement and one part of marble powder by weight. For mix every part of cement marble powder- the proportion of marble aggregate by volume shall be 1-1/2 parts unless otherwise specified. The topping shall be mixed and laid in panels as described in IS:2114 and as per decorative designs prepared by consultants. The dividing strips of panels shall be Aluminium or as specified in the schedule of quantities. It shall be polished as specified in IS:2114 & instruction of Engineer-in-charge.

WHITE GLAZED TILES IN FLOORING AND DADO

White glazed tiles from approved manufacturer shall be used. They shall be of specified size and thickness. All specials viz., cover, internal and external angles, corners, beads etc. shall be used wherever directed. Under layer of specified thickness and mortar of stipulated portion shall be laid as described in marble, mosaic flooring. Tiles shall be washed clean and set in cement grout and each tile being gently tapped with a wooden mallet till it is properly bedded and in proper line & slope in level with the adjoining tiles. The joints shall be kept as thin as possible and in straight lines or to suit the required pattern. After the tiles have been laid, surplus cement grout shall be cleaned off. The joints shall be cleaned off the grey cement grout with a wire brush or trowel to a depth of 5mm (3/16") and all dust and loose mortar removed. Joints shall then be flushed pointed with white cement. The floor shall then be kept wet for seven days. After curing, the surface shall be washed with mild hydrochloric acid and clean water. The finished floor shall not sound hollow when tapped with a wooden mallet.

PVC TILE FLOORING

The thickness and size of tiles used for flooring shall be as per the item of works and shall be manufactured by standard approved



manufacturer. The base over which the tiles are to be laid shall be finished smooth to receive the tiles. The surface shall be thoroughly cleaned and made dry before laying the tiles. The tiles shall be laid in position with an approved brand of adhesive and used in accordance with manufacturer's direction. Tiles shall be laid by skilled workmen experienced in this class of work in a workmanlike manner. Tiles shall be carefully butted together cut into corners and angle and showing even margins. The joints between the tiles shall be as fine as possible and uniform throughout.

PVC tiles skirting shall be done with the tiles fully matching to tile flooring.

6.13 STEEL DOORS, WINDOWS, VENTILATORS, ROLLING SHUTTERS, MS GRILLS ETC.

STEEL DOORS, WINDOWS & VENTILATORS

Steel used in the manufacture of rolled steel sections shall not have more than 0.060 percent of sulphur and 0.060 percent of phosphorous. The carbon content shall not exceed 0.20 percent and shall be of weldable quality. In all other respects, the rolled steel sections shall conform to relevant IS code.

Frames shall be square and flat. Both the fixed and openable frames shall be constructed of sections, which have been cut to length, mitred and electrically welded at corners. Sub-dividing bar units shall be tonned and riveted into the frames. All frames shall have the corners welded to a true right angle and welds shall be neatly cleaned off. Couplings, mullions, transom and weather bar shall be provided as directed by the Engineer-in-charge.

Outer frames shall be provided with fixing holes centrally in the web of the sections and fixing screws and lugs shall be used for fixing the frame to masonry. Mastic cement shall be used for making the joints watertight.

Hinges shall be strong projecting type. If directed friction type hinges shall be used in which case windows shall not be fitted with peg stays.



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Projecting type hinged shutter shall be fitted with bronze or brass peg stays, 30cm. long with pegs and brackets welded/riveted to the frame.

All windows shall be provided with handles of brass or bronze.

Top hung ventilators shall be fixed with plain hinges riveted/welded to the fixed frame. A brass or bronze peg stay 30cm. long in windows shall be provided.

Centre hung ventilators shall be hung on two pairs of brass or leaded tin bronze cup pivots riveted to the inner and outer frames of the ventilators to permit the ventilators to swing through an angle of approximately 85 degree. The opening position of the ventilators shall be so balanced to keep it open at any desired angle under normal weather conditions. A bronze spring catch shall be fitted in the centre of the top bar of the ventilator for the operation of the ventilator. This spring catch shall be secured to the frame with brass screws and shall close into a mild steel malleable form catch plate riveted or welded to outside of the outer ventilator frame bar. A brass cord pulley wheel in mild steel or malleable iron brackets shall be provided along with cord eye.

The windows and ventilators shall be painted. All the steel surfaces shall be thoroughly cleaned free of rust, scale or dirt and mill scale by picking or phosphating and before erection painted with one coat of approved primer and after erection painted with two finishing coats of synthetic enamel paint of approved shade and quality.

Glazing of specified thickness shall be provided on the outside of frames and unless otherwise specified, metal beadings of approved shape and section shall be used for fixing glasses. Special metal sash putty of approved make shall be used, if directed.

ROLLING SHUTTERS

Shall be from approved manufacture suitable for fixing in the position ordered i.e. outside, inside, on or below lintel or between Jambs. Shutters upto 12 Sq.m (130 Sq.ft.) in area shall be manually operated or 'Push up' type while



bigger sizes shall be of reduction gear type mechanically operated by chain or handles.

These shall consist of 8 gauge sheet or as specified with 75mm (3") MS laths of best quality mild steel strip machine rolled and straightened with an effective bridge depth of 16mm (5/8") and shall have convex corrugation. These shall be interlocked together throughout their entire length with end locks. These shall be mounted on specially designed pipe shaft.

The springs shall be of approved make coiled type. These shall be manufactured from tested high tensile spring steel wire or strip of adequate strength to balance the shutters in position. The spring pipe shaft etc. shall be supported on strong MS or malleable cast iron brackets. Hoods shall be formed of not less than 20 gauge steel, suitably reinforced to prevent sag.

COLLAPSIBLE GATES

These shall be double or single collapsible gates depending upon the size of the opening. These shall consist of vertical channels 20x10x2mm at 10cm centres braced with flat iron diagonals 20x5mm and top and bottom rails of T-iron 40x40x6 mm with 38mm dia. steel pulleys or ball bearing in every 4th double channels, unless otherwise specified. Where collapsible gate is not provided within the opening and is fixed along the outer surface T-iron at the top may be replaced by flat iron 40x10mm. The collapsible gate shall be provided with necessary bolts and nuts, locking arrangement stoppers and handles. Any special fittings like springs, catches and locks shall be provided as described in the nomenclature of item in the schedule of quantities.

a) Fixing

T-iron shall be fixed to floor and lintel by means of anchor bolts at 45cm centre alternatively in two flanges of T-iron embedded in cement concrete of floor and lintel. The bottom runner shall be embedded in floor and proper groove formed along the runner for the purpose. The collapsible shutter on the sides shall be fixed by fixing the end double channels with T-



iron rails and also by hold-fasts bolts to the end double channel and fixed in masonry of the side on the other side.

MS GRILLS

MS Grills shall be of required patterns in windows etc. and shall be made of MS flats, square or round bars and framed all around. It shall be properly welded, bolted and grouted in walls or fixed with windows/ventilators frame. Grouting shall be done with at least 4 clamps 150mm long grouted with cement concrete (1:2:4).

6.14 ALUMINIUM DOORS, WINDOWS AND GLAZING

a) Structural Sufficiency

All door, windows and ventilators shall be manufactured from standard extruded section of approved, appropriate sizes suitable for the particular type and size of glazing unit. Detailed shop drawing indicating the full design of every type and unit shall be furnished for approval before undertaking the work. Tenderer shall assume full responsibility regarding soundness of various units and adequacy of the sections used for the particular sizes required to provide appropriate stiffness and strength. If in the opinion of the Engineer-in charge deficiencies in the section used are found, the tenderer shall replace the glazing units made of approved section at his own cost.

b) General

i) The unit assemblies shall be as per drawings or as directed by the Engineer-in-charge.

ii) The unit assemblies shall be anodised finish. Anodising shall be 20 to 25 microns thick of mat texture non-directional and non-specular. Anodised surface shall be suitably protected during transportation, storage and erection.

iii) The unit shall be joined together by concealed screws. Jamb members shall be self-mulling type obviating use of separate mullions.

iv) Joints shall either be mitred or coped. Mitred joints shall have extruded corner reinforcements. All joints shall be neat, hairline and sealed with epoxy resin to make them water proof.

v) Openable shutters shall have a single row continuous neoprene or PVC weather strips to prevent air infiltration. Weather strips shall not be



interrupted by any fittings.

vi) All windows shall be glazed from inside with PVC rubber. Glazing beads shall be snap fit and shall be fitted without use of screws. No screws other than those on some of the hard ware shall be visible.

vii) Glass in windows shall be 4mm thick and for doors and glazing 5.5mm thick of sheet glass of selected quality.

6.15 SPECIFICATION FOR CARPENTRY AND JOINERY

Timber used shall conform to specifications described under 'Materials'. Fixtures for doors, windows, furniture, etc. shall be as given below: Schedule of hardware fittings for doors shall be decided as per direction of Engineer in Charge.

SCHEDULE OF HARDWARE FITTINGS

a) General

The fittings shall be of iron/brass/aluminium or as specified. These shall be well made, smooth and free from sharp edges, flaws and other defects, screw holes shall be counter sunk to suit the head of the wood screws. All hinge pins shall be of steel with riveted heads.

- i) Iron fittings shall be bright finished or black enamelled or copper oxidised.
- ii) Brass fittings shall be bright finished brass, oxidised, or chromium plated.
- iii) Aluminium fittings shall be bright, finished anodised in choice shade or as specified.

The screw used shall be of the same metal and finished as the fittings and shall be of the required size. For aluminium fittings anodised steel screws shall be used. The screw shall be driven with a screwdriver and not hammered.

b) Butt Hinges

Shall be heavy quality of mild steel, brass, brass oxidised aluminium or as specified. Butt hinges shall be cranked.

Brass and steel butt hinges shall conform to IS 205-1966. MS butt hinges shall be made from sheets, aluminium and brass hinges shall be extruded type and made from extruded sections.



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c) Tower Bolts

Tower bolts shall be of mild steel, brass oxidised or aluminium as specified:

- i) Plate and straps shall be riveted, the barrel bolt shall be cast including the knob.
- ii) Brass Tower Bolts: The bolt with knob shall be cast and rolled and shall be made in one piece.
- iii) Aluminium Tower Bolts: Shall be made out of extruded sections. Knob shall be screwed to the bolt and riveted at the back.

d) Sliding Door Bolts (Aldrop)

These shall be of metal as specified, and shall have smooth sliding action. MS and brass sliding bolts shall conform to IS 281-1973.

Brass sliding bolts shall be made from rolled brass. The hasp and the bolt shall be in one piece. The fixing and staple bolts shall be cast 6 mm studs and shall be threaded, provided with round washers and nuts of square or hexagonal shape.

e) Handles

- i) Iron Handles - shall be of the size specified and shall be made out of sheet steel pressed into oval section. They shall conform to IS 208 - 1972 and shall be fixed with 2.5 cm long screws.
- ii) Brass Handles - shall of the specified size, shape and pattern made out of cast brass. They shall conform to IS 208 - 1972 and shall be fixed with 2.5 cm long screws.
- iii) Aluminium Handles - shall be of size specified finished bright or anodised made out of cast aluminium to shape and pattern required. These shall be fixed with 2.5 cm long screws.

f) Mortice lock

Mortice lock with latch and a pair of lever handles shall have steel casing and brass bolts and shall be right or left handles as required. It shall be of approved make and quality. The lock for single leaf door shall have plain face and for double leaf a rebated face. The lever handles with spring shall be mounted on plates and shall be bright brass finished or chromium plated or oxidised as approved.

g) Mortice Latch



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Mortice latch with one dead bolt and a pair of lever handles shall have steel casing and brass bolt, right or left handed as required. It shall be of approved make and quality. The latch for single leaf door shall be mounted on plates and finished brass bright chromium plated or oxidised as approved.

h) Floor Door Stopper

Shall be of shape, pattern and size specified of cast brass with a rubber cushion. It shall be brass finished right, chromium plated or oxidised as approved. The length of the plate shall determine the size of floor door stopper.

WORKMANSHIP

The work shall be done by skilled carpenters as per details shown on drawing or instructed by the Engineer-in-charge. Framing timber and other work shall be close fitting with proper wood joinery, accurately set to required lines or levels and rigidly secured in place. The surface of frame etc. which shall come in contact with masonry after fixing shall be given two coats of approved paint before fixing. Mastic caulking shall be done after fixing external door and window frames.

Special care shall be taken to match the grain of timber of plywood, which shall be subsequently polished. Screwing or nailing shall not be permitted to the edge of plywood or chipboard sheets. All exposed plywood edges shall be finished with teakwood lipping unless otherwise shown on drawings.

Fixing of frames and partitions shall generally be with 40 mm x 6 mm x 300 mm long MS hold-fasts bifurcated at end and grouted with 1:2:4 cement concrete. The gap between masonry and external door and window frame shall be caulked with mastic. MS grills or guard bars shall be provided to windows where called for in the drawings or schedule of items.

All carpentry work after finishing shall be sand papered smooth. A prime coat of paint shall be given after inspection of the Engineer-in-charge to all surfaces other than those which shall be subsequently polished or covered with laminated plastic sheet.



ACCEPTANCE CRITERIA

All frames shall be square and flat at the time of delivery and shall be checked for dimensions and corner angles. After fixing they shall be on a fine vertical plane. All external door and window frames shall be caulked with mastic.

Door and Window Shutters shall be of proper size, shape and design and free of warp. When fixed to frames, these shall operate smoothly without jamming and all latching or locking devices shall engage properly without pressure.

6.16 ROOF WATERPROOFING, INSULATION AND ALLIED WORKS

This specification covers providing, laying, repairing, finishing, curing, testing, protection, maintenance till handing over of roof waterproofing, insulation and allied works for buildings and at locations covered under the scope of the tenderer.

GRADING UNDERBED

The surface to receive the underbed shall be roughened and thoroughly cleaned with wire brush and water. The joints in case of pre-cast planks used for roofing shall be thoroughly filled in with 1: 2 cement mortar using 'Impermo' or approved water-proofing compound. Oil patches, if any, shall be removed with detergent. The surface shall be soaked with water and all excess water removed just before laying of the underbed.

The underbed shall not be laid under direct hot sun and shall be kept in shade immediately after laying so as to avoid quick loss of water from the mix and separation from the roof surface. The underbed shall be cured under water for at least 7 days.

The underbed shall be laid to provide an ultimate run-off gradient not less than 1 in 120 and as directed by the Engineer-in-charge. Upto an average thickness of 25 mm the underbed shall usually be composed of cement and sand plaster. For higher thickness the underbed shall be made with cement concrete



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The underbed shall be finished to receive the water-proofing treatment direct or insulation as the case may be.

The grading plaster shall be average 25 mm thick maximum. It shall consist of cement and coarse sand in the ratio 1 : 4 nominal by volume. The sand and cement shall be thoroughly mixed dry and then water added. Each batch of mix shall be consumed before the initial set starts.

The plaster shall be fully compacted to the desired grade in continuous operation. The surface shall be even and reasonably smooth.

Concrete shall be used where the sub-grade is more than average 25 mm thick. It shall consist of cement concrete 1: 2: 4 nominal mix by volume with 12 mm down stone chips and coarse sand. The aggregate shall be mixed dry and minimum quantity of water shall be added to make the mix workable.

The mix shall be laid to proper grade, fully consolidated and surface shall be smooth and even.

INSULATION

Where roof insulation is required, detailed proposals for its type, supply and installation shall be submitted to the Engineer-in-charge for approval.

FILLETS

Fillets at junction of roofs and vertical walls shall be provided with the same insulating material as provided for the main roof insulation. The fillets shall be 150 mm x 150 mm in size unless otherwise shown on drawings or instructed by the Engineer-in-charge.

Where there is no insulation over roof slab, fillets shall be cast in situ cement concrete (1:2:4) nominal mix by the volume.

INSTALLATION

Water-proofing with felt lining

- a) Bitumen felt type-3, grade-I water proofing (4 layers finished with asphalt/ crushed stone chips and/or gravel).
- i) A layer of special roofing asphalt @ 1.45 Kg per sq.m.



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- ii) A layers of bitumen felt Hessian based self finished felt type-3, grade-1, of approved make.
- iii) A layer of special roofing asphalt @ 1.45 Kg per sq.m.
- iv) A layer of crushed pea size stone chips and/or gravel.
- b) Bitumen felt type-3, grade-I water proofing (3 layers) with surface painted with asphalt and finished with brick tiles.
 - i) A layer of special roofing asphalt @ 1.45 Kg per sq.m.
 - ii) A layers of bitumen felt Hessian based self finished felt type-3, grade-1, of approved make.
 - (iii) A layer of special roofing asphalt @ 1.45 Kg per sq.m.

After specifications (b) has been laid, it shall be protected with tiles and every care is to be taken while laying the brick or stone tiles so that the waterproofing is not damaged or punctured by the sharp edged implements or bricks, stone or walling over it with some shoes having nails etc.

GUARANTEE

The tenderer through the specialised agency of sub Contractor shall give a guarantee against any leakage for 10 years. Any leakage or defects during this period shall be made good by the tenderer through the sub Contractor at his own cost in a manner to be decided by the Engineer-in-charge, to their entire satisfaction.

WATERPROOFING ROOFS WITH EXPANDED POLYETHYLENE KINIFOAM

- a) A layer of bituminous primer @ 0.4 kg per sq.m.
- b) A layer of semi hot asphalt blown grade 85/25 or 90/15 @ 1.8 Kg/sq.m.
- c) A layer of 2 mm thick expanded Polyethylene, KINIFOAM.
- d) A layer of Neoprene adhesive @ 300 to 350 ml. per sq.m.
- e) A layer of 2 mm thick expanded polyethylene KINIFOAM.

INSULATING AND WATERPROOFING ROOF TERRACES OF AIR CONDITION

- a) A layer of bituminous primer @ 0.4 kg per sq.m.
- b) A layer of semi hot asphalt blown grade 85/25 or 90/15 @ 1.8 kg



per sq.m.

- c) A layer of 6 mm thick expanded Polyethylene, KINIFOAM.
- d) A layer of Neoprene adhesive @ 300 to 350 ml. per sq.m.
- e) A layer of 6 mm thick expanded polyethylene KINIFOAM.
- f) A layer of Neoprene adhesive @ 300 to 350 ml. per sq.m.
- g) A layer of 6 mm thick expanded polyethylene KINIFOAM.
- h) Roof grading concrete laid to slope as specified.
- i) Brick tile/ or precast cement tile/ or precast Terrazo tile or china mosaic treatment.

PROTECTION TREATMENT IN TERRACES SOLAR HEAT AND MOISTURE CHINA MOSAIC 3 LAYER TREATMENT

Preparation of surface - The final roof terrace after water proofing shall be smooth finished with cement plaster 1:4 (1 cement : 4 fine sand) to receive the following treatment.

- a) A layer of BRC primer @ 0.2 litres per sq.m.
- b) A layers roofing asphalt @ 1.45 kg per sq.m.
- c) A layer of broken glazed tiles of odd sizes and shape with as close joints as possible grouted with white cement.

ACCEPTANCE CRITERIA

The surface level shall be such as to allow quick draining of water without leaving any pool anywhere. The finishing course shall be fully secured and shall have an even density. There shall not be any bubble formation or crushed or squeezed insulation on underbed.

The tenderer shall give a guarantee in writing for all works executed under this specification supplemented by a separate and unilateral guarantee from the specialised agency for the roof water-proofing treatment work. The guarantee shall be for material and workmanship for five (5) years in case of normal treatment, ten (10) years for heavy treatment and twenty (20) years for extra heavy treatment. The mode of execution of the guarantee shall be acceptable to the Owner.

6.17 DRAINAGE AND SANITARY FIXTURE



SCOPE

This section covers the layout and construction of drains for foul water and surface water together with all fittings and fixtures and inclusive of ancillary works, such as connections, man-holes and inspection chambers used within the building and from the building to the existing available connections. The scope is also inclusive of supply, erection of all supply to be taken from the terminal points to the respective buildings, conveyer galleries etc.

RAINWATER DOWN TAKE PIPES

Rainwater down take pipes shall be standard Cast Iron Pipes. Rainwater down comers shall run along and be secured to walls, columns etc. Where desired by the Engineer-in-Charge these may have to be installed in chases cut in the structure. All pipes shall be well secured and supported by adequately strong brackets. The brackets may be wrought iron cleaves type, splintering type or perforated strap iron type as approved by the Engineer-in-Charge. For vertical runs each pipe shall hang freely on its bracket fixed just below the socket, suitable spacer blocks shall be provided against the vertical surface to which the pipe is fixed. All bends and junctions shall be supplied with watertight clean outs/ doors.

Roof and floor drains and yard gullies shall be installed, if required, by cutting up to the structure and grouted with 1:2:4 cement concrete. All gutters shall be provided with removable gratings.

All horizontal pipes shall have a minimum slope of 1 in 100.

GUTTERS

The gutters shall be made of GI. Each section shall be sufficiently uniform having rigid edges and corners. The GI gutters shall have the edges strengthened by suitable means. Unless noted otherwise the gutters shall have a minimum fall of 1 in 120. Adequate number of strong supports shall be provided so that there is no deflection even when the gutter is full. Each joint must have a support. Unless otherwise specified the supports shall be fabricated of MS brackets. All junctions shall be thoroughly watertight. The



joints may be made by riveting, bolting or soldering. All joints between successive lengths of gutters shall have an overlap of at least 5 CM. The drop in the overlap shall always be in the direction of the fall of the gutter. Ends of gutters shall be watertight. Junction with rainwater down take pipes shall be made fully water tight and secured.

SOIL & DRAINAGE PIPES GRADIENTS

If not specified the minimum gradients of soil and drainage pipe line shall be as follows:

100mm nominal dia : 1
in 35
150mm nominal
dia : 1 in 65
230mm
nominal dia : 1 in 120
300mm nominal dia : 1
in 200

Relation with Water Supply Pipelines: Under no circumstances, unless specifically cleared by the Engineer-in-Charge in special circumstances, drainage and soil pipes shall be allowed to come close to water supply pipelines.

LAYING

Each separated pipe shall be individually set for line, level, plumb etc. Where lengths of sewer or drain pipes are laid in trench, properly painted sight rails shall be fixed across the trench at suitable intervals and levels according to the gradient to be provided and length of the boning rod to be used above the required invert level of the drain or sewer at the point where the sight rail is fixed. More sight rails shall be required at manholes, change of gradient and intermediate positions if the distance for sighting is too far, which shall not be more than 15M apart. The excavation shall be boned in at least once in every 2 meter. The foot of the boning rod shall be set on a block of wood of the exact thickness of the wall of the pipe. Each pipe shall be separately and accurately boned between sight rails.

SUPPORT & PROTECTION TO PIPELINES



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All drainage and sewer pipes shall be laid with sockets leading uphill. Preferably the pipes shall rest on solid and even foundations for the full length of the barrel. However, the pipe manufacturer's instruction as approved by the Engineer-in- Charge shall be followed in the matter of support and jointing.

For others, to achieve full and continuous support, concrete for bedding and packing is the best. Where pipes are not bedded on concrete, the floor shall be left slightly high and carefully bottomed up as pipe-laying proceeds so that the pipe barrels rest on undisturbed ground. If anywhere the excavation has been carried too low, the packing shall be done in concrete. Where laid on rock or very hard ground that cannot be easily excavated to a smooth surface, the pipes shall be laid on a cradle of fine concrete floor or floor of gravel and crushed stone bed only as desired by the Engineer-in-charge so as to install even on bearing. PVC or similar pipes shall be laid directly on stable soil and packed with selected soil.

The minimum support and protection for glazed stoneware pipes shall be as follows:

- a) When cover is less than 1 M below ground level and where pipes are unavoidably exposed just above ground surface, the pipes shall be completely encased or surrounded with concrete.
- b) Where the pipes are laid on a soft soil with the maximum water table lying at the invert of the pipe, the pipe shall be bedded on concrete.
- c) Where the pipes have to be laid on a soft soil with the maximum water table rising above the invert of the pipe, but below the top of the barrel, the pipe sewer shall be launched.
- d) Where the maximum water table is likely to rise above the top of the barrel or wherever the pipe is laid on soft soil, the pipe sewers shall be completely encased or surrounded with concrete.

Cast Iron pipes and concrete pipes may be supported on suitable concrete or brick support, where specified. The supports shall be unyielding and strong enough. At least one support shall be located close to each joint. Spacing of intermediate supports shall be as desired by the Engineer-in-Charge. Pipes shall be secured to the supports by approved means.



Anchoring of pipes where necessary shall be achieved by suitably concrete encasing designed for the expected thrust.

ENTRY INTO STRUCTURES

For entry of the pipelines into any building or structures suitable conduits across the structures or sleeves shall be used. The conduits and sleeves shall be such as to allow easy repairs and replacement of the pipes.

When openings or chases are required to be made in the structure for entry of pipelines, locations and sizes shall be marked and checked by the Engineer-in- Charge. After laying of the pipeline the openings and chases shall be mended.

DUCTS

Where soil, waste and ventilating pipes are accommodated in ducts, access to cleaning eyes shall be provided. Connection to drain shall be through a gully with sealed cover to guard against ingress of sewer gas, vermin or back flow.

TRAPS & VENTILATING PIPES

Pipes for carrying off the waste from water closets and waste water and overflow water from baths, wash basins, sinks to drains shall be trapped immediately beneath such fixtures. Traps shall have minimum water seal of 50mm and shall be ventilated whenever such ventilation is necessary to maintain water seal of the trap.

Ventilating pipes shall be carried up vertically from the drain to a height of at least 600mm above the outer covering of the roof of the building. All vertical ventilating, anti-syphonage and similar pipe shall be covered on top with a crown. The cowl shall be made of CI, unless desired otherwise by the Engineer-in-Charge.

MANHOLES & INSPECTION CHAMBERS

The maximum distance between manholes shall be 30 m unless specially permitted otherwise. In addition, at every change of alignment gradient of diameter there shall be a manhole for inspection chamber. The distance between manhole or inspection chamber and gully chamber shall not



exceed 6 meters unless desired otherwise. Manhole shall be constructed so as to be watertight under test. The benching at the sides shall be carried out in such a manner as to provide no lodgement for any splashing in case of accidental flashing of the chamber. The channel or drain at the bottom of chamber shall be plastered with 1:2 cement, sand mortar and finished smooth to the grade. The channels and drains shall be shaped and laid to provide smooth flow. Connection to existing sewer lines shall be through a manhole.

Manholes shall be provided with standard covers, usually CI or as desired by the Engineer-in-Charge. The covers shall be close fitting so as to prevent gases from coming out.

CUTTING OF PIPES

Manufacturer's instruction shall be followed for cutting of pipes where necessary. Suitable and approved tools shall be used for cutting so as to leave clean and square surface to the exit of the pipe.

JOINTING

Jointing of laid pipes shall be so planned as to completely avoid any movement or strain to the joint already made. If any joint is suspected to be damaged, it shall be opened out and redone.

All joints between pipes, pipes and fittings and manholes shall be leak proof (gas tight watertight) method of jointing shall be as per instruction of the pipe and fittings manufacturer and as approved by the Engineer-in-Charge. However, in the absence of any instruction available from the manufacturer the methods as detailed hereunder shall be used :

a) Cast Iron Pipes

Socket and spigot pipes shall be joined by cast lead joints. The spigot shall be centred in the socket of the next pipe by tightly caulking in sufficient turns of tarred gasket or hemp yarn to have unfilled half the depth of socket. When the gasket or hemp yarn has been caulked tightly a jointing ring shall be placed round the barrel and tightened against the face of the socket to prevent airlock. Molten lead shall then be poured in to fill the remainder of the socket and



caulked (with suitable tools), tight around the joint to make up for shrinkage of the molten metal on cooling and shall be finished 3mm behind the socket face.

In special cases if flanged joints are accepted by the Engineer-in-Charge the joints shall be made leak proof by inserting approved type of rubber or other gaskets not less than 1.5mm thick. The bolts shall be secured in stages to avoid uneven strain. Damaged gaskets shall be replaced.

b) Glazed Stoneware Pipes

Tarred gasket or hemp yarn soaked in thick cement slurry first be placed round the spigot of each pipe and the spigot shall then be placed into the socket of the pipe previously laid. The pipe shall then be adjusted and fixed in the correct position and the gasket caulked tightly so as to fill 1/4 of the total depth of the socket and the remaining shall be filled and packed with a stiff mixture of cement mortar of 1:1 proportion. When the socket is filled, a fillet shall be formed round the joint with a trowel, forming an angle of 45 Degree with the barrel of the pipe. The newly made joints shall be protected, until set, from sun and rain and shall be covered with damp sacking or other suitable materials.

c) Jointing Cast Iron Pipes with Stoneware Pipes

Where any cast iron soil pipe, ventilating pipe or trap is connected with a stoneware or semi vitrified waste pipe or drain communicating with a sewer, the bedded spigot end of such cast iron soil pipe, waste-pipe or ventilating-pipe or trap shall be inserted into a socket of such stoneware pipe or drain and the joint made with mortar consisting of one part of cement and one part of clean and sharp sand after placing a tarred gasket or hemp yarn soaked in neat cement slurry round the joint and inserted in it by means of caulking tool.

d) Jointing Stoneware with Cast Iron Pipes

Where any water closet pan or earthenware trap connected to such a pan is to be jointed with a cast iron soil pipe, the joint between the stoneware spigot and the cast iron socket shall always be made of a flexible



nature. Such joint shall be made with a mixture of bitumen and chopped asbestos fibre.

TRENCHES & OTHER EXCAVATIONS

Width of the trench at the bottom shall be such as to provide 200mm clearance on either side of the pipe for facility of laying and jointing. Excavated material shall be stacked sufficiently away from the edge of the trench and the side of the bank shall not be allowed to become such as to endanger the stability of the excavation. Spoil may be carted away and used for filling the trench behind the work. All excavations shall be properly timbered where necessary. Efficient arrangements for dewatering during excavation and keeping it dry till back filling done shall be made to the satisfaction of the Engineer-in-Charge. Sumps for the dewatering shall be located clear of the pipe layout.

Special care shall be taken not to damage underground services, cables etc. These when exposed shall be kept adequately supported till the trench is back filled. The back filling shall be done after the pipeline has been tested and approved by the Engineer-in-Charge. Special care shall be taken to pack under the side of the pipe hand packed thoroughly with selected material. At least 300mm over the pipe shall also be filled with soft earth or sand. Consolidation shall be done in 150mm layers. The surface water shall be prevented from getting into the filled up trench. Traffic shall not be inconvenienced by heaping up unduly the back filling material to compensate future settlements shall be made good regularly to minimize inconvenience of traffic where applicable.

FIXTURES

The tenderer shall mention in his contract the type and manufacturer of the fixture he intends to use enclosing manufacturer's current catalogues. In the absence of any such agreement the Engineer-in-Charge shall be at liberty to choose any type and make.

All fixtures and fittings shall be of approved quality and type manufactured by well known manufacturers. All items brought to the site must bear identification mark of the type and manufacturer. Procurement



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shall be made well in advance and got inspected and approved immediately by Engineer-in-Charge. All fixtures shall be adequately protected, covered and plugged till handed over. All fittings, gratings, fasteners, unless specified otherwise, shall be chromium plated.

Unless specified in the contract, the fixture shall be as specified hereinafter:

a) Water Closet (Raised Type)

It shall include glazed stoneware basin with siphon, open front solid plastic seat, plastic cover, low level glazed stoneware flushing cistern with valveless fittings, supply connections and necessary fittings. All fittings shall be chromium plated. Colour of basin, cistern, seat and cover shall be as desired by the Engineer-in-charge.

b) Water Closet (Squatting Type)

It shall include glazed stoneware pan with foot rests and high level cast iron flushing cistern with valveless fittings supply connections and necessary fittings. All fittings shall be chromium plated. The foot rests shall be made of white glazed stoneware with chequered surface. The flushing cistern shall be painted as desired by the Engineer-in-charge.

c) Urinals

It shall consist of wall type glazed stoneware urinals, cast iron automatic flushing cistern complete with supply connections, flush pipe, lead pipes, gratings, traps and all other necessary fittings. Automatic flushing shall be approximately once every five minutes. A number of urinals located together may be served by one cistern of adequate capacity. All fittings shall be chrome plated.

d) Wash Basins

It shall be made of glazed stoneware. The basin shall be flat back, wall hung by painted cast iron brackets and complete with pattern with hot and cold brass faucets with nylon washers, chain waste, waste washers, lead waste pipe with traps, perforated waste complete with necessary fittings. All fittings including faucets shall be chromium plated.

e) Sink

It shall be made of glazed stoneware. It shall be wall hung by painted cast iron brackets and complete with one brass faucets with nylon



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washers, chain waste, waste washers, lead waste pipes with traps perforated waste with necessary fittings. All fittings including faucets shall be chromium plated.

f) Bathroom Mirror

It shall be made of the best quality 6 mm thick indigenous glass and produced by a reputed mirror manufacturer. It shall be wall mounted with adjustable revolving brackets. The brackets, screws and other fittings shall be chromium plated.

g) Glass Shelves

Glass shelves shall consist of 6 mm thick clear glass with guard rails and shall be wall mounted with brackets. All brackets, guard-rails and screws shall be chromium plated.

h) Towel Rail

Towel rails shall be 20 mm dia. chromium plated M.S. pipes wall mounted with chromium-plated screws.

i) Liquid Soap Dispenser

It shall be round and easily revolving with removable threaded nozzle. The body, bracket for wall mounting and screws shall be chromium plated.

j) Toilet Roll Holder

It shall be made of strong members with suitable cover cum cutter. The whole item including wall mounting screws shall be chromium plated.

k) Installation

All plumbing fittings and fixtures shall be installed in most workmanlike manner by skilled workers. These shall be perfect in level, plumb, plane, location and symmetry. All items shall be securely anchored to walls and floors. All cuttings in walls and floors shall be made good by the tenderer.

SEPTIC TANK & EFFLUENT DISPOSAL

a) Septic Tank

Septic tank shall consist of the tank itself with inlet and outlets there from complete with all necessary earthwork and backfilling. The details of septic tank shall be as shown on drawings. This item shall also include



ventilating pipe of at least 100 mm dia whose top shall be provided with a suitable mosquito proof wire mesh and cowl. Ventilating pipe shall extend to a height of about 2 metre when the septic tank is at least 15 metre away from the nearest building and to a height of 2 metre above the top of building when it is located closer than 15 metre. Ventilating pipes can be connected to the normal soil ventilating system of the building where allowed.

b) Effluent Disposal

The effluent from the septic tank shall be disposed by allowing it into the open channel or a body of water if the concerned authority approves or into a soak pit for absorption by soil or shall be allowed to be absorbed by soil through open jointed S. W. pipes laid in a trench filled with broken bricks.

i) Soak Pit

The soak pit shall be complete as shown on drawing. In absence of a detailed drawing it shall consist of a 900 mm dia pit 1000 mm in depth below the invert level of the inlet pipe. The pit shall be lined with stone, brick concrete blocks set in cement mortar (1.6) and filled with brick bats. Inlet pipe shall be taken down to a depth of 900 mm from the top as an anti-mosquito measure.

ii) Open Jointed S.W. Pipe

Minimum dia of the S. W. pipes shall be 200 mm nominal. The trench for laying the pipes shall be minimum 600x600 mm sizes. The joints of the pipes shall be left unsealed.

c) Commissioning of Septic Tank

After the septic tank is proved water-tight and the sewage system is checked the tank shall be filled with water to its outlet level before the sewage is let into the tank. It shall be seeded with well-digested sludge obtained from septic tank or sludge digestion tank. In the absence of digested sludge a small quantity of decaying organic matter such as digested cow-dung may be introduced.

TESTING & ACCEPTANCE

i) Inspection before Installation



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All pipes, fittings and fixtures shall be inspected before delivery at the site to see whether they conform to accepted standards. The pipes shall again be inspected on site before laying by sounding to disclose cracks. All defective items shall be clearly marked and forthwith removed from the site.

ii) Testing of Pipelines for Drainage & Sanitation

Comprehensive test of all pipe lines shall be made by simulating conditions of use. The method of actual tests shall be as per relevant IS code and decided by the Engineer-in-charge. All test data shall be recorded and submitted to the Engineer-in-Charge for review and instruction.

iii) General guidance for the tests are given below:

a) Smoke Test

All soil pipes, waste pipes and vent pipes and all other pipes shall be approved gas-tight after a smoke test conducted under the required pressure and maintained for 15 minutes after all trap seals have been filled with water. The smoke is produced by burning oily waste or tar paper or similar material in the combustion chamber of a smoke machine. Chemical smokes are not satisfactory.

b) Water Test for Pipes other than Cast Iron

Glazed ware pipes shall be subjected to the required test pressure. The tolerance figure of two litres per centimetre of diameter per kilometre may be allowed during a period of 10 minutes. The test shall be carried out by suitably plugging the low end of the pipe/drain and the points of connections, if any and filling the system with water. A knuckle bend shall be temporarily jointed at the top and a sufficient length of the vertical pipe jointed to it so as to provide the required test.

Head of the top end may be plugged with a connection to a hose ending in a funnel which could be raised or lowered till the required head is obtained and fixed suitably for observation.

Subsidence of test water may be due to one or more of the following causes:



- Absorption by pipes and joints
- Sweating of pipes or joints
- Leakage at joints or from defective pipes
- Trapped air.

Allowance shall be made for Absorption by pipes and joints by adding water until absorption has ceased and after which the test proper should commence. Any leakage and the defective part of the work shall be cut out and made good.

6.18 For Cast Iron

Cast Iron sewers and drains shall be tested as for glazed ware and concrete pipes. The drain/pipe plug shall be suitably structured to prevent their being forced out of the drain/pipe during the test.

c) For straightness

i) By inserting at the high end of the sewer or drain a smooth ball of a diameter 13mm less than the pipe bore. In the absence of obstruction, such as yarn or mortar projecting through the joints, the ball shall roll down the invert of the pipe and emerge at the lowest end.

ii) If the pipeline is straight, the full circle of light may be observed. The mirror shall also indicate obstruction in the barrel if the pipeline is not straight.

d) Fixture etc.

All fixtures and fittings shall be connected with water tight joints. No dripping shall be accepted.

6.19 ADDITIONAL SAFETY MEASURES TO BE TAKEN BY THE TENDERER

Suitable scaffolds shall be provided for workmen for all works that can not safely be done from the ground or from solid construction except such short period work as can be done safely from ladders. When a ladder is used, an extra mazdoor shall be engaged for holding the ladder and if the ladder is used for carrying materials as well, suitable footholds shall be provided on the ladder and the ladder shall be given a inclination not steeper 1/4 to 1 (1/4 horizontal and 1 vertical).

Scaffolding or staging more than 3.5m above the ground or floor swing or suspended from over head support or erected with stationary support shall have a guardrail properly attached, braced or otherwise secured at least 1m



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high above the floor or platform of such scaffolding or staging and ends thereof with only such opening as may be necessary for the delivery of materials. Such scaffolding or staging shall be fastened as to prevent it from swaying from the building or structure.

Working platform gangways and stairways shall be so constructed that they should not sag and if the height of the platform of the Gangway or the Stairway is more than 3.5m above ground level or floor level they should be closely banded and should have adequate width and should be suitably fenced as described elsewhere.

Every opening in the floor of a building or in working platform be provided with suitable means to prevent the fall of persons or materials by providing suitable fencing or railing whose minimum height shall be 1m.

Safe means of access shall be provided to all working platforms and other working places. Every ladder shall be provided securely fixed. No portable single ladder shall be over 9m in length while the width between side rails in running ladder shall in no case be less than 30cm for ladder upto and including 3m in length. For longer ladder this width should be increased at least 6mm for each additional 30cm of length. Uniform step spacing shall not exceed 30cm. Adequate precautions shall be taken to prevent danger from electrical equipment. No material on any of the sites of works shall be taken to cause danger from electrical equipment. No materials on any of the sites of works shall be so soaked or placed as to cause danger or inconvenience to any person or the public. The tenderer shall also provide all

necessary fencing light to protect the public from accident and shall be bound to bear the expenses of defence of every suit; action or other proceedings at all they may be brought by any person for injury sustaining owing to neglect to the above precautions and to pay damage and cost which may be awarded in any such suit, action or proceedings to any such person or which may with the consent of the HEC be paid to compromise any claim by any such person.

EXCAVATION AND TRENCHING



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All trenches 1.2m or more in depth, shall at all times be supplied with at least one ladder for each 30m in length or fraction there of. Ladder shall be extended from bottom of the trench to at least 1m above the surface or the ground. The side of the trenches, which are 1.5m or more in depth, shall be stopped back to give suitable slope, or securely held by timber bracing, so as to avoid the danger of slides collapse. The excavated materials shall not be placed within 1.5m of the edge of the trench or half of the trench whichever is more. Cutting shall be done from top to bottom. Under no circumstances undermining or undercutting shall be done.

DEMOLITION

Before any demolition work is commenced and also during the process of the work:

All road and open areas adjacent to the work site shall either be closed or suitably protected.

No electric cable or apparatus, which is liable to be a source of danger or a cable or apparatus used by the operator, shall remain electrically charged.

All possible steps shall be taken to prevent danger to persons employed from risk of life from explosion, or flooding. No floor, roof or other part of the building shall be so overloaded with debris or materials as to tender it unsafe.

PERSONAL SAFETY EQUIPMENTS

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

Workers employed for mixing asphalt, materials, cement and lime mortars shall be provided with protective footwear and protective gloves.

Those engaged in white washing and mixing or stacking of cement bags or any materials, which is injurious to the eyes, shall be provided with protective goggles.

Those engaged in welding works shall be provided with welders glass.

Stone breakers shall be provided with protective goggles and protective



clothing, and seated at sufficiently safe intervals.

When workers are employed in sewers and manholes, which are in use, the tenderer shall ensure that the manhole covers are opened and are ventilated at least for an hour before the workers asked to get into the manholes and the manholes so opened shall be cordoned off with suitable railing and provided with warning signals or boards to prevent accident to the public.

The tenderer shall not employ men below the age of 18 years and women on the work of painting with products containing lead in any form whenever man above the age of 18 are employed for the work of lead painting the following precautions should be taken:

6.20 PAINTING

No paints containing lead or lead products should be used except in the form of paste or ready-made paint.

Suitable face masks should be supplied for use to the workers when paint is applied in the form of spray or a surface having lead paint dry rubbed and scrapped.

Overalls shall be supplied by the tenderer to the workmen and adequate facilities shall be provided to enable the working painters to wash during the process of work.

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

6.21 HOISTING MACHINE

Use of hoisting machines and tackles including their attachment, anchorage and supports shall conform to the following standard or conditions.

These shall be of good mechanical construction, sound materials and adequate strength and free from Patent defect and shall be kept in good working order.

Every rope used in hoisting or lowering materials or as a means of suspension shall be of durable quality and adequate strength and free from patent defects.



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Every crane driver or hoisting appliance operator shall be properly qualified and no person under an age 21 years should be in-charge of any hoisting machine including scaffold and one who gives signals to operator.

In case of every hoisting machine and of every chain ring hook, shackle swivel and pulley block used in hoisting or lowering or means of suspension, the safe working load shall be ascertained by adequate means. Every hoisting machine and all referred to above shall be plainly marked with safe working load. In case of a hoisting machine having a variable safe working load, each safe working load and the conditions under which it is applicable shall be clearly indicated beyond the safe working load except for the purpose of testing.

In case of departmental machines, the safe working load shall be modified by the Electrical Engineer-in-charge. As regards tenderer's, machine, the tenderer shall notify the safe working load of the machine to the Engineer-in-charge whenever he brings any machinery to site of work and get it verified by the Electrical Engineer concerned.

Gearing, Transmission, Electric wiring and other dangerous parts of housing appliance should be provided with efficient safeguard. Hoisting appliances should be provided with such means as shall reduce risk of a accidental descent of the load. Adequate precautions should be taken to reduce to the minimum risk or any part of suspended load becoming accidentally displaced.

When workers are employed on electrical installation, which are already energised, insulating mats, wearing apron such as gloves, sleeves, and boots as may be necessary should be provided. The workers should not wear any rings, watches, and carry keys or other materials, which are good conductors of electricity.

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

These safety provision shall be brought to the notice of all concerned by display on a Notice Board at a prominent place at the work spot. The persons responsible for compliance of the safety code shall be named there by the tenderer.



To ensure effective enforcement of the rules and regulations relating to Safety Precautions, the arrangements made by the tenderer shall be open to inspections by the Labour Officer, Engineer-in-charge of the department or their representative.

Notwithstanding the above clauses, there is nothing in these to exempt the tenderer from operation of any other Act or Rule in force in Republic of India.

6.22 LIST OF IS CODES

All the Civil Engineering works shall be carried out in accordance with the latest Civil Engineering practices and as per relevant IS codes (latest version). Materials shall be of the best approved quality and shall comply with the respective latest IS codes. Wherever no Indian Standard is available, International Standards may be followed only on approval from the owner.

6.23 TECHNICAL SPECIFICATIONS FOR P.WAY WORKS

1. All works - linking of Railway tracks, assembly, laying and linking at points and crossings, ballasting, through packing and connected works shall conform to the various instructions and specifications stipulated in "Indian Railways Permanent Way Manual with upto date correction slips, IRS drawings, track manual and other relevant Railway Codes/Manuals.
2. The proposed sidings will be mostly upgraded with 60 Kg/52 Kg/90R rails on PSC/Metal/ Wooden sleepers in single rails as the case may be.
3. The Turn-outs/Diamond double slip (1 in 8½) assembly i.e. switch assembly, lead portion and crossing assembly will be laid by 52 Kg/90 R/ 60 Kg rails as the case may be to the Indian Railway Standard on PSC sleepers/STO/Wooden with a ballast cushion as directed by Engineer in-charge or his authorized representative at site.
4. The operation of dumping ballast, lifting and packing should continue till such time the track attains final level and shape of ballast section.
5. Pack the sleeper with ballast as directed by Engineer in-charge or his authorized representative at site.
6. Lift the track to the required level as directed by Engineer in-charge or his authorized representative at site.
7. Rails shall be connected by means of pair of fish plate in the first in stance only with two bolts and nuts, one in each rail. The fishing planes of the fish plates and rail are to be greased. Proper size of expansion liners are to be provided at the joints to ensure correct expansion gaps. Cutting of rails where necessary, will be done to suit



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- squaring of joints.
8. On curves sharper than 5° (radius less than 360m) the rail joints will be mid-staggered and check rails to be provided. All the sleepers of the sharper curves (radius less than 360m) to be provided with PSC sleepers having provision with check rail.
 9. All the drilled bolt holes are to be chamfered by chamfering tools.
 10. Paint mark shall be made on the rails showing the spacing of sleepers as directed by Engineer-in-Charge at site.
 11. Sleeper spacing:
 - a. Sleeper spacing for fish-plated joints having 13m/12m single rails:

Sleeper spacing	M+7 density		M+4 density	
	13m	12m	13m	12m
i) Rail ends to centre of sleeper	15cm	15cm	15cm	15cm
ii) Centre of joint sleeper to centre of 1 st shoulder sleeper	61cm	60cm	61cm	60cm
iii) Centre of 1 st shoulder sleeper to centre of 2 nd shoulder sleeper	64cm	63cm	70cm	69cm
iv) Centre of 2 nd shoulder sleeper to centre of intermediate shoulder sleeper	68cm	66cm	84cm	83cm

- b. Sleeper spacing for SWP of 3X13m/3X12m/3X 11m rails:

Sleeper spacing	M+7 density		M+4 density		
	39m	36m	39m	36m	33m
i) Rail ends to centre of sleeper	15cm	15cm	15cm	15cm	15cm
ii) Centre of joint sleeper to centre of 1 st shoulder sleeper	59cm	58cm	66cm	62cm	60cm
iii) Centre of 1 st shoulder sleeper to centre of 2 nd shoulder sleeper	61cm	60cm	75cm	67.5cm	66cm
iv) Centre of 2 nd shoulder sleeper to centre of intermediate shoulder sleeper	66cm	64cm	78cm	77cm	77.5cm

- c. Sleeper spacing for curve with Mid-staggered
 Joint: Sleepers =18 nos. per single rail
 length.

Sleeper spacing	18 sleeper per rail	
	13m	12m
i) Rail ends to centre of sleeper	15cm	15cm
ii) Centre of joint sleeper to centre of 1 st shoulder sleeper	65cm	65cm
iii) Centre of 1 st shoulder sleeper to centre of 2 nd shoulder sleeper	75cm	70cm
iv) Centre of 2 nd shoulder sleeper to centre of intermediate shoulder sleeper	85cm	75cm

12. Full quantities of small fittings are to be fitted completely after slewing the track to correct alignment as directed by Engineer-in-Charge at Site.



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13. The track so linked shall be aligned correctly to the alignment pegs given or as directed by Engineer till it takes correct position and the remaining two bolts to be fixed in fish plated joints.
14. During the above process, alignment, adjustment and squaring of sleepers, gauging, Cross level and longitudinal levels should be checked and rectified by doing packing as directed.
15. The operation of spreading of stone ballast, lifting and packing should continue till such time the track attains final level and shape.
16. Greasing of fish plates, fish bolts and nuts with lubricating oil and graphite grease to be done by cleaning fishing planes of rail ends with wire brush.
17. Screening of Track should be done as per Indian Railways Permanent Way Manual Para- 238 and as per direction of Engineer- in- Charge. For screening work, required wooden blocks & wedges are to be arranged by the contractors. No extra payment will be made for arranging wooden blocks.
18. The works should be executed in a workman like manner to the satisfaction of the Engineer-in-Charge at site. The contractor will be primarily responsible for Safety of traffic that moves on opened up track, notwithstanding the presence of RITES representative at site.
19. Good quality track ballast as per specification and of approved quality will have to be supplied and stacked on 'Cess' of formation or at the toe of bank or at suitable places as directed by RITES representative. Stacks will be measured jointly by the contractor and RITES' s representative and entered in a register to be signed jointly by them.
20. Lifting and spreading of stone ballast includes all lead, lift, ascent, descent, crossing road/ railway, handling as required for packing tracks from the stacks measured and passed already including all labour, tools and plants for the operation and the same will be arranged by the contractor at his own cost. The payment for spreading will be made based on measurement of ballast supplied in stacks, less shrinkage.
21. Pulling out of ballast on to the formation by ballast rakes and boxing is to be done as per specified profiles. Proper templates and loglines should be used. The width at the shoulder should be as directed by Engineer-in-Charge which will normally be not less than 3.55 metre (11'-0") and not more than 3.66 metre (12'-0").
22. No ballast should be wasted on the slopes of banks or in cuttings or any places.
23. After the ballast is measured, the Contractor shall spread it on top of the blanketing surface/formation/in the track with standard profile. After spreading, the ballast profile should be consolidated.
24. The thickness of the finished ballast spread should be as specified by the Field Engineer, and the layer should be dressed and boxed to proper profile and dimensions.
25. While spreading the ballast on the finished formation, care shall be taken that the formation/blanketing surfaces is not damaged. In no circumstances,



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vehicular carts/trucks shall be permitted to ply on the finished blanketing/ formation. In case some damage to the surface is done, the Contractor shall repair the damages at his own cost before spreading the ballast.

26. Through packing of railway track on any type and any density of sleepers which will consist of –
 - (i) Opening of the road,
 - (ii) Examination of rails, sleepers and fastenings,
 - (iii) Squaring of sleepers,
 - (iv) Slewing of track to correct alignment,
 - (v) Gauging,
 - (vi) Packing of sleepers including lifting & leveling,
 - (vii) Repacking of joint sleepers,
 - (viii) Boxing of ballast section & tidying.
27. The length of track to be opened out on any day must not be more than that can be efficiently tackled by the end of the day. Broken or missing fittings are to be replaced and loose ones tightened. Cross drains are to be provided at mid section each rail except sharper curve track. On sharper curve track the cross drains are to be provided as per direction of Engineer in-charge.
28. Through packing of points and crossings 1 in 8.1/2 or diamond x-over / derailing switch will comprise opening out of ballast, squaring of sleepers, replacing or readjusting fittings to keep correct gauge clearances of check rail, wing rails, etc. including lifting or lowering as necessary and packing all the sleepers in the points and crossings efficiently and finishing all works with boxing and dressing of the shoulder ash ballast neatly. All bolts and nuts including crossing bolts, check rail bolts, slide chairs, tongue rails, heel block bolts etc. are to be properly oiled and greased also.
29. Picking up slacks will include lifting and packing of sleepers where necessary, attention to all fittings and fastenings, adjusting gauge, cross level and longitudinal level, cleaning of drain etc. as directed by the RITES' representative at site at specified scattered locations. The work should be neatly finished with proper boxing.
30. Any sleeper which have shifted from correct spacing or gone out of square shall be moved back and square after loosening the fastenings. The fastenings shall be tightened again after squaring.
31. The track shall be slewed to correct alignment by sighting along the rail head of the base rail. It should be ensured that track does not get lifted in the process of slewing.
32. The track shall then be given a final packing. For this, sighting shall be done along the base rail and any dip or low joint are found, the same are to be attended for its correction by packing of sleepers. After the base rail is thus packed for two or three rails length, the cross level should be checked and the opposite rail lifted wherever necessary and sleepers under the rail seat packed.
33. The joint and shoulder sleepers shall be re-packed and cross level adjusted at the time of each through packing of sleepers.



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34. Oiling and greasing hand operated points will include adjusting the point Roding and fixing hand lever frame, where found necessary by means of spikes with the sleepers for smooth operation of the point and adjusting the opening between tongue rail and stock rail. For any bent tongue rail, if required, Jim-crowing may have to be done and the gap adjusted as required. Blacksmith and other staff for this work, as required, will be deputed by the Contractor at his cost. Oil & Grease to be supplied by the Contractor at his own cost.
35. Gauge:

Will be with standard broad gauge on straight and curves upto 350 m radius and 5 mm slack on sharper curves with a Permissible variation with (+) or (-) 3mm. But not exceeding 1 mm between consecutive sleepers.
36. Alignment:

Should be perfectly straight verified by sighting. On curves, the alignment should be correct of versine or as directed by the Engineer-in-Charge, who will pass the work.
- i) Straight on 10M chord = (+) or (-) 2mm;
ii) Curves of radius 600M on 10M chord = (+) or (-) 5mm;
iii) Curves of radius 600M on 20M chord = (+) or (-) 10mm.
37. Level:

To be checked by level board and spirit level. Track should be free from sag and low joints. Permissible variation of Cross levels being (+) or (-) 3 mm. but not exceeding 1 mm between consecutive sleepers.
38. Joint out of square :
i) On straight = (+) or (-) 10mm;
ii) On curves = 1/2 pitch of fish bolt holes.
39. High Joint: Permissible upto 2mm.
40. Low Joint: Not permissible.
41. All the elastic rail clips should be thoroughly cleaned. Grease to IS:400-1981 (Specifications for Grease No. 'O' Graphite) should then be applied on Central leg of the E.R.C. and eye of Inserts and then the clip should be driven at the time of assembly. The rate accepted includes the cost of the grease as per specifications and labour.
42. During execution of the work, contractor should arrange for protection of track and displaying the signals as per extent rule of Indian Railways.
43. All the P. Way tools such as (a) Rail tongs, (b) Crow bars, (c) Fishing spanners, (d)



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Hammers, (e) Keying hammers, (f) Cotter splitters, (g) Shovels, (h) Mortar Pans, (i) Beaters, (j) Track Lifting Jacks, (k) Gauges, (l) Level Board, (m) Spirit levels, (n) Cant Board, (o) Expansion Liners, (p) Wooden Squares, (q) Steel Tape @ Wire brushes, (s) Cotton waster, (t) Rake Ballast, (u) Chamfering tools, (v) Soap as required for the work as assessed by the Engineer- in-Charge depending on the labour strength will be arranged by the contractor at his own cost



CHAPTER 7 TECHNICAL BID

TECHNICAL BID

TENDERER'S PROFILE

The tenderers are to furnish the following particulars.

1. Name of the tenderer:
2. Status of the Contractor (in case of proprietary concern please mention the particulars of instrument empowering his successor to complete the remaining contract period in the event of death of proprietor)
3. Name & address of the Proprietor/Partner/Directors along with contact phone No.(If required separate sheet may be attached).
4. Office-post of the tenderer:
5. Office Address of the tenderer and its Phone No., Fax & e-mail, etc.
6. Local address for immediate contact, if any
7. Any other information including those of responsible representative of Contractor / Tenderer.

Signature of Tenderer.

Name:

Seal:



TECHNICAL BID

SCHEDULE OF DEVIATIONS

Date _____

To
Dy. Manager
Civil Maintenance-HMBP
Room No.07, First Floor,
Maintenance Building
Heavy Machine Building Plant
Ranchi- 834 004

Dear Sir,

I have gone through the contents of Tender Documents and the following Clauses of the Tender Documents are **not acceptable** to me.

Sl. No.	Clause No.
----	-----

Signature of Tenderer.
Name:
Seal:



TECHNICAL BID

UNDERTAKING

1. I / We hereby declare that I/we have carried out successfully works of large magnitude in nature to the work embraced in this Tender and have adequate organization and experienced personnel to handle this type and magnitude of works.
2. I / We also hereby declare that I/we have seen and studied carefully before submitting the Tender, the technical aspects of the work and terms & conditions, general conditions of Contract, special conditions. Bill of Quantity and description of work, etc. and I/we am/are aware that all the above Tender Documents relating to the said work will be binding on us.

Signature of Tenderer.

Name:

Seal:



TECHNICAL BID

DISCLOSER OF RELATIONSHIP

Declaration by the Tenderers regarding the particulars of employees on the roll of HEC Ltd. who are related to the Tenderers:

Sl. No.	Name of the employees of HEC related to the tenderers	Designation	Place of Work	P. No.	Signature of the employees concerned

It is certified that the above particulars are correct.

Signature of Tenderer.
Name:
Seal:



TECHNICAL BID

Declaration of Relationship

1. Whether the proprietor or any Partner of the firm or Director of the firm/Company as the case may be has any relation with any employee working in any Unit/Plant/Office of HEC Yes/No
If yes, give detail
2. Whether the proprietor or any partner of the firm or Director of the firm/Company as the case may be has any relationship (within the of Section 6 of the Companies Act 1956) with any of the Directors of HEC Yes/No
If yes, give detail
3. Whether the proprietor or any partner of the firm or Director of the firm/Company as the case may be has any relation with Partner/ Director of any other bidder(s) participating in this Bidding Yes/No
If yes, give detail

I/We declare that information furnished above are correct to the best of my/our knowledge. I understand that if any information furnished above is found to be wrong at any point of time , my work order shall be cancelled , EMD shall be forfeited & my/our firm shall be kept in business holiday as deemed fit by the corporation.

Signature of Tenderer.
Name:
Seal:



TECHNICAL BID

LIST OF DOCUMENTS AND ENCLOSURES ATTACHED

Date _____

To
Dy. Manager
Civil Maintenance-HMBP
Room No.07, First Floor,
Maintenance Building
Heavy Machine Building Plant
Ranchi- 834 004

Dear Sir,

I have gone through the Tender Documents and I am submitting my offer for doing the work as specified in the tender documents. I am submitting the following documents for your kind consideration:

Sl	Documents required as enclosures	Particulars of documents
1.	Demand Draft / BG towards Earnest Money.	
2.	Demand Draft t towards Application fee for tender.	
3.	Income tax Clearance Certificate/ Income-tax returns pertaining to last financial year	
4.	Copies Of Contract-Completion / Work-Order / Performance Certificates in support of experiences of "similar work" execution.	
5.	Tenderer's Profile	
6.	Schedule Of Deviations	
7.	Undertaking	
8.	Discloser Of Relationship	
9.	Declaration Of Relationship	
10.	EPF Registration Certificate as per EPF	



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	& Misc. provision Act 1952	
11.	ESI Registration Certificate as per Employee's state Insurance Act 1948.	
12.	Labour Licence as per prevailing rule.	
13.	Insurance Coverage Certificate (General Insurance Scheme under LIC)	
14.	Registration with HEC or any other Govt. Agency.	
15.	Tenderer must declare that he/his organisation has not been convicted or Black-listed by any PSU or Govt. Sector	
16.	Copy of PAN	
17.	Copy of GST registration Certificate as per prevailing rule (effective from 01 st 2017)	
18.	A certified copy of Registration certificate in case of Cooperative Society	
19.	A certified copy of Passed resolution for taking up the work on contract and authorizing its representative to file tender on its behalf	

"I/We confirm that the information furnished in the documents enclosed with the tender are correct to the best of my/our knowledge and I/We agree to comply with all the conditions stipulated in the Tender Documents"

Encl :

Signature of Tenderer.

Name:

Seal:



CHAPTER 8 PRICE BID

(Put this price-bid in separate envelop)

To,
Dy.Mgr/Civil Maint.
Maint. Bldg/HMBP

Sub: Price Bid

Dear Sir,

We have carefully gone through the Scope of Work, Terms & Conditions and all other documents attached with the Tender Documents. The same is clearly understood and acceptable to us and based on that we furnish our best prices as follows:

BILL OF QUANTITY

Name of Work: LAYING OF TWO NUMBERS OF INTERCONNECTED RAILWAY TRACKS AND ASSOCIATED CIVIL & STRUCTURAL WORK AT SFW SHOP OF HMBP PLANT

BOQ for Rail Track laying Project					
Sl No.	Description/Item	Unit	Quantity	Quoted Rate	Amount against item
<i>Civil & Structural Work</i>					
1	Demolishing cement concrete manually/ by mechanical means including disposal of material within 50 metres lead as per direction of Engineer - in -charge. Nominal concrete 1:3:6 or richer mix (i/c equivalent design mix)	Cu.m	744.11		
2	Earth work in excavation by mechanical means (Hydraulic excavator)/manual means over areas (exceeding 30 cm in depth, 1.5 m in width as well as 10 sqm on plan) including getting out and disposal of excavated earth lead upto	Cu.m	1323.36		



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	50 m and lift upto 1.5 m, as directed by Engineer-in-charge.				
3	Earth filling in foundation trenches and plinth in layers not exceeding 150mm.Thick well watered ,Rammed,fully compacted and fine dressed with earth obtained from excavation of foundation trenches with in a lead of 50 m and lift of 1.5m or complete as per building specifications and direction of E/I.	Cu.m	210.45		
4	Providing PCC M 15 in nominal mix of (1:2:4) in foundation with approve quality of stone chips 20 mm to 06 mm size graded and cleaned coarse sand of F.M 2.5 to 3.0 including screeing ,shuttering ,mixing cement concrete in mixer and placing in position , vibrating,striking,curing ,taxes and royalty all complete as per building specification and as per direction of E/I	Cu.m	675.27		
5	Filling of Morrurum	Cu.m	445.14		
6	Providing coarse clean sand in filling in foundation trenches or in plinth including ramming and watering in layers not exceeding 150 mm thick with all leads and lifts including cost of all materials ,labour,royalty and taxes all complete as per building specifications and direction of E/I(Mode of measurement compacted volume)	Cu.m	100		



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7	Providing and laying in position ready mixed M-25 grade concrete for reinforced cement concrete work, using cement content as per approved design mix, manufactured in fully automatic batching plant and transported to site of work in transit mixer for all leads, having continuous agitated mixer, manufactured as per mix design of specified grade for reinforced cement concrete work, including pockets as per drawing, pumping of R.M.C. from transit mixer to site of laying , excluding the cost of centering, shuttering finishing and reinforcement, including cost of admixtures in recommended proportions as per IS : 9103 to accelerate/ retard setting of concrete, improve workability without impairing strength and durability as per direction of the Engineer-in-charge Note :- Cement content considered in this item is @ 330 kg/cum.Excess/less cement used as per design mix is payable/recoverable separately All works upto plinth level	Cu.m	129.94		
8	Providing Tor steel reinforcement of 10 mm,12 mm, 16 mm and above dia bars (TMT coil Fe 500) (Only valid for SAIL & TATA steel) as per approved design and drawing including carriage of bars to work site ,cutting,bending and binding with annealed wire with cost of wire,removal of rust,placing the rods in position all complete as per building specifications and direction of E/I	MT	12.99		
9	Centering and shuttering including strutting, propping etc. and removal of form for all heights for Walls (any thickness) including attached pilasters, butteresses, plinth ,string courses ,Foundations, footings, bases of columns, etc. for mass concrete	Sq.m	1275.55		



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10	Providing 25 mm thick water proof cement plaster 1:3 with clean coarse sand o F.M 1.5 with 5% cico or any other approved water proofing compound including screening curing including all leads and lifts of water ,scaffolding taxes and royalty all complete as per building pecification and as per direction of E/I	Sq.m	274.58		
11	Extra for providing and mixing water proofing material in cement concrete work in doses by weight of cement as per manufacturer's specification.	Cost per bag of cement of 50kg.	5636.00		
12	62 mm thick cement concrete flooring with concrete hardener topping, under layer 50 mm thick cement concrete 1:2:4 (1 cement : 2 coarse sand : 4 graded stone aggregate 20mm nominal size) and top layer 12mm thick cement hardener consisting of mix 1:2 (1 cement hardener mix : 2 graded stone aggregate, 6mm nominal size) by volume, hardening compound mixed @ 2 litre per 50 kg of cement or as per manufacture's specifications. This includes cost of cement slurry, cost of nosing of steps etc. complete.	Sq.m	1488.95		
Supply of Structural steel					
13	Supply Structural steel such as tees, angles channels and R.S. joists	130.11	Quintal		
	Mild steel plates	298.65	Quintal		
14	Labour for fabricating,erecting,hoisting and fixing in position structural steel work in R.S joist,channel,Angle,Tee.flate,plate,latice member,builtup compound section in column girder,stair case or truss including cost of gusset plates,holding down bolts,anchor plates at all heights and depths,bolting,weldinf (machining wherever necessary) with applying a primming coat of red lead paint all	MT	42.88		



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	complete as per approved drawing,building specification and direction of E/I				
TOTAL for Civil & Structural (A)					
15. Electrical work for Inspection Pit and Painting Room					
a.	1.5 sq.mm cable (Anchor/havells/Poly cab)	Each coil of 90 mtr	5		
b.	3 core 2.5 sq. mm cable (Anchore / Havells/Polycab),	Each coil of 100 Mtr	4		
c.	3 Core 4 sq. mm cable (Anchore/Havells/Polycab)	Each coil of 100 Mtr	4		
d.	3 core 6 sq. mm cable (Anchore/Havells/Polycab)	Each coil of 100 Mtr	3		
e	Switch +Socket 16 A / Unit (Anchore/HPL)	Each	16		
f	Switch 6A / Unit (Anchore /HPL)	Each	50		
g	Socket 6A / Unit (Anchore / HPL)	Each	30		
h	Modular board for 16A switch + Socket	Each	16		
i	Modular board for 5A switch + Socket	Each	16		
j	LED wall light 10W Baton (philips/crompton/Bajaj)	Each	8		
k	LED wall light 20W Baton (philips/crompton/Bajaj)	Each	14		
l	MCB 32A SP (Anchore/ Havells)	Each	8		
m	MCB 16A SP (Anchore/ Havells)	Each	12		
n	Distribution Box (small) / unit (Anchore/Havells)	Each	10		
o	Labour charges for each point fitting including wiring (wall light (8+14), Sockets 16 A & 6A (16 + 30), MCB 32A & 16A (8+12), Distribution box (10)	Each	100		



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Total Electrical Items (B)					
Permanent Way (Railway Track)					
16	Track straight and curved Supply of Rail, 52 Kg, Free issue by HEC				
b	Supply of Broad Gauge Monoblock Prestressed concrete sleepers (category 1) as per RDSO drawing no. T 2496 (PSC-14) and IRS specification T-39	No.	600		
c	Supply of Joggled Fish Plate 52 Kg to RDSO Drg. No. T-5848 (one set consisting of 02 fish plates with hole and 04 bolts & nuts)	Set	60		
d.	Supply of Elastic Rail Clips (ERC) with flat toe (MKIII) to RDSO drg. No. T-3701 conforming to T-31	No's	2400		
e	Supply of Combination Metal liners to RDSO Drg. No. T-3741 & 3742	No.	2400		
f.	Supply of 10 mm thick Grooved Rubber sole Plate to RDSO Drg. No. T-7010	No.	1200		
g.	Laying of BG P-way track in straight and curve over compacted ballast/on top of formation	Track metre	960		
h.	Linking of new B G track on main line/ loops on straight and curved alignment over ballast bed using 60 Kg/52 kg/ 90R rails (Pre-welded panels or on single rails) & PSC sleepers, fittings & fastenings with contractor-s labour, tools & plants including all lead & lift complete. The item mainly includes marking of the center line with theodolite, providing reference pegs/ pillars, bringing the PSC sleepers from stacks on cess/ formation/ toe of bank with 100m lead including crossing of track, road etc. & any lift, spreading them on ballast bed centrally to the center line of the track at proper spacing depending on the sleeper density, putting the GR pads in position on sleepers at rail seats, putting the rails on PSC sleepers	Track metre	960		



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	& identifying permanent kinks if any & removing the same with the help of Jim crow, cleaning the eyes of MCI inserts and putting the GFN/ metal liners in position fastening rails to sleepers with ERC-s greasing MCI insert eyes and middle leg of ERC-s greasing of fishing plane of rails & fish plates with contractor-s grease and graphite of approved grade and specification of greasing putting fish plates and fish bolts wherever required, making the correct spacing of sleepers on rails, re-spacing of sleepers wherever required, aligning the track and correcting the track geometry by initial packing, etc. as per the directives of Engineer-in-charge or his authorized representative. The cutting of rails and drilling of holes required for linking will be paid extra in separate item. Rails/ welded rail panels and PSC sleepers will be supplied within a lead of 100m.				
i.	Through packing of newly laid track/regraded track				
	First round Through Packing	Track metre	960		
	Second round Through Packing	Track metre	960		
	Third round Through Packing	Track metre	960		
j	Drilling of holes, 32 mm dia	Nos	480		
k	End cropping /cutting existing 60 Kg //52Kg/90R rails at the vertical plane on running track/cess with or without traffic block with contractors own labour, tool, plants etc. as per direction of the Engineer or his authorized representative at site of work.	Eack	100		



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l	<p>Making guard rails from railway 90R/ 52 kg rails and fixing it on along railway track and its approaches on PSC sleepers as per Railway-s standard drawing/ approved sketch with contractor-s labour, tools & plants inclusive of all lead and lift complete. The mainly includes cutting of the rails to required length , bending it to prepare the splayed portion as per the approved drawing/ sketch, drilling of the holes , notching if required, putting guard rails in position, fastening it to PSC sleepers, making and providing wooden block and bolts for its fixing at the end of the splayed portion, burying ends of guard rails etc. for any other item required in making and fixing of guard rails as per the directives of Engineer- in-Charge or his authorized representative. Rails for making guard rails to be supplied by HEC and fittings to be arranged by Contractor</p>	Track metre	960		
m	Fabrication & Fixing of Buffer Stop	Nos	3		
n	<p>Oiling and greasing of ERCs, SEJ, including opening out of insertion after removing dust, sand, rust, if any by using hydro carbon compound etc. by contractor's own labour, tools & plants and arrangement and as per direction of Engineer or his authorised representative. Rate shall include cost of O grade grease.</p>	No.	2400		
17	Point and Crossings				
a	supply of pre stressed concrete sleepers of variable sizes (66 nos.)	Set	2		
b	Point and Crossings complete with all accessories	Set	2		
c	Supply of Elastic Rail Clips (ERC) with flat toe (MKIII) to RDSO drg. No. T-3701 conforming to T-31	Nos	528		
d.	Supply of Combination Metal liners to RDSO Drg. No. T-3741 & 3742	No.	252		



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e	Supply of 10 mm thick Grooved Rubber sole Plate to RDSO Drg. No. T-7010	No.	252		
f	Laying and linking of points & crossings, 52 Kg with intermediate portion with fan shaped PSC layout, 1 in 8.5	Set	2		
g	Linking of new BG points and crossings, derailing switches in position over dressed ballast bed or linking on cess using Railways 52kg switches, crossings, lead rails & special PSC sleepers, fittings & fastenings with contractors labour, tools & plants including all lead & lift complete. The item mainly includes marking of the center line, providing reference pegs, bringing the points and crossings special PSC sleepers from stacks in yard, spreading them on ballast bed as per RDSOs drawing, putting the GR pads in position on sleepers at rail seats and fixing the same properly with approved quality adhesive, cutting rail, drilling and chamfering holes, putting the switches, lead rails & crossing on sleepers, cleaning the eyes of MCI insert and middle leg of ERC, putting the GFN/metal liners in position, fastening rails to sleepers with ERCs, applying grease in MCI insert and middle leg of ERCs, oiling of bolts, fixing the slide chairs to sleepers on stock rail/tongue rail, greasing of fishing plane of fish plates and rail, putting fish plates and fish bolts, wherever required, grinding the distance blocks, giving at the end of stock rails and fish plates as required, removing kinks, if any, in rails by Jim Crow, lubricating switches and slide chairs including the grease, black oil, lubricant of approved quality, fixing check rails, fixing stretcher bars & gauge tie plate, fixing spring lever and pulling rod wherever required, marking the correct spacing of sleepers on rails, re-spacing of sleepers wherever required, lifting	set	2		



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	<p>the track to desired level, correcting cross levels, longitudinal levels and alignment, with initial through packing, marking the station Nos. in turn out curve, dressing of ballast to correct profile etc. as per the directives of Engineer-in-charge or his authorized representative. Switches, crossing body, check rails will be given at other fittings will be issued from depot/ godown at and payment for carriage to site will be made separately. (a) 1 in 8 and 1/2 on fan shaped PSC layout</p>				
h	<p>Laying 52 kg /60 Kg Switch Expansion Joint (SEJ) on special PSC sleepers as per RDSO-s Drawing. No. T- 4160/4165 at the required locations with contractor-s labours and tools inclusive of all lead and lift complete. The item mainly includes laying SEJ special PSC sleepers to correct spacing over dressed ballast bed , laying of stock & tongue rails(two pairs) , providing the fittings and fastening, fixing two angle spacers, lifting the SEJ track to desired longitudinal profile, fixing of reference rail post, correcting gauge , cross levels, alignment and longitudinal level marking sleepers spacing, re-spacing, squaring and packing the sleepers, bracing the ballast to required profile, oiling and greasing the tongue rails and stock rails , etc. or any other item required as per the directives of Engineer-in-Charge or his authorized</p>	set	2		



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	representatives.				
i	Through packing of points and crossings with fan shaped PSC layout, 1 in 8.5	Set	2		
	First round through packing		2		
	Second round Through Packing		2		
	Third round Through Packing		2		
j	Supply of Trap switch for 1 in 8.5 point and crossing complete with all accessories	Set	2		
k	Assembling and laying of Trap switch, 52 Kg with intermediate portion with fan shaped PSC layout, 1 in 8.5	Set	2		
l	Through packing of Trap/Derailing switch with fan shaped PSC layout, 1 in 8.5	Set			
	First round through packing		2		
	Second round Through Packing		2		
	Third round Through Packing		2		
m	Drilling of holes, 32 mm dia	No	150		
n	Oiling and greasing of ERCs, SEJ, including opening out of insertion after removing dust, sand, rust, if any by using hydro carbon compound etc. by contractor's own labour, tools & plants and arrangement and as per direction of Engineer or his authorised representative. Rate shall include cost of O grade grease.	No	252		
TOTAL for P Way (C)					
Design Drawing & Survey					



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18	Supply of Design & Drawing of concrete work in the form of footings, pedestals, beams with pockets, H.D. bolts etc for supporting of traight and curve rail tracks including points & crossings etc. as per tentative layout drawing/sketch (enclosed with tender document) with loads as per Railway norms and as per approval by RPD/HMBP/HEC and as per instruction of Engineer-in-Charge at site and including soil investigation and test, if required.	One	Lumpsum		
19	Providing service for survey and alignment of straight and curve rail tracks including point & crossing and fixing the locations of all auxiliary structure, i.e., inspection pits, painting room, etc.	One	Lumpsum		
TOTAL for Drawing & Survey (D)					

GRAND TOTAL (A+B+C+D) Rs.

E. GST Rs.

Grand Total Amount (in words) for A+B+C+D+E :

Thanking you,

Yours faithfully,

Signature of Tenderer.

Name:

Seal:



CHAPTER - 9 FORMATS

(The information to be submitted by all the Bidders)

QUALIFICATION INFORMATION

Constitution or Legal status of Bidder (attach copy) Place
of Registration:

Principal place of business :

Power of Attorney of signatory Bid : (attach)

Details of the turnover during last 3 (three) years :

Annual Turnover Data (Construction only)		
Year	Turnover in Rs	Remarks

Details of experience for similar nature and complexity of work in last 7 (seven)
years:

Use a separate sheet for each work/ contract (Attach performance
certificate from customers concerned):

1.	Name of the Work :
2.	Name of the Firm :
3.	Address of the Firm :
4.	Nature of work :
5.	Value of the Work :
6.	Date of Commencement :
7.	Date of Completion with original schedule and slippage, if any.

Note : Add pages as per requirement

Subcontractors/ firms proposed to be involved (Attach
performance credentials including Bio-data)

Section of work	Approx. value of subcontract	Sub- contractor	Experience in similar



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Evidence of access to financial resources to meet the qualification requirements:
Cash in hand, lines of credit and other financial means etc. sufficient to meet the construction cash flow (copies to be submitted and the following format to be filled up)

Source of financing	Amount in Rs
1.	
2.	

Financial reports of the last three years : balance sheets, profit and loss statement, auditors report etc. (copies to be submitted and the following format be filled up):

Financial information in Rs.	Actual : Previous five years		
	1	2	3
1. Total assets			
2. Current assets			
3. Total liabilities			
4. Current liabilities			
5. Profits Before tax			
6. Profits After tax			

Evidence of access to financial resources :

Cash in hand, liquid assets, unencumbered real assets, lines of credit and other financial means etc. sufficient to meet the construction cash flow (the copies to be submitted and the following format to be filled up)

Source of financing	Amount in Rs
1.	
2.	

Details of the bankers :

Banker	Name of the banker	
	Address of the banker	
	Telephone	Contact name ant title
	Fax	Telex

Information about litigations, if any, in which bidder is involved :

Year	Award FOR or AGAINST applicant	Name of the client, Clause of Litigation and Matter of dispute	Disputed amount in R



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Details of the major soft ware/ equipment to be used for the work :

	Equipment type and capacity	Make and model	Minimum number
1			

Personnel capabilities

The applicant must have suitably qualified personnel to fill the following key positions for the project. The applicant will supply information on a prime candidate and an alternate for each positions both of whom, wherever possible meet the experience requirements as specified in format below :

Position	Name	Total post qualification experience (years)	In similar Works (years)	As Manager or Section Leader of Similar Works (years)
Project Manager Alternative name				
Site engineers of respective discipline Alternative names				
Cost controller Alternative name				
Quality Assurance Engineer Alternative name				
Site supervisors of respective discipline Alternative names				

Permanent Income Tax Account No. (PAN) :

Details of Earnest Money/Performance Security

Deposit of Earnest Money by :

Draft No. :	}	Bank Guarantee Details :
Drawn on :	}	Name of the Bank :
Amount (Rs.) :	}	Amount of BG. :
Other Details	}	Bank Guarantee valid upto :

- Details of registration/ enlistment with Government organizations/ PSUs/.
- Certificate of registration as per statutory requirements under Sales Tax, Contract Labour Laws etc. as may be applicable



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Signature of the Tenderer

NOTE : Separate sheets may be attached to furnish details, if necessary.



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2.0 AFFIDAVIT

Non-Judicial Stamp Paper

I,, Partner/ Legal Attorney/ Accredited
Representative of M/S., solemnly declare that:

1. We are submitting Tender for the Work.....
..... against Tender Notice No.
..... dated.....
2. None of the Partners of our firm is relative of employee of (Name of
the Company)
3. All information furnished by us in respect of fulfillment of eligibility criteria and qualification
information of this Tender is complete, correct and true.
4. All documents/ credentials submitted along with this Tender are genuine, authentic, true and
valid.
5. If any information and document submitted is found to be false/ incorrect at any time, department
may cancel my Tender and action as deemed fit may be taken against us, including termination of the
contract, forfeiture of all dues including Earnest Money and banning/ delisting of our firm and all
partners of the firm etc.

Signature of the tenderer, Dated :

Seal of Notary



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3.0 BANK GUARANTEE FOR EARNEST MONEY DEPOSIT/ BID SECURITY

(TO BE STAMPED IN ACCORDANCE WITH STAMP ACT)

(TO BE ISSUED BY ANY NATIONALIZED/ SCHEDULED BANK AUTHORIZED BY
RBI TO ISSUE A BANK GUARANTEE)

To

The Heavy Engineering Corporation Limited Plant
Plaza Road, Dhurwa
Ranchi -834 004, Jharkhand

Dear Sir,

WHERE AS (name and address of Bidder) (hereinafter called the bidder) shall submit its Bid in response to NIT No. Dated for the work (name of the work)hereinafter called “the Bid”)

KNOW ALL MEN by these present that we (name of the Bank) of (name of the country) having our registered office at (address of the Bank) (hereinafter called “the Bank”) are bound unto the Heavy Engineering Corporation Limited, Plant Plaza Road, Dhurwa, Ranchi- 834004 (Jharkhand), (hereinafter called “the Employer”) for the sum of (amount of Guarantee in words and figures) for which payment well; and truly to be made to the said Employer the bank binds itself, his successors and assigns by these presents.

SEALED with the Common Seal of the said bank this day of 20 ... THE
CONDITIONS of this obligation are:

1. If the bidder withdraws its Bid during the period of Bid Validity specified by the employer on the bid form, or
2. It the Bidder withdraws having been notified of the acceptance of its bid by the Employer during the period of Bid Validity:
 - a) Fails or refuses to execute the contract Agreement when required: or
 - b) Fails or refuses to furnish the Performance Security (if any) in accordance with the Bid conditions.
3. We Bank to hereby undertake to pay the amounts due and payable under this Guarantee without any demur, merely on a demand from the Company stating



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that the amount claimed is due by way of loss or damage caused to or Bidder/ Contractor of any terms & conditions contained in the said contract or by reason of the bidder/ Contractor's failure to perform the said contract. Any such demand made on the Bank shall be conclusive as regards the amount due and payable by the bank under this Guarantee. We shall not withhold the payment on the ground that the Company has disputed its liability to pay or legal proceeding or legal proceeding is pending between company and the Bidder/ Contractor regarding the claim. However, our liability under this guarantee shall be restricted to an amount not exceeding

4. We Bank further agree that the Guarantee herein contained shall come into force from the date here of and shall remain in full force and effect during the period that would be taken for the performance of the said contract and that it shall continue to be enforceable till all the dues of the Company under or by virtue of the said contract have been fully paid and its claim satisfied or Company certifies that the terms and conditions of the said contract have been fully and properly carried out by the said Bidder/ Contractor and accordingly discharges the guarantee. Unless a demand or claim under this guarantee is made on us in writing on or before the (date to be given) (months from the date of the Bank Guarantee) we shall be discharged from all liability under this guarantee thereafter:

5. We ----- Bank further agree with said company that the company shall have the fullest liberty without our consent and without effecting in any manner our obligations hereunder to vary any of the terms and conditions of the said Contract/agreement or to extend time of performance by the said Bidder(s)/Contractor(s) from time to time or to postpone for any time or from time to time any of the power exercisable by the Company against the said Bidder/ Contractor and to forbear or enforce any of the terms conditions relating to said contract and we shall not be relieved from our liability by reason of any such variation or extension being granted to the said Bidder/ Contractor or for any forbearance act or omission on the part of the company on any indulgence by the Company to the said Bidder/ Contractor or by any such matter or thing whatsoever which under the law relating to sureties would, but for this provision have effect of so relieving us. The bank further agree that in case this guarantee is required for a longer period and it is not extended by the said bidder/Contractor beyond the period specified above, the Bank shall pay to the company the said sum of R (Specify the amount) or such lesser sum as may then be due to the company and as the company may demand.

6. We Bank lastly undertake not to revoke this guarantee during its



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currency except with the previous consent of the Company, in writing.

- a) The bank has under its constitutions power to give this guarantee and Mr. Manager, who has signed it on behalf of the Bank has authority to do so.
- b) This Bank Guarantee will not be discharged due the change in the constitution of the Bank or the Contractor.

We, (name of the Bank) undertake to pay to the Employer up to the above amount upon receipt of its first written demand without the Employer having to substantiate its demand, provided that in demand the Employer will note that the amount claimed by it is due to it owing the occurrence of 1 or both of the 2 or (b) specifying the occurred condition or condition.

This guarantee will remain in full force up to and including the date and any demand in respect thereof should reach the Bank not later than the date of expiry of this guarantee.

For and on behalf of the bank

Signature

Name

Designation

Common Seal of Bank

Under jurisdiction of Ranchi Court only.



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4.0 BANK GUARANTEE FOR SECURITY DEPOSIT

(TO BE STAMPED IN ACCORDANCE WITH STAMP ACT)

(TO BE ISSUED BY ANY NATIONALIZED/ SCHEDULED BANK AUTHORIZED BY
RBI TO ISSUE A BANK GUARANTEE)

To

The Heavy Engineering Corporation Limited
Plant Plaza Road, Dhurwa
Ranchi -834 004, Jharkhand

Ref : Bank Guarantee in respect of Agreement dated day
of 2013 between (Name of Purchaser
company) and(Name of tenderer's company)

Messers a company/ firm having called the contractor has
entered into an agreement with (Name of the Purchaser Company)
hereinafter Called (the company) to supply----- stores/
materials amounting to R----- on terms and conditions contained in the said
agreement.

It has been agreed that (..... percent) payment of the value of the
stores/ Materials will be made to the contractor in terms of the said agreement on the contractors
furnishing to the Company a Bank Guarantee for the sum of Rs. as security for
due repayment of the said sum in terms of the said agreement and also interest as therein
provided.

The having its office at has at the request of the
contractor agreed to give the guarantee as hereinafter contained.

(We (hereinafter called the bank) do hereby
(Name of the Bank) unconditionally agree with the company that if the contractor shall in any
way fail to observe or perform the terms of the said agreement regarding repayment of the said sum
of R or any of them including the terms for payment of interest for delay in deliveries or
shall commit any breach of its objection or demur pay to the Company the said sum of R
..... or such portion as shall then remain unpaid with interest without requiring the
company to have recourse to any legal remedy that may be available to it or compel such payment
by the contractor.



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MAINTENANCE DEPTT.
Dhurwa, Ranchi- 834004, Jharkhand**

Any such demand shall be conclusive as regards the liability of contractor to the company as regards the amount payable by the bank under this guarantee. The Bank shall not be entitled to withhold payment on the ground that contractor has disputed its liability to pay or as disputed the quantum of the amount or that any arbitration proceedings or legal proceedings is pending between the Company and the Contractor regarding claim.

We, the bank further agree that the guarantee shall come into force from the date hereof and shall remain in full force and effect till the period that will be taken for the performance of the said agreement which is likely to be the day of but if the period of agreement is extend either pursuant to the provisions in the said agreement or by mutual agreement between the contractor and the company the bank shall renew the period of the guarantee failing which it shall pay to the company the said sum of R Or such lesser amount out of the said sum of R as may be due to the company may demand. The agreement shall remain in force until the dues of the Company in respect of the said sum Rs and interests are fully satisfied and the company certified that the agreement regarding repayment. If the said sum of Rs has been fully carried out by the contractor and discharges the guarantee.

The Bank further agree with the company that the company shall have the fullest liberty without the consent of the bank and without affecting in any way the obligations hereunder to vary and the terms and conditions of the said agreement or to extend the time for performance of the said agreement from the time to time respond for any time or from time to time any of the powers exercisable by the company against the contractor and the forbearer to enforces any of the terms and conditions relating to the said agreement and the bank shall not be relieved from its liability by reason of such failure or extension being granted to the contractor or through and forbearance act or omission on the part of the company or any indulgence by the Company to the contractor buy other matter or thing whatsoever which under the law relating to sureties would but for this provisions have the effect of relieving or discharging the contractor.

The Bank further agree that in case this guarantee is required for a longer period and it is not extended by the Bank beyond the period specified above that bank shall pay to the company the said sum of Rs or such lesser sum as may then be due to the company out of said advance of Rs and as the Company may require.



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Now withstanding anything herein contained the liability of the bank under this guarantee is restricted to Rs only the guarantee shall remain in force till the Day of and unless the guarantee is renewed or a claim is preferred against the bank within 3 months from the said date all rights of the Company under this guarantee shall cease and the bank shall be released and discharged from all liability hereunder except as provided in the proceeding clause.

This bank guarantee will not be discharged due to the change in the constitution of Bank or Contractor.

The bank has under its constitution power to give their guarantee and who has signed it on behalf of the Bank has authority to do so.

Name of the person

Signature of authorized person from and on
behalf of the Bank

Dated this day of 20 .



5.0 **SAMPLE CONTRACT FORM**

Contract No.

THIS CONTRACT is made on ----- day of -----
between Heavy Engineering Corporation Limited, a Government of India
Undertaking, established and existing under the laws of India, and having its Registered
Office at Plant Plaza Road, Dhurwa, Ranchi- 834004, Jharkhand, India (hereinafter
referred to as Owner/ Company), which expression shall unless repugnant to the
context or meaning thereof, include its successors-in-interest, administrators and assigns
as ONE PART AND M/s -----, a proprietary firm/ registered
partnership firm/ body corporate/ joint stock company* or equivalent in case of foreign
bidder(s) having its (registered/ principal/ head etc.*) office at
..... (address of the Bidder), hereinafter referred to as the “Selected Bidder”
which expression shall unless repugnant to the context or meaning thereof, include its
successors-in-interest, administrators and permitted assigns as the OTHER PART.

WHEREAS Heavy Engineering Corporation Limited invited bids vide Bid
Notice No./ Bid Document No. ----- dated-----

for works related to laying of Railway track with associated civil, electrical & structural
work in SFW of HMBP on turnkey/ item rate basis.

WHEREAS the Selected Bidder submitted the Bid in response to the said
invitation of Heavy Engineering Corporation Limited.

WHEREAS Heavy Engineering Corporation Limited accepted the Bid of the
Bidder for works related to laying of Railway track with associated civil, electrical &
structural work in SFW of HMBP on turnkey/ item rate basis.

Now this Contract witnessth as follows:

- 1) In this Contract, words and expressions shall have the same meaning as are respectively



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assigned to them in the following documents and shall be deemed to form and be read and construed as integral part of the Contract.

- (i) Notice Inviting Bid,
- (ii) Letter of Acceptance of Bid indicating deviations, if any, from the conditions of contract incorporated in the Bid Document issued to the bidder and the Bid submitted by the bidder,
- (iii) Conditions of Contract for the entire contract period including General Terms & Conditions, General Technical Conditions for construction, Erection Conditions etc. forming part of the Contract.
- (iv) Specifications (i.e. Civil & Structural Engineering Works and Performance Guarantees of construction), where it is part of Bid Documents,
- (v) Scope of Works/ Bills of Quantities/ Schedule of Works/ Quantities
- (vi) Contract Drawings/ Finalized Work Programme
- (vii) Proforma of applications for payment to selected bidder for works related to laying of Railway track with associated civil, electrical & structural work in SFW of HMBP on turnkey/ item rate basis.

2) Scope and Conditions of the Contract

The scope and conditions of the Contract shall be in accordance with the Contract Documents specified and as provided in the LoA.

3) Contract Price

Subject to the Contract Documents mentioned above, Contract Price shall mean price payable to the 'Selected Bidder' under the contract towards the costs of works related to laying of Railway track with associated civil, electrical & structural work in SFW of HMBP on turnkey/ item rate basis.

5) Terms of Payment

Payment to Selected Bidder for the works related laying of Railway track with associated civil, electrical & structural work in SFW of HMBP on turnkey/ item rate basis.

The payment to the Selected Bidder for the performance of the works under the contract will be governed in pursuance to Clause mentioned elsewhere. All payment made during the contract shall be on account payments



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only. The final payment will be made at the end of 15 months of Guaranteed Period on completion of all the works and on fulfillment by the selected bidder of all his liabilities under the contract.

6) Time schedule for completion of works related to laying of Railway track with associated civil, electrical & structural work in SFW of HMBP The time schedule for design & drawing, construction & commissioning under the Contract (including various clearances from concerned agencies) shall be according to implementation scheme as furnished in the offer and agreed subsequently by the Owner.

7) Effective Date of Contract

This Contract shall come into effect upon signing of the contract by the Preferred Bidder.

8) In consideration of the payment to be made by Heavy Engineering Corporation Ltd. to the (name of the Selected Bidder) as mentioned herein above, the(name of the Selected Bidder) hereby covenants with Heavy Engineering Corporation Ltd. to perform the Contract in conformity in all respect and in accordance with the terms & conditions of this Contract.

9) Heavy Engineering Corporation Ltd. hereby covenants to pay the(name of the Selected Bidder) in laying of Railway track with associated civil, electrical & structural work in SFW of HMBP in accordance with the terms and conditions of the Contract, the Contract price at the time and in the manner, as provided herein above.

IN WITNESSTH WHEREOF the parties hereto set their hands on the day written herein above.

For and on behalf of :	For and on behalf of :
..... Heavy Engineering Corporation Ltd. (Name of the Selected Bidder) Signature	:
Signature	:



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(Authorised Signatory of the Owner)

(Authorised Signatory of the Selected Bidder)

Name of the Signatory :

Name of the Signatory :

Designation :

Designation :

Company's Stamp/ Seal :

Company's Stamp/ Seal :

Date :

Date :

Place :

Place :

Witness: Witness :

1 (Signature with full name, Designation & address)

1 (Signature with full name, Designation & address)

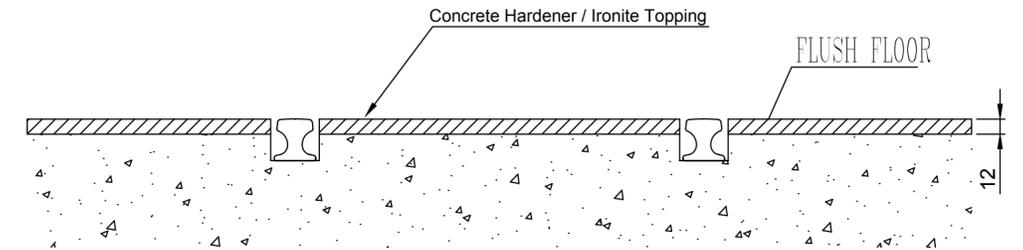
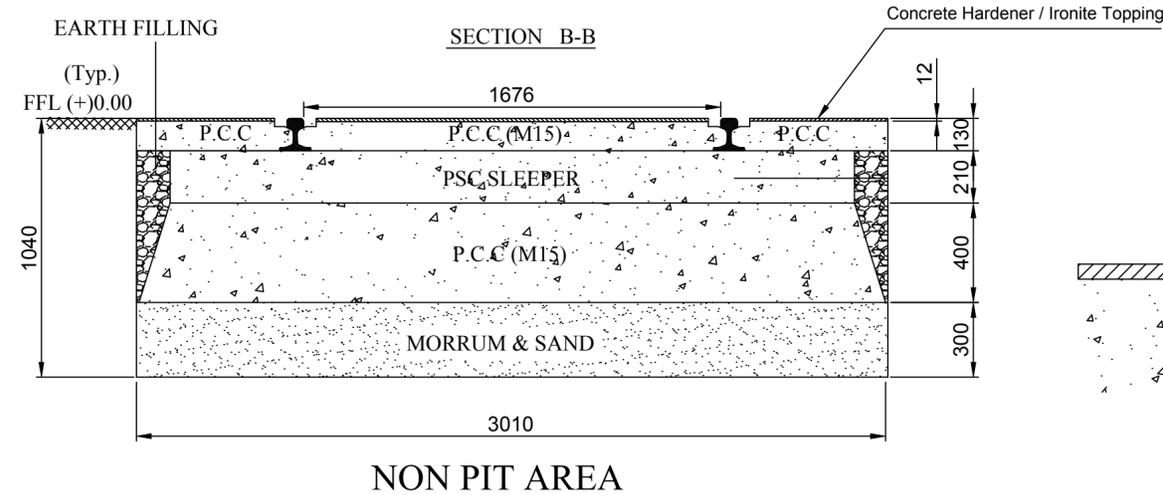
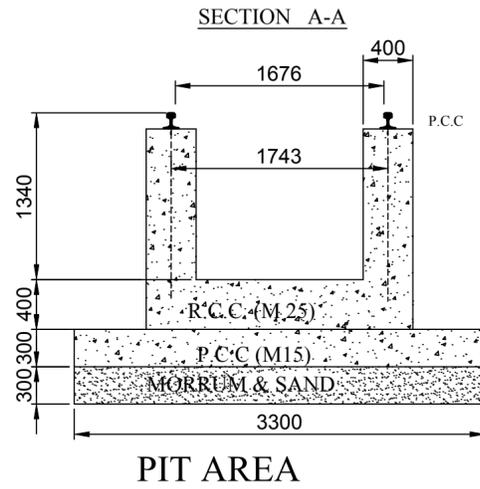
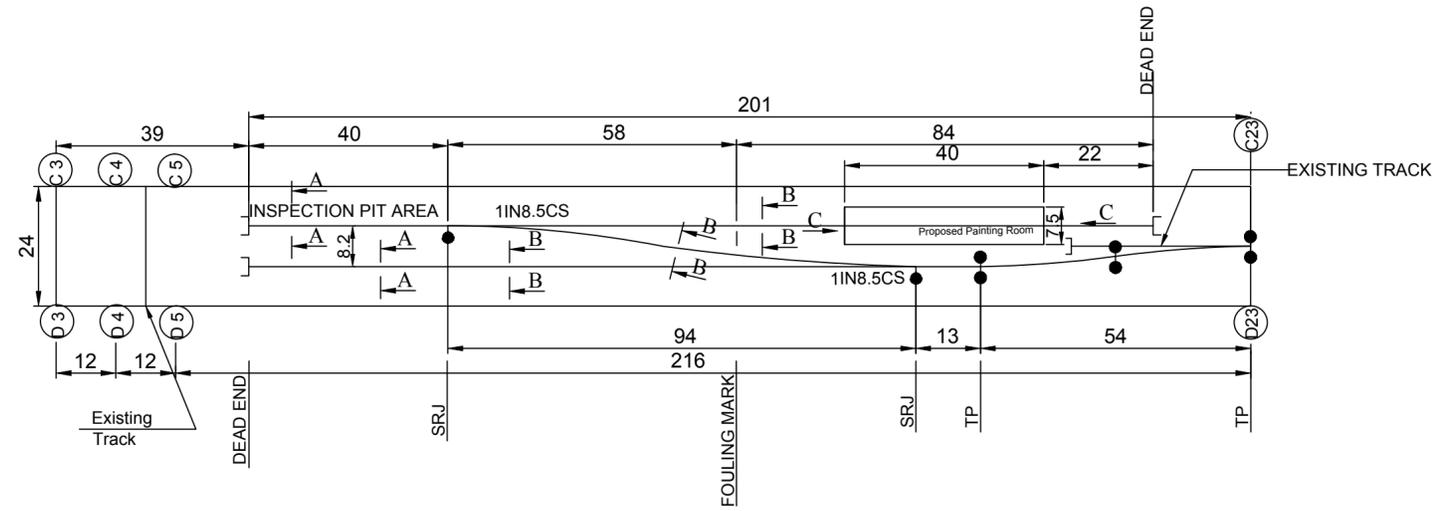
2 (Signature with full name, Designation & address)

2 (Signature with full name, Designation & address)

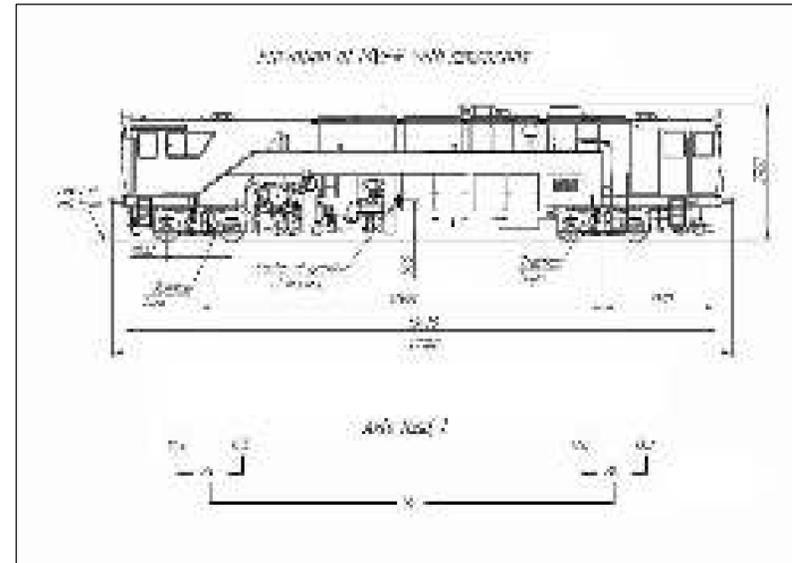
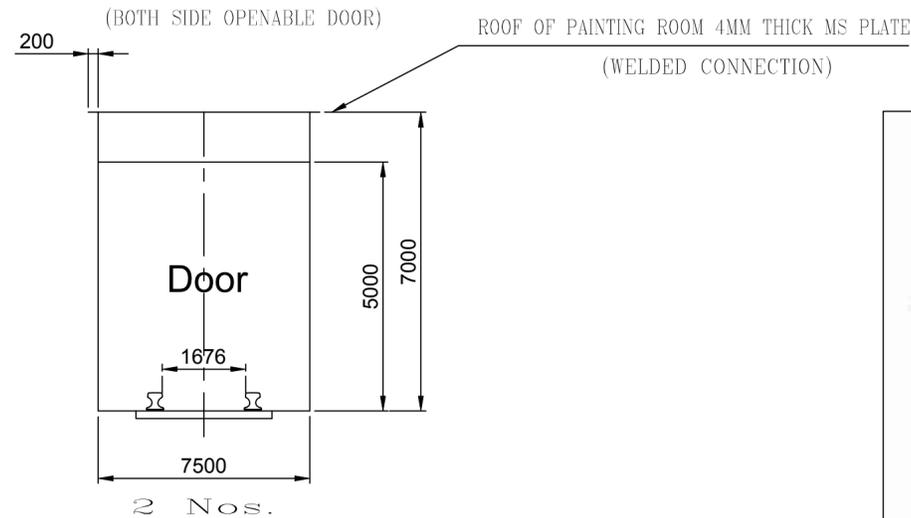
* Strike out whichever is not applicable.

SCHEMATIC TRACK LAYOUT PLAN FOR SFW/HMBP

FOR TEMPING M/c & UTILITY VEHICLE (in MTR)



VIEW - C



NOTE:-

1. DRG. IS NOT TO SCALE.
2. ALL DIMENSIONS ARE IN MM OTHER THAN NOTED.
3. ONLY WRITTEN DIMENSIONS ARE TO BE FOLLOWED.
4. THICKNESS OF INSPECTION PIT WALL MAY CHANGE AFTER DESIGN.
5. THE CURVATURE OF RAILWAY TRACK IS TENTATIVE, WHICH MAY CHANGE AFTER DETAILING.
6. THE ENTIRE TRACK LAY OUT SHALL BE DONE AS PER INDIAN RAILWAY NORMS/ STANDARD.
7. ON CURVATURE / STRAIGHT SUITABLE SLEEPERS SHALL BE USED.
8. 52 Kg/m RAIL SHALL BE USED FOR THE TRACK LAYOUT, THE SAME SHALL BE SUPPLIED BY HEC.

FOR TENDER PURPOSE ONLY

INDEX	NO.	DESCRIPTION	REVISION	SIGNATURE	DATE

 एच.ई.सी.	SCHEMATIC TRACK LAYOUT PLAN FOR SFW/HMBP		60.89.100
	APPROVED BY	C Prasad	SCALE-
CHECKED BY	Sanjeev Kumar		
PREPARE BY	Rakesh Kumar		
REF.DRG.NO.			
H.M.B.			Sep'2018
HEC LTD.,RANCHI			Rev - 0