



**भारत कोकिंग कोल लिमिटेड**  
(कोल इण्डिया लिमिटेड का एक अंग)  
**BHARAT COKING COAL LIMITED**  
A Subsidiary of Coal India Limited  
Civil Engineering Department, Koyla Nagar  
Dhanbad – 826 005 (Jharkhand State), India

## **PART – I (COMMERCIAL)**

- Name of Work : **Planning, Design, Engineering, Construction, Fabrication, Supply, Erection, Trial-run, Commissioning and Testing of 5 Nos. Feeder Breakers Complete with its attachment, Capable of Crushing Coal Lumps of maximum size (1500 x 1500 x 1200 mm) to (-) 100 mm 3-dimensional of Capacity 400 TPH with Installation, Commissioning including Civil Works like RCC Retaining Wall, Foundation etc Complete (on TurnKey Basis).**
2. Place of Work : 1. Sijua Area – 1 No.  
2. Bastacolla Area – 2 Nos.  
3. Lodna Area – 2 Nos.  
Under Areas of BCCL, Dhanbad (Jharkhand).
3. Tender Notice No. & Dated : BCCL/CED/TC/NIT-30/2011-12/3299-3331 dated 02/03.08.2011
4. Earnest Money : Rs. 9,20,000.00 (Rupees Nine lakhs twenty thousand only)
5. Name of the Tenderer :  
Address with Pincode :  
Telephone/ Mobile No. :
5. Date & Time of Pre-Bid Meeting : 23.08.2011 at 11.00 AM
6. Date & Time of submission of tender (i.e. Part-I, Part – II & Part - III) : On 13.09.2011 upto 15.00 hrs.(IST)
7. Date & Time of Opening of Part-I of the Tender : 16.00 hrs. IST on 16.09.2011
9. Details of Earnest Money Deposit :
10. Details of Cost of Tender paper. :
11. Documents Issued to Tenderers :

Signature of Issuing Authority

## 1. IMPORTANT

The tenderer is requested to go through the complete tender document and understand the requirements for submission of credentials & required documents before the same are enclosed with their tender offer.

The tenderer must check “**Check List**” given in the tender document before submission of their tender offer.

INCOMPLETE AND/ OR INCORRECT INFORMATION / CREDENTIALS / DOCUMENTS / TENDER OFFER IS LIABLE FOR REJECTION.

**Guidance for submission of credentials / documents along with offer (Must be checked / verified by the tenderer before submission of offer):**

### 1. Completion certificate for similar nature of works---

#### A. The certificate(s) of work should contain: -

- Name of work (Similar nature of work as mentioned in the NIT) [Note only the Agt / WO ref.].
- Work order / Agreement No/LOI.
- Award Value (As per work order / agreement)
- Date of commencement & Completion as per work order / Agreement.
- Actual Date of commencement & Completion.
- Completed / executed value of work/ payment certificate
- Status of work (Successfully completed or in progress). For work in progress, the value of work executed on date successfully.
- Seal / Designation/Official address of certificate issuing officer.

#### B. **Copy of work order** to be submitted in support of corresponding certificate (s) along with the copy of Bill of quantity/Copy of bills (for verifying similar nature of works).

2. **Certificate for Annual financial turnover** certified by Chartered Accountant or copy of yearly audited reports including balance sheet and profit & loss account for the prescribed periods to be submitted.

3. **Bid Capacity:**

**Maximum value of Construction, Fabrication, Supply, Erection, Commissioning and Testing of Feeder Breakers Complete with its attachment and Civil Works like RCC Retaining Wall, Foundation etc Complete Works executed in any one year during the last five years (updated to present level @ 5% per calendar year) taking into account the completed as well as works in progress are to be furnished duly signed by the bidder.**

**NOTE:** Maximum value of supply & Works as per above is to be submitted separately, for calculation of Bid Capacity.

- The informations as asked for in a tabular form in respect of –
  - (A) Existing commitments and on going works.
  - (B) Works for which bids already submitted.
  - (C) Works performed as prime contractor (In the same name) for works of a similar nature, over the last five years.

are essentially to be furnished by the bidder.

4. Affidavit / Bank Guarantees must be in the prescribed format of the Tender Document.
5. List of Technical persons and Tools & Plants to be furnished by the tenderer.
6. Status of company i.e. Proprietary firm / Partnership firm / Pvt. Ltd Company / Ltd Company/ PSU / Joint ventures are to be given as prescribed in the Tender Document

## 7. Income Tax Permanent Account Number (PAN)

Particulars of Registration with appropriate Sales Tax Authorities (In relation with 'Works Contract Tax') if applicable.

8. Particulars of PAN based Service Tax Registration, if Service Tax is applicable

9. Particulars of Registration / Clearance from the Appropriate Provident Fund Authorities, if applicable

Above information / documents / credentials are required to be duly signed by the bidder.

For further clarifications, if any, the tenderer may contact the office of General Manager (Civil), Civil Engineering Department, BCCL, Koyla Nagar, Dhanbad

---

**I / we hereby declare that the above instructions have been gone through by me/ us along with the other provisions hereinafter given in the document and I / we have given all the documents along with the Part– I tender offer accordingly.**

**Signature of Tenderer**



## **Bharat Coking Coal Limited**

**( A Subsidiary of Coal India Limited )**

**Office of the General Manager (Civil)**

**Civil Engineering Dept., Koyla Nagar , Dhanbad 826005**

### **2. CHECK LIST OF DOCUMENT TO BE SUBMITTED BY THE TENDERERS ALONG WITH PART - I**

- (1) Firm's registration details, if any.
- (2) Income Tax Permanent Account Number (PAN)
- (3) Particulars of Registration with appropriate Sales Tax Authorities (In relation with 'Works Contract Tax') if applicable.
- (4) **Particulars of PAN based Service Tax Registration, if Service Tax is applicable.**
- (5) Particulars of Registration / Clearance from the Appropriate Provident Fund Authorities, if applicable

- (6) Details of Construction Equipment to be possessed by the tenderers and the list of Technical person working under them.
- (7) Tenderers must submit the proof of Credentials for qualifying criteria.-
- (8) Affidavit on non-judicial stamp paper in support of authenticity of credentials.
- (9) Information of Bid capacity, if applicable.
- (10) **STATUS OF THE FIRM** : Copy of the following as applicable should be enclosed to Indicate the status of the firm
  - (1) Registered Partnership deed
  - (2) Power of attorney
  - (3) Affidavit in case of proprietorship firm
  - (4) Articles of Association/Memorandum
- (11) **DECLARATIONS:** - Stating the firm is not banned or de-listed by any Govt. Or Quasi Govt. Agencies or PSUs. If this declaration is not given the bid will be rejected as non-responsive.
- (12) Power of Attorney, if any.
- (13) **CERTIFICATE:** Only for tenderers using downloaded tender document from Website.

### **13. CERTIFICATE**

**(Only for tenderer using downloaded tender document from Website)**

1. We undertake that the tender submitted by, is downloaded from BCCL website ([www.bccl.gov.in](http://www.bccl.gov.in)) and is same in content and form (verbatim), and any deviation, if detected, at any state, would entitle BCCL to reject our bidding/offer without assigning any reason or recourse to any penal action and would be legally binding on us.
2. We undertake, we will accept the tender document as available in web site and our tender will be rejected if any tempering in the tender document is found to be done at time of opening of tender.
3. In case of any discrepancy between the tender document downloaded from web site & the master copy available in the office, the later shall prevail and will be binding on us. We will not claim on this account.

**Signature:**\_\_\_\_\_

**(Of tenderer)**

**Seal:**\_\_\_\_\_

**NOTE: -**

All the above documents which are to be submitted along with Part – I of the tender should be attested by any Gazetted officer of Govt. (Central or State)/Notary and the same should be certified/signed by the tenderers also.

I / We hereby certify that I / We have gone through the above instructions and submitted all the documents accordingly.

**Signature of the Tenderer/s**





**TENDER DOCUMENT  
FOR**

**Planning. Design, Engineering, Construction,  
Fabrication, Supply, Erection, Trial-run,  
Commissioning and Testing of 5 Nos. Feeder  
Breakers Complete with its attachment, Capable of  
Crushing Coal Lumps of maximum size  
(1500 x 1500 x 1200 mm) to (-) 100 mm  
3-dimensional of Capacity 400 TPH with Installation,  
Commissioning including Civil Works like RCC  
Retaining Wall, Foundation etc. Complete (on  
TurnKey Basis).**

AT

**BHARAT COKING COAL LIMITED, DHANBAD**

**PART - I : COMMERCIAL PART**

#

**Bharat Coking Coal Ltd.**

(A Subsidiary of Coal India Ltd.)

Koyla Nagar, Dhanbad- 826005 (Jharkhand)

## CONTENTS OF BIDDING DOCUMENTS

	<b>Description</b>	<b>Section</b>
	<b>PART-1 Commercial</b>	
	Tender Notice	Section-1
	Instructions to Bidders	Section-2
	Forms of Bid & Qualification Information	Section-3
	Conditions of Contract	Section-4
	Miscellaneous Forms	Section-5
	<b>PART-II Technical Specifications</b>	<b>Section-6</b>
	1. Preamble	Sub-Section-6.1
	2. Scope of Supply, works & Technical Specifications E&M	Sub-Section-6.2
	3. Technical specification-civil	Sub-Section-6.3
	<b>Part-III Format of Price Bid</b>	<b>Section-7</b>

## PART– I : COMMERCIAL

<b>Section</b>	<b>Description</b>
Section - 1	Tender Notice
Section - 2	Instructions to Bidders
Section – 3	Forms of Bid & Qualification Information
Section – 4	Conditions of Contract
Section – 4.1	General Terms & Conditions of Contract
Section – 4.2	Additional Terms & Conditions of Contract
Section – 4.3	General Technical Conditions
Section – 4.4	Erection Conditions of Contract
Section - 5	Miscellaneous Formats (Formats of Securities, Bank Guarantee, Article of Agreement, Integrity Pact format, EFT format etc. )

***SECTION -1***

**TENDER NOTICE**

## **BHARTH COKING COAL LIMITED**

(A Subsidiary of Coal India Limited)  
Koyla Nagar, Dhanbad-826005  
Jharkhand, India.

## **TENDER NOTICE**

**TENDER NOTICE NO. : BCCL/CED/TC/NIT-30/2011-12/3299-3331 dated 02/03.08.2011**

- 1. BHART COKING COAL LIMITED (BCCL), Civil Engineering Department, Koyla Nagar, Dhanbad, Jharkhand, invites sealed turnkey bids under three parts/envelopes system from reputed and experienced contractors for the following works :**

### **Brief Scope of Work:**

<b>Name &amp; Description of Works</b>	<b>Location</b>	<b>Period of completion</b>
<b>Planning, Design, Engineering, Construction, Fabrication, Supply, Erection, Trial-run, Commissioning and Testing of 5 Nos. Feeder Breakers Complete with its attachment, Capable of Crushing Coal Lumps of maximum size (1500 x 1500 x 1200 mm) to (-) 100 mm 3-dimensional of Capacity 400 TPH with Installation, Commissioning including Civil Works like RCC Retaining Wall, Foundation etc Complete (on TurnKey Basis).</b>	1. Sijua Area – 1 No. 2. Bastacolla Area – 2 Nos. 3. Lodna Area – 2 Nos. under Areas of BCCL, Dhanbad (Jharkhand).	12 months

2. The total scope of supply and works & services shall be treated as a combined contract as whole.

- 3. Earnest Money / Bid Security** of Rs. 9,20,000.00 (Rupees nine lakhs twenty thousand only) is to be deposited in the form of irrevocable Bank Guarantee (from any Nationalized Bank/ Scheduled Bank approved by Reserve Bank of India payable at its branches at Dhanbad) with validity 28 days beyond the validity of the Bid in the format given in the Bid Document in a separate envelope alongwith the tender. Certified Cheques and Demand Drafts will also be acceptable as Earnest Money/ Bid Security drawn in favour of Bharat Coking Coal Limited on any scheduled Bank payable at its branch at Dhanbad. Earnest Money / Bid Security of the unsuccessful bidder shall be refunded as promptly as possible after opening of Price Bid and finalisation of the tender and shall bear no interest.

**4 Application Fee for Tender Documents:** The price of Tender Documents shall be Rs.10,000/- (Rupees Ten thousand only) payable either in cash or by Bank Draft drawn in favor of Bharat Coking Coal limited, payable at Dhanbad.

**5. Availability of tender documents :** Tender documents including terms and conditions of works, shall be available on payment, from the following office, during the period (during the working hours) as stated below.

Place	DATE & TIME
Office of the General Manager (Civil) BCCL, Koyla Bhawan Complex Dhanbad-826005	From 09.08.2011 to 09.09.2011 From 10:30hours(IST) to 16.00 hours IST

Tender Documents are also available on our website. For details please visit company's website at [www.bccl.gov.in](http://www.bccl.gov.in)

**6. General Instructions for Submission of Tender :** A tenderer should strictly be complied with the following instructions :

(a) A tenderer is required to submit offers in sealed covers giving reference to this Tender Notice No. and date, containing offers in three parts prominently superscribing as Part I, Part II and Part III respectively.

(b) Three Parts of the bid should contain the details as follows : -

Part-I - Full details of the firm, information on the "supply, installation & commissioning" of similar equipment to different parties in the country, details of project handled, testimonials and documentary evidence in support of satisfactory performance, financial capabilities and any other relevant information and the Earnest Money Deposit.

Part-II - (i) Technical offer along with technical specifications of equipment/ know-how offered, drawings, pamphlet etc. strictly in terms of tender enquiry.

Part-III-Prices only in the format as indicated in the tender document.

The Earnest Money Deposit is to be submitted in a separate

envelope altogether; super-scribing "Earnest Money Deposit"; and not inside the envelope containing Part I or part II of the Bid.

The bidders, who will download the tender documents from the website of the company, will be required to pay the cost of tender documents (Application Fee) by Bank Draft as per NIT at the time of submission of tenders.

The bidders will be required to submit an undertaking that they will accept the tender documents as available in the website and their tender shall be rejected if any tampering in the tender document is found to be done at the time of opening of tender. The Bank Draft towards the cost of tender documents (Application Fee) and the undertaking of the tenderer as above shall be submitted in a separate envelope marked "Cost of Tender Document and the Undertaking" and not with Part-I/ EMD.

In case of any discrepancy between the tender documents downloaded from the web site and the master copy available in the office, the latter shall prevail and will be binding on the tenderers. No claim on this account will be entertained

Part-II and III of the offer shall be opened only in respect of such tenders as are found valid after scrutiny of Part-I.

7. **Validity of offer** : The rates offered in Part-III shall be valid for 180 (one hundred and eighty) days from the date of opening of part-I of the tender.
8. **PRE-BID MEETING**  
A pre bid meeting will be held on 23.08.2011 with intending tenderers at Conference Room, Level-III, Koyla Bhawan, BCCL at 11.00 AM.
9. **Receipt of Tenders** : Tenders are to be received in sealed covers upto 15:00 hours (IST) on 13.09.2011 at the following office:
  - a) Tender Box No. 20, C.I.S.F. Post, near Koyla Bhawan gate, Koyla Nagar, BCCL, Dhanbad and also
  - b) In the office of BCCL Desk Office, 6, Lyons Range, Kolkata-700001
10. **Opening of Tenders** : Tenders will be opened at 16:00 hours (IST) on

16.09.2011 in Conference Hall, Level – II, Koyla Bhawan Complex, BCCL, Dhanbad-826005 (India).

11. After opening of the tender, if the company decides to negotiate, the tenderers should be in a position to present himself or depute their authorised representatives, at short notice, with full authority for negotiating on technical as well as commercial terms and conditions of the contract.
12. The Company is not under any obligation to accept the lowest tender(s) and reserves the right to reject any or all the tenders without assigning any reason whatsoever and also to distribute the works and allot it to more than one tenderer, at its sole discretion..
13. Eligibility criteria for the Bidders

The intending bidder must have in its name as a prime contractor experience of having successfully completed similar works during last 7 ( seven) years ending last day of month previous to the one in which bid applications are invited should be either of the following

- (a) Three similar completed works each costing not less than the amount of Rs. 3.68 Crores

Or

Two similar completed works each costing not less than the amount of Rs. 4.60 Crores.

Or

One similar completed work costing not less than the amount of Rs. 7.36 Crores.

**Similar work means** - “Work related to Supply, Construction & Commissioning of Feeder Breaker/ Coal Handling/ Bulk Handling Plant, System Consisting of Feeder Breakers/ Crushers with RCC Foundation, Superstructure & Steel Structural Works”

- (b) Average annual financial turnover of work during the last 3(three) years, ending 31st March of the previous financial year should be at least Rs. 2.76 Crores.
- (c) Evidence of possessing adequate working capital of (at least Rs. 7.36 Crores.) inclusive of access to lines of credit and availability of other financial resources to meet the requirement.

**Other details are available in bid document.**

**14. The bidders are required to sign the Integrity Pact as per format given in Tender Document Part-I.**

**Name and address of Independent External Monitor:**



Sl. No.	Name	Address
1	Shri D. Bandopadhyay, IAS(Retd.)	GD-89, Sector-III, Salt Lake, Kolkata-700016
2	Justice Ashok Kumar Chakraborty, (Retd.)	BB-69, Sector-I, Salt Lake, Kolkata-700064

**Sd/-**

**General Manager (Civil), BCCL,  
CED, Koyla Nagar, Dhanbad-826005(India)**

CC :- Shri D. Bandopadhyay, IAS(Retd.), GD-89, Sector-III, Salt Lake, Kolkata-700016

CC :- Justice Ashok Kumar Chakraborty, (Retd.), BB-69, Sector-I, Salt Lake, Kolkata-700064

**CC:-PRO – With a request to publish the abridged NIT as enclosed in local as well as National dailies as per norms of the Company and also arrange to send the paper cutting to Civil Engineering Department, Koyla Nagar.**

CC: D(P)/ D(T)OP/ D(T)P&P /D(F)/ CVO.

CC:CGM(Cordn)/GM(P&P)/GM(Finance) I/c/CGM(E&M)/ RI-II, CMPDI

CC: GM(System)

CC: Sr.ES to CMD for kind information of CMD.

CC:HOD (Admn) with a request to display this NIT in Koyla Bhawan Notice Boards.

CC: All CGMs/GMs in the Areas including Washery Division for wide circulation through display in the Notice Boards.

**CC:Inspector, CISF- with a request to deploy security personnel at Conference Hall, Level – II, Koyla Bhawan Complex, BCCL, Koyla Nagar, Dhanbad on 16.09.2011 from 3.30 PM till completion of the meeting.**

CC: BCCL Desk Office, 6, Lyons Range, Kolkata - 1.

CC: CGM (Production), CIL, Kolkata.

CC: Kolkata offices of all Subsidiaries.

.

## **SECTION -2**

### **INSTRUCTIONS TO BIDDERS**

## **SECTION-2**

### **INSTRUCTIONS TO BIDDERS**

#### **1. SCOPE OF TENDERER**

- 1.1 Bharat Coking Coal Limited, Dhanbad P.O. BCCL Township, Dist. Dhanbad, Jharkhand, India (referred to as Employer/ Owner/ Company in these documents) invites bids for the construction on turnkey basis for the works (as defined in these documents and referred to as "the works") detailed in the table given in the Notice Inviting Tenders (NIT). The tenderers must submit tenders for all of the works (Packages or slices) detailed in the NIT.
- 1.2 The successful Bidder will be expected to complete the Works by the Intended Completion date specified in the Contract.
- 1.3 The total scope of supply and works & services shall be treated as a combined contract as a whole.

#### **2. ELIGIBLE TENDERERS :**

- 2.1 The invitation for bids is open to all bidders eligible to participate as per qualifying criteria laid down separately hereinafter.
- 2.2 All bidders shall provide in Part-I, Forms of Bid and Qualification Information, a statement that the Bidder (including all members of a joint venture and sub contractors) is not associated, nor has been associated in the past, directly or indirectly, with the consultant or any other entity that has prepared the design, specifications, and other documents for the Project or being proposed as Engineer for the Contract. A firm that has been engaged by the Employer to provide consulting services for the preparation or supervision of the Works shall not be eligible to Bid.
- 2.3 Joint Venture : Two or three companies/ contractors may jointly undertake contract(s). Each entity will be jointly responsible for completing the task as per the contract.

#### **3.0 QUALIFICATION OF THE TENDERER:**

- 3.1 All bidders shall provide in Part-I, Forms of Bid and Qualification Information, a preliminary description of the proposed work method and schedule, including drawings and charts, as necessary.

- 3.2 In the event that prequalification of potential bidders has been undertaken, only Bids from pre-qualified bidders will be considered for award of Contract. These qualified bidders should submit with their Bids any information updating their original prequalification applications or, alternatively, confirm in their Bids that the originally submitted prequalification information remains essentially correct as of the date of Bid submission. The update or confirmation should be provided in Part-I.
- 3.3 If the Employer has not undertaken prequalification of potential bidders, all bidders shall include the following information and documents with their bids (copies of all documentary evidences are to be duly authenticated by the tenderers/ constituted attorney of the tenderer with full signature and seal.

All signed declarations are to be made in the tenderer's letter head.)

- (a) Copies of original documents, defining the constitution or legal status, place of registration, and principal place of business; written power of attorney of signatory of the Bid to commit the Bidder;
- (b)
  - i) total monetary value of contractual work performed for each of the last five years.
  - ii) experience of having successfully executed similar works during last seven years;
- (c) experience in works of similar nature and size for each of the last five years and details of work under way or contractually committed; and the name and address of clients who may be contacted for further information on those contracts with performance certificate for the works executed in last five years from the respective owners;
- d) major items of construction equipment proposed to carry out the contract;
- e) qualifications and experience of key site management and technical personnel proposed for the Contract;
- f) reports on financial standing of Bidder, such as profit and loss statement and auditor's reports for the past five years;
- g) evidence of adequacy of working capital for this Contract (access to lines of credit and availability of other financial resources);
- h) authority to seek references from the Bidder's bankers;
- i) information regarding any litigation, current or during the last five years, in which the Bidder is involved, the parties concerned and dispute amount including status of final settlement of contracts including claims/counter claims, liquidated damages, bonus etc., if any;
- j) proposals for sub contracting components of the works amounting to more than 10 percent of the Contract Price and
- k) Permanent Income Tax No ( PAN);

- l) The bidders would give a declaration that they have not been banned or de listed by any Government or Quasi-govt. Agencies or PSU's. If a bidder has been banned by any Govt. or Quasi-Govt. Agencies or PSU's that fact must be clearly stated and it may not necessarily be a cause for disqualifying him. If this declaration is not given the bid will be rejected as non responsive.
- m) Two or three companies/ contractors participating in the bid as Joint Venture should submit firm-wise participation details, Banker's name, execution of work with details of contribution of each and all other relevant details.
- n) PAN based Service Tax registration with competent statutory authority.
- o) Registration with CMPF authorities.
- p) It is mandatory for all the bidders to sign Integrity Pact Documents. Tenders submitted without the Integrity Pact Documents will be summarily rejected and will not be considered for further evaluation.[refer to (a) clause 3.8 of this Section-2 for details and (b) Section-6 for the format of Integrity Pact].

*[Note: The intending tenderer will have to submit a declaration in support of the authenticity of the credentials submitted by them along with the tender in the form of an affidavit as per the format provided in the bid document.]*

**3.4 To qualify for award of the contract** - The intending bidder must have in its name as a prime contractor experience of having successfully completed similar works during last 7 ( seven) years ending last day of month previous to the one in which bid applications are invited should be either of the following

- (a) Three similar completed works each costing not less than the amount of Rs. 3.68 Crores

Or

Two similar completed works each costing not less than the amount of Rs. 4.60 Crores.

Or

One similar completed work costing not less than the amount of Rs. 7.36 Crores.

**Similar work means** - Work related to Supply, Construction & Commissioning of Feeder Breaker/ Coal Handling/ Bulk Handling Plant, System Consisting of Feeder Breakers/ Crushers with RCC Foundation, Superstructure & Steel Structural Works.

- (b) Average annual financial turnover of work during the last 3(three) years, ending 31st March of the previous financial year should be at least Rs. 2.76 Crores.
  - (c) Evidence of possessing adequate working capital of (at least Rs. 7.36 Crores) inclusive of access to lines of credit and availability of other financial resources to meet the requirement.
  - (d) Evidence of possessing adequate infrastructural support with respect to design, construction, manufacture/ supply of major equipment inclusive of legally bound back-up MOU/ Agreement with other agencies in the respective field of specialization as joint venture partners.
- 3.5 Sub contractors experience and resources will not be taken into account in determining the bidder's compliance with qualifying criteria.
- 3.6 Bidders who meet the minimum qualification criteria will be qualified only if their available bid capacity is more than the total bid value. The available bid capacity will be calculated as under :

$$\text{Assessed available bid capacity} = (A \times N \times 2 - B)$$

Where – A : Maximum value of works executed in any one Year during the last five years (updated to current level) taking into account the completed as well as works in progress.

N : Number of years prescribed for completion of the Works for which bids are invited.

B : Value at current price level of existing commitments and ongoing works to be completed during the next 12 months.

*[Note 1: Financial turnover and cost of completed works of previous works shall be given a weightage of 5% per year (average annual rate of inflation) to bring them at current price level.]*

*[Note 2: The statements showing the values of existing commitments and on going works as well as the stipulated period of completion remaining for each of the works listed should be countersigned by the engineer-in charge not below the rank of executive engineer.]*

- 3.7 Even though the bidders meet the above qualifying criteria, they are subject to be disqualified if they have

- a. made misleading or false representations in the forms, statements and

attachments submitted in proof of the qualification requirement; and /or

b. record of poor performance such as abandoning the works, not properly completing the contract, inordinate delays in completion, litigation history, or financial failures etc.

3.8 It is mandatory for all the bidders to sign Integrity Pact Documents . Tenders submitted without the Integrity Pact Documents will be summarily rejected and will not be considered for further evaluation. (for format, refer to Section-6) as described in clause 3.3(p). Any bidder who does not submit this duly-signed document, shall be disqualified from participation in the tender process.

#### **4.0 ONE BID PER BIDDER**

4.1 Each Bidder shall submit only one Bid, either individually, or as a partner in a partnership firm or a partner in a joint venture or a public limited firm. A Bidder who submits or participates in more than one Bid (other than as a subcontractor or in cases of alternatives that have been permitted or requested) will cause all the proposals with the Bidder's participation to be disqualified.

#### **5.0 COST OF BIDDING**

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

#### **6.0 SITE VISIT**

6.1 The Bidder, at the Bidder's own responsibility, cost and risk, is encouraged to visit and examine the Site of Works and its surroundings and obtain all information that may be necessary for preparing the Bid and entering into a contract for construction of the Works. The costs of visiting the Site shall be at the Bidder's own expense.

6.2 It shall be deemed that the tenderer has visited the site/ area and got fully acquainted with the working conditions and other prevalent conditions and fluctuations thereto whether he actually visits the site/ area or not and has taken all the factors into account while quoting his rates and prices.

6.3 Site investigation reports: The contractor, in preparing the bid, shall rely on the site investigation report referred to in the contract data, supplemented by any information available to the Bidder.

## 7.0 CONTENT OF BIDDING DOCUMENTS

7.1 The set of bidding documents comprises the documents listed in the table below and addenda issued in accordance with Clause 9:

Section - 1	Tender Notice
Section - 2	Instructions to Bidders
Section - 3	Forms of Bid and Qualifications Information
Section - 4	Conditions of Contract
Section - 5	Miscellaneous Forms
Section - 6	Technical Specifications
Section - 7	Format of Price Bid

## 8. CLARIFICATION OF BIDDING DOCUMENTS

8.1 A prospective Bidder requiring any clarification of the bidding documents may notify the Employer in writing or by cable (cable includes telex and facsimile) at the Employer's address indicated in the Notice Inviting Tender. The Employer will respond to any request for clarification received earlier than 15 days prior to the deadline for the submission of Bids. Copies of the Employer's response will be forwarded to all purchasers of the bidding documents, including a description of the enquiry but without identifying its source.

## 9.0 AMENDMENT OF BIDDING DOCUMENTS

9.1 Before the deadline for submission of Bids, the Employer may modify the bidding documents by issuing addenda. Any addendum thus issued shall be part of the bidding documents and shall be communicated in writing or by cable to all purchasers of the bidding documents. Prospective Bidders shall acknowledge receipt of each addendum by cable to the Employer.

9.2 To give prospective Bidders reasonable time in which to take an addendum into account in preparing their Bids, the Employer shall extend, as necessary, the deadline for submission of Bids, in accordance with Sub-clause 19.2 below. And the same is also to be communicated simultaneously to all the purchaser of the bidding document.

## 10.0 LANGUAGE OF BID

10.1 All documents relating to the Bid shall be in the English language.

## 11.0 DOCUMENTS COMPRISING THE BID

11.1 The Bid, comprising of three parts, will be submitted by the bidder in the following manner :

a. **Part I** of the bid to be submitted in Ist inner sealed envelope comprising of -

(i) Bid security/ Earnest money deposit, (refer to Sec. I Clause 3.)



- (ii) Letter of the bidder submitting the bid in the form as stipulated in 'Contractor's bid' (refer to Sec. 2) of the Bid Document and
- (iii) Qualification information as indicated in bid document (Section 2) and Documents as required in accordance with stipulations of Bidding Documents (Section 2) and any other materials required to be completed and submitted by bidder in accordance with these instructions.
- (iv) Part-I (commercial) of tender document duly signed on all pages by the bidder as acceptance of all terms and condition of tender document.

b. **Part II** of the bid to be submitted in the 2nd inner sealed envelope comprising of

- (i) Technical offer along with technical specifications of equipments / know how offered, drawings, pamphlets etc. strictly in terms of tender enquiry.
- (ii) Commercial Terms and Conditions including payment terms in case deviating from those in the tender enquiry.
- (iii) Part-II technical of the tender document (purchased copy from the owner or downloaded from the specified website) duly signed on all pages by the bidder as acceptance of all terms and conditions of the tender document.

c. **Part III** of the bid, to be submitted in 3rd inner sealed envelope, shall comprise of Price Bid only in the format as indicated in the tender documents (refer to Sec 5).

d. All the inner sealed envelopes will then be placed in one outer envelope, sealed and marked properly as per Clause 18 and submitted to the Employer at its address before the deadline for submission of the bid as described in Clause 19.

e. If the Bidding Documents are downloaded from the company's website, the Bidders shall deposit requisite Application Fee as the cost of Bidding Documents in the form of Bank Draft of scheduled bank drawn in favour of **Bharat Coking Coal Limited, payable at DHANBAD**. The bidders are also required to submit an undertaking that they will accept the Tender Documents as available in the website and their tender shall be rejected if any tampering in the tender document is found to be done at the time of opening of tender or there after during subsequent scrutiny. In case of any discrepancy between the tender documents downloaded from the website and the master copy available in the office of the Employer,

the latter shall prevail and will be binding on the tenderers. No claim on this account will be entertained. The Company shall not be responsible for any delay/difficulties or inaccessibility of the downloading facility for any reason, whatsoever. The downloading facility shall be available during the period of sale of Tender Documents.

The bank draft and the undertaking shall be submitted in a separate envelope marked "Cost of Tender Documents and the Undertaking" and not with Part I / EMD but will be put inside the outer sealed envelope (refer to para 'd' above).

## **12 BID PRICES**

- 12.1 The contract shall be for the whole Works as described in Sub-Clause 1.1, based on the scope of work as detailed in the bidding document.
- 12.2 The Bidder shall submit rates and prices for all items of the Works described in the scope of works. Corrections, if any, shall be made by crossing out, initialing, dating and rewriting.
- 12.3 All duties, taxes except service tax and other levies payable by the Contractor under the Contract, or for any other cause shall be included in the rates, prices and the total Bid Price submitted by the Bidder. All incidentals, overheads, leads, lifts, carriages etc. as may be attendant upon execution and completion of works as stipulated in the bidding document shall also be included in the rates, prices and total Bid price submitted by the bidder.
- 12.4 The rates and prices quoted by the Bidder shall be fixed for the duration of the contract and shall not be subject to variations on any account except to the extent variations allowed as per the conditions of the contract indicated in clause no. 2.6 of section 4.2 (Additional Terms & Conditions of Contract) in the bidding document.

## **13.0 CURRENCIES OF BID AND PAYMENT**

- 13.1 The unit rates and prices shall be quoted by the Bidder entirely in Indian Rupees.

## **14.0 Bid Validity:**

- 14.1 Bid shall remain valid for a period not less than one hundred and eighty days (after the deadline for bid submission specified in clause-19). A bid valid for a shorter period shall be rejected by the Employer.
- 14.2 In exceptional circumstances, prior to expiry of the original time limit, the employer may request the bidders to extend the period of validity for a specified additional period. The request and the bidder's responses shall be made in writing or by cable. A bidder may refuse the request without forfeiting his bid security. A bidder agreeing to the request will not be required or permitted to modify his bid but will be required to extend the

validity of his bid security for a period of the extension and in compliance with clause no. 15 in all respects.

### **15.0 Bid Security/Earnest Money Deposit**

- 15.0 The bidder shall furnish ,as part of his bid, a Bid Security/ Earnest Money in the amount as shown in NIT for this particular work. Bid Security/ EMD will be required to be deposited in the form of irrevocable Bank Guarantee (from any Nationalised/Scheduled Bank Branch acceptable to the owner) with validity 28 days beyond the validity of the bid in the format given in the bid document. Certified Cheques and Demand Drafts will also be acceptable as Earnest Money/ Bid Security drawn in favour of Bharat Coking Coal Limited. Refer to clause #3 of section-1 about bank draft details (as for earnest money, other details and conditions of bank draft are applicable in this case also).**
- 15.1 Any bid not accompanied by an acceptable Bid Security/ EMD and necessary documents for pre qualifying criteria shall be rejected by the Employer as non-responsive.**
- 15.2 The Bid security/ EMD of the unsuccessful bidder shall be refundable as promptly as possible after opening of price bid and finalization of the tender.
- 15.3 The Bid Security/ EMD of the successful Bidder will be discharged when the Bidder has signed the agreement and furnished the required Performance Security/ Security Deposit.
- 15.4 The Bid Security / Earnest Money may be forfeited :
- a) if the Bidder withdraws the Bid after Bid opening during the period of Bid validity; or
  - b) in the case of a successful Bidder, if the Bidder fails within the specified time limit to :
    - (i) sign the Agreement;
    - (ii) or furnish the required Performance Security/ Security Deposit.
  - c) if the Bidder does not accept the correction of the bid price pursuant to clause 26 of ITB (Instructions To Bidders).
- 15.6 The Bid Security / EMD deposited with the Employer will not carry any interest.

### **17.0 Format and Signing of Bid**

- 17.1 The Bidder shall prepare the bid documents comprising the Bid as described in Clause 11 of these Instructions to Bidders.
- 17.2 All documents of the Bid shall be typed or written in indelible ink and shall be signed by a person(s) duly authorized to sign on behalf of the Bidder, pursuant to Sub-Clauses 3.3(a). All pages of the Bid document shall be signed by the person(s) signing the Bid.

- 17.3 The Bid shall contain no alterations, or additions, except those to comply with instructions issued by the Employer, or as necessary to correct errors made by the Bidder, in which case such corrections shall be initialed by the person(s) signing the Bid. Erasing or overwriting in the Bid Document may disqualify the Bidder.

## 18. SEALING, MARKING AND SUBMISSION OF BIDS

- 18.1 The Bidder shall seal the Bid in three inner sealed envelopes and one outer sealed

envelope, duly marking the inner envelopes in the following manner :

- a) 1st inner sealed envelope will be marked **“Part I- Bid for Planning. Design, Engineering, Construction, Fabrication, Supply, Erection, Trial-run, Commissioning and Testing of 5 Nos. Feeder Breakers Complete with its attachment, Capable of Crushing Coal Lumps of maximum size (1500 x 1500 x 1200 mm) to (-) 100 mm 3-dimensional of Capacity 400 TPH with Installation, Commissioning including Civil Works like RCC Retaining Wall, Foundation etc Complete (on TurnKey Basis).” Comprising of Bid Security/ EMD with qualification information**
- b) 2nd inner sealed envelope will be marked as **“Part II- Technical and Commercial Parts for Planning. Design, Engineering, Construction, Fabrication, Supply, Erection, Trial-run, Commissioning and Testing of 5 Nos. Feeder Breakers Complete with its attachment, Capable of Crushing Coal Lumps of maximum size (1500 x 1500 x 1200 mm) to (-) 100 mm 3-dimensional of Capacity 400 TPH with Installation, Commissioning including Civil Works like RCC Retaining Wall, Foundation etc Complete (on TurnKey Basis).”**
- c) 3rd inner sealed envelope will be marked **“Part III- Price Bid for Planning. Design, Engineering, Construction, Fabrication, Supply, Erection, Trial-run, Commissioning and Testing of 5 Nos. Feeder Breakers Complete with its attachment, Capable of Crushing Coal Lumps of maximum size (1500 x 1500 x 1200 mm) to (-) 100 mm 3-dimensional of Capacity 400 TPH with Installation, Commissioning including Civil Works like RCC Retaining Wall, Foundation etc Complete (on TurnKey Basis).”**
- d) Outer Sealed envelope will be marked **“Bid Documents for Planning. Design, Engineering, Construction, Fabrication, Supply, Erection, Trial-run, Commissioning and Testing of 5 Nos. Feeder Breakers Complete with its attachment, Capable of Crushing Coal Lumps of maximum size (1500 x 1500 x 1200 mm) to (-) 100 mm 3-dimensional of Capacity 400 TPH with Installation, Commissioning including Civil Works like RCC Retaining Wall, Foundation etc Complete (on TurnKey Basis).”**

- 18.2 The inner envelopes placed in the outer envelope shall :

- a. be addressed to BCCL at the following address and submitted accordingly before the deadline for submission of bid as indicated in Clause 19:

General Manger (Civil), Civil Engineering Department, Koyla Nagar, BCCL, Dhanbad, (JHARKHAND).

b.inner and outer envelopes will bear the following additional identification:

- **Bid for “Planning. Design, Engineering, Construction, Fabrication, Supply, Erection, Trial-run, Commissioning and Testing of 5 Nos. Feeder Breakers Complete with its attachment, Capable of Crushing Coal Lumps of maximum size (1500 x 1500 x 1200 mm) to (-) 100 mm 3-dimensional of Capacity 400 TPH with Installation, Commissioning including Civil Works like RCC Retaining Wall, Foundation etc Complete (on TurnKey Basis)”.**

- **Bid Reference No : BCCL/CED/TC/NIT-30/2011-12/3299-3331 dated 02/03.08.2011**

**DO NOT OPEN BEFORE 16:00 HRS (IST) on 16.09.2011**

18.3 In addition to the identification required in Sub-Clause 18.2 the inner and outer envelopes shall indicate the name and address of the Bidder.

18.4 If the outer envelope is not sealed and marked as above, the Employer will assume no responsibility for the misplacement or premature opening of the Bid.

## 19. DEADLINE FOR SUBMISSION OF BIDS

19.1 Bids shall be delivered to BCCL at the address specified above not later than **15:00 Hrs.(IST) on 13.09.2011** In the event of the specified date for the submission of bids being declared a holiday for the Employer, the Bids will be received up to the appointed time on the next working day.

19.2 The BCCL may extend the deadline for submission of Bids by issuing an amendment in accordance with Clause 9, in which case all rights and obligations of the BCCL and the Bidders previously subject to the original deadline will then be subject to the new deadline.

## 20. LATE BIDS

20.1 Any Bid received after the deadline prescribed in Clause 19 due to any reason whatsoever will not be accepted.

## 21. MODIFICATION AND WITHDRAWAL OF BIDS

21.1 Bidders may modify or withdraw their Bids by giving notice in writing before the deadline prescribed in Clause 19 in case the bidder has submitted the bid well before the deadline or extended deadline.

21.2 Each Bidder's modification or withdrawal notice shall be prepared, sealed, marked and delivered in accordance with the provisions of Clause 11, 17, 18 and 19, with the outer and inner envelopes additionally marked "MODIFICATION" or "WITHDRAWAL" ,as appropriate.

21.3 No Bid may be modified after the deadline for submission of Bids.

21.4 Withdrawal of a Bid between the deadline for submission of Bids and the expiration of the period of Bid validity specified in the Bid Document or as extended pursuant to Sub-Clause 14.2 may result in the forfeiture of the Bid Security pursuant to Clause 15.

## **22. BID OPENING**

22.1 BCCL will open part I of the bids first, modifications made pursuant to Clause 21, in the presence of the bidders' or their representatives who choose to attend at the time and in the place specified in Clause 19. In the event of the specified date of Bid opening being declared a holiday for the Employer, the Bids will be opened at the appointed time and location on the next working day.

22.2 After examination and evaluation of part I of the bids in accordance with Cl. 25 of these instructions, Part II of the bids which are substantially responsive and fulfill the requisite eligibility criteria laid down under these instructions shall be opened.

22.3 Part III of the bids which are technically and commercially at par and substantially responsive in accordance with specifications, scope, terms and conditions and fulfilling the requirements of the instructions to the bidders, shall be opened.

22.4 Envelopes marked "WITHDRAWAL" shall be opened and read out first. Bids for which an acceptable notice of withdrawal has been submitted pursuant to Clause 21 shall not be opened.

22.5 The Bidders' names, the Bid Prices, the total amount of each Bid and of any alternative Bid (if alternatives have been requested or permitted), any discounts, Bid modifications and withdrawals, the presence or absence of Bid Security, and such other details as the employer may consider appropriate, will be announced by employer at the opening.

## **23.0 PROCESS TO BE CONFIDENTIAL**

23.1 Information relating to the examination, clarification, evaluation and comparison of Bids and recommendations for the award of a contract shall not be disclosed to Bidders or any other persons not officially concerned with such process until the award to the successful Bidder has been announced. Any effort by a Bidder to influence the Employer's processing of Bids or award decisions may result in the rejection of his Bid.

## **24.0 CLARIFICATION OF BIDS**

24.1 To assist in the examination, evaluation, and comparison of Bids, the Employer may, at the Employer's discretion, ask any Bidder for clarification of the Bidder's Bid, including breakdowns of unit rates. The request for clarification and the response shall be in writing or by cable, telex, or facsimile.

## **25.0 EXAMINATION OF BIDS AND DETERMINATION OF RESPONSIVENESS**

25.1 Prior to the detailed evaluation of Bids, the Employer will determine

whether each Bid :

- a. meets the eligibility criteria defined in Clause 3;
- b. has been properly signed;
- c. is accompanied by the required securities; and
- d. is substantially responsive to the requirements of the Bidding documents.

25.2 A substantially responsive Bid is one which conforms to all the terms, conditions, and specifications of the Bidding documents without material deviation or reservation is one

- a. which affects in any substantial way the scope, quality, or performance of the works;
- b. which limits in any substantial way, inconsistent with the Bidding documents, the Employer's rights or the Bidder's obligations under the Contract; or
- c. whose rectification would affect unfairly the competitive position of other Bidders presenting substantially responsive Bids.

25.3 If a Bid is not substantially responsive, it may be rejected by the Employer at its sole discretion.

## **26. CORRECTION OF ERRORS**

26.1 Bids determined to be substantially responsive will be checked by BCCL for any arithmetical errors. Errors will be corrected by BCCL as follows :

- a. where there is a discrepancy between the amounts in figures and in words, the amounts in words will govern; and
- b. where there is a discrepancy between the unit rate and the line item total resulting from multiplying the unit rate by the quantity, the unit rate as quoted will govern.
- c. discrepancy in totaling or carry forward in the amount quoted by the contractor shall be corrected .

The tendered sum so corrected and altered shall be substituted for the sum originally tendered and considered for acceptance instead of the original sum quoted by the tenderer along with other tender(s). Rounding off to the nearest rupee should be done in the final summary of the amount instead of in totals of various sections of the offer.

26.2 The amount stated in the Bid will be adjusted by BCCL in accordance with the above procedure for the correction of errors and, shall be considered as binding upon the Bidder.

## **27 EVALUATION AND COMPARISON OF BIDS**

- 27.1 BCCL will evaluate and compare only the Bids determined to be substantially responsive in accordance with Clause 25.
- 27.2 In evaluating the Bids, BCCL will determine for each Bid the evaluated Bid Price by adjusting the Bid Price as follows :
- a. Making any correction for errors pursuant to Clause 25.
  - b. Making an appropriate adjustment for any other quantifiable acceptable variations, deviations or alternative offers submitted in accordance with Clause 16 and
  - c. Making appropriate adjustments to reflect discounts or other price modifications offered in accordance with Clause 20.
- 27.3 The Employer reserves the right to accept or reject any variation, deviation, or alternative offer and other factors that are in excess of the requirements of the Bidding documents or otherwise result in unsolicited benefits for the employer shall not be taken into account in Bid evaluation.
- 27.4 If the Bid of the successful Bidder is seriously unbalanced in relation to the Engineer's estimate of the cost of work to be performed under the contract, the Employer may require the Bidder to produce detailed price analyses for any or all items of the work, to demonstrate the internal consistency of those prices with the construction methods and schedule proposed.

## **28 BCCL'S RIGHT TO ACCEPT ANY BID AND TO REJECT ANY OR ALL BIDS**

- 29.0 Notwithstanding Clause 27, the Employer reserves the right to accept or reject any Bid, and to cancel the bidding process and reject all Bids, at any time prior to the award of Contract, without thereby incurring any liability to the affected Bidder(s) or any obligation to inform the affected Bidder(s) of the grounds for CMPDI's action.

## **30.0 NOTIFICATION OF AWARD AND SIGNING OF AGREEMENT**

- 30.1 The Bidder, whose Bid has been accepted, will be notified of the award by



the Employer prior to expiration of the Bid validity period by cable, telex, or facsimile confirmed by registered letter. This letter (hereinafter and in the Conditions of Contract called the "Letter of Acceptance") will state the sum that the Employer will pay the Contractor in consideration of the execution, completion and maintenance of the Works by the Contractor as prescribed by the Contract (hereinafter and in the Contract called "the Contract Price").

30.2 The notification of award will constitute the formation of the Contract, subject only to the furnishing of a Performance Security/ Security Deposit in accordance with Clause 31.

30.3 The Agreement will incorporate all agreements between the Employer and the successful Bidder within 28 days following the notification of award along with the Letter of Acceptance.

30.4 Upon the furnishing by the successful Bidder of the Performance Security/ Security Deposit, the Employer will promptly notify the other Bidder that their Bids have been unsuccessful and refund the Bid Security/ Earnest Money Deposit.

305 Bidders are required to submit the duly-signed 'Integrity Pact' (for format, refer to Section-6).

### **31.0 PERFORMANCE SECURITY/ SECURITY DEPOSIT/**

#### **PERFORMANCE GUARANTEE**

31.1 Security deposit shall consist of two parts

- a) Performance security to be submitted at award of work and
- b) Retention money to be recovered from running bills. The security deposit shall bear no interest

31.1.1 Performance security should be 5% of contract amount and should be submitted within 28 days of receipt of the Letter of Acceptance by the successful Bidder in any of the form given below after which the bid security/earnest money will be refunded to the contractor.

- A bank Guarantee on a bank as indicated by the employer in the form given in section-8 from any Nationalised/scheduled Indian bank or Govt. Securities , FDR or any other form of deposit stipulated by the owner. Or,
- Demand Draft for the full amount of contract performance security drawn in favour of Bharat Coking Coal Limited. Refer to clause #2 of section-1 about bank draft details. (as for earnest money, other details and conditions of bank draft are applicable in this case also).

31.1.2 If performance security is provided by the successful bidders in the form of bank guarantee it shall be issued either –

(a) at Bidder's option by a Nationalized/ Scheduled Indian Bank or

(b) by a foreign Bank located in India and acceptable to the Employer.

31.1.3 Retention Money should be deducted at 5% from running bills. Total of performance security and Retention Money should not exceed 10% of contract amount or lesser sum indicated in the bid document.

31.2 The Guarantee amount shall be payable to the Employer without any condition whatsoever.

31.3 The Performance Guarantee shall cover additionally the following guarantees to the Employer:

(a) The successful bidder guarantees the successful and satisfactory operation of the equipment furnished and erected under the contract, as per the specifications and documents,

(b) The successful bidder further guarantees that the equipment provided and installed by him shall be free from all defects in design, material and workmanship and shall upon written notice from the employer fully remedy free of expenses to the Employer such defects as developed under the normal use of the said equipment within the period of guarantee specified in the relevant clause of the Conditions of Contract.

31.4 The Contract Performance Guarantee is intended to secure the performance of the entire Contract. However it is not construed as limiting the damages under clause entitled 'Equipment Performance Guarantee' in section Technical Conditions of Contract and damages stipulated in the other clauses in the bidding documents.

31.5 Bank Guarantee is to be submitted in the format prescribed by the company in Section-6. Bank Guarantee shall be irrevocable and it shall be from any Nationalised Bank/ Scheduled Bank.

31.6 The Company shall be at liberty to deduct/ appropriate from the Contract 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 Contract Performance Guarantee/ Security Deposit shall have to be restored by Contractor subsequently.

31.7 The Contract Performance Guarantee will be returned to the Contractor without any interest at the end of the Guarantee Period.

31.8 Failure of the successful Bidder to comply with the requirements of Sub-Clause 31.1 shall constitute sufficient grounds for cancellation of the award

and forfeiture of the Bid Security.

- 31.9 Performance Security/ Security Deposit shall be converted into Performance Guarantee on successful completion of work in accordance with contract and upon satisfactory trial operations and shall be valid for 90 days after the end of Guarantee period.

## **32. EMPLOYMENT OF LOCAL LABOUR**

- 32.1 "Contractors are to employ, to the extent possible, only local project affected people and pay wages not less than the minimum wages fixed by the local Government".

## **33. LEGAL JURISDICTION**

- 33.1 Matter relating to any dispute or difference arising out of this tender and subsequent contract awarded based on the bid shall be subject to the jurisdiction of Dhanbad Court, or Ranchi High Court , Jharkhand (India ) only.

## **34.0 DEEMED EXPORTS**

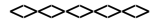
- 34.1 If the bidder has quoted any item(s) under the deemed exports then it will be the responsibility of the Bidder to get all the benefits under deemed exports from the Government. The Company's responsibility shall only be limited to the issuance of required certificates. The quotation of the Bidder will be unconditional and phrases like "Subject to availability of deemed exports benefit" will not find place in it.

## **35. CONSULTANTS NOT TO BID & VICE-VERSA :**

- 35.1 A firm which has been engaged by the Company to provide Goods or Works for a project or any of its affiliates will be barred from providing consultancy services for the same project. Conversely, a firm hired to provide consultancy services for the preparation or implementation of a project and any of its affiliates will be barred from subsequently providing Goods or Works or services related to the initial assignment for the same project.

**36 SUB-CONTRACTOR/ SUB-VENDOR :**

- 36.1** If a contractor submits his bid, qualifies and does not get the contract because of his not being the lowest, he will be prohibited from working as a sub-contractor for the contractor who is executing the work.



## **SECTION -3**

### **FORMS OF BID & QUALIFICATION INFORMATION**

## SECTION - 3

**FORMS OF BID AND QUALIFICATION  
INFORMATION**

**CONTRACTOR'S BID**

Sub : BID for the Work \_\_\_\_\_

To :

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Dear Sir,

We offer to execute the Works described above in accordance with the Conditions of Contract accompanying the Bidding Documents issued to us. The Bid Security/ Earnest Money in accordance with the NIT/ Tender Notice and Instructions to Bidders amounting to Rs ..... (in figures) ..... ( in words ) in the form as stipulated in Clause 15 of the Instructions to Bidders is enclosed herewith *(to be filled in by the Bidder)*.

This Bid and your written acceptance of it shall constitute a binding contract between us . We understand that you are not bound to accept the lowest or any Bid you receive.

We hereby confirm that this Bid complies with the Bid validity and Bid security required by the Bidding documents. We also confirm that EMD and other required documentary evidences related to this part of the Bid are enclosed (as listed below) herewith either in original/ copy attested by Gazetted Officer / copy duly authenticated by us with signature and seal along with affidavit as per the format provided in the bidding documents.

Yours faithfully,

Authorised Signature : \_\_\_\_\_

Name and Title of the Signatory : \_\_\_\_\_

Name of the Bidder : \_\_\_\_\_ (the Contractor)

Address : \_\_\_\_\_

Date : \_\_\_\_\_

(To be filled in by the Bidder )

Encl.      i)      EMD of Rs..... vide ..... dt. ....  
             ii)  
             iii  
             iv

## QUALIFICATION INFORMATION

(The information to be submitted by all the Bidders)

### 1.0 Individual Bidders or Individual Members of Joint Ventures

#### 1.1 Constitution or Legal status of Bidder (attach copy )

Place of registration: \_\_\_\_\_  
 Principal place of business: \_\_\_\_\_  
 Power of Attorney of signatory Bid: (attach)

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

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

#### 1.3 Joint Venture details :

Name of all partners of a joint venture  
 1. Lead partner  
 2. Partner  
 3. Partner

**Notes:** Joint ventures must comply the following requirements :

- i) Following are the minimum qualification requirements for joint ventures
  - a) The lead partner shall meet not less than 40% of all the qualifying criteria stated in the bidding documents.
  - b) The other partners shall meet not less than 30% of all the qualifying criteria stated in the bidding documents.
- ii) The formation of joint venture or change in the joint venture character / partners after submission of the bid and any change in the bidding regarding joint venture will not be permitted.
- iii) Any bid shall be signed so as to legally bind all partners jointly and severally and any bid shall be submitted with a copy of the Joint Venture Agreement (JV agreement) providing the joint and several liability with respect to the contract
- iv ) The pre qualification of a joint venture does not necessarily pre qualify any of its partners individually or as a partner in any other joint venture or association. In case of dissolution of a joint venture, each one of the constituent firms may pre qualify if they meet all the pre qualification requirements, subject to the written approval of the employer.
- v) The bid submission must include documentary evidence to the relationship between joint venture partners in the form of JV Agreement to legally bind all partners jointly and severally for the proposed agreement, which should set out the principals for the constitution, operation, responsibilities regarding work and financial arrangements, participation (percentage share in the total) and liabilities (joint and several) in respect of each and all of the firms in the joint venture. Such

JV Agreement must evidence the commitment of the parties to bid for the facilities applied for (if pre-qualified) and to execute the contracts for the facilities if their bid is successful.

- vi) One of the partners responsible for performing a key component of the contract shall be designated as Lead Partner, this authorization shall be evidenced by submitting with the Bid a Power of Attorney signed by legally authorized signatories of all the partners.
- vii) The JV agreement must provide that the Lead Partner shall be authorized to incur liabilities and receive instructions for and on behalf of any and all partners of the joint venture and the entire execution of the contract shall be done with the active participation of the Lead Partner.
- viii) The contract agreement should be signed jointly by each Joint Venture Partners.
- ix) An entity can be a partner in one Joint Venture. Bid submitted by Joint Ventures including the same entity as partners will be rejected.

**1.4 Details of experience for similar nature and complexity of work:**

Use a separate sheet for each contract (Attach performance certificates from concerned customer).

1.	Number of contract :
	Name of contract :
2	Name of the employer :
3.	Employers address :
4.	Nature of work and special features, if any :
5.	Contract role (check one ) 1. Sole contractor    2. Subcontractor 3. Partner in Joint venture
6.	Value of the total contract
7.	Date of award :
8.	Date of completion with original schedule and slippage, if any.
9.	Specified requirements : a) concrete :                      b) structural steelworks :      c) equipment :

**1.5 Subcontractors/ Consultants and firms proposed to be involved :**

(Attach performance credentials including Bio-data of design personnel of Consultants)

Section of work	Approx.. value of sub-contract	Sub-contractor (Name & Address)	Experience in similar works

**1.6 Information on Bid Capacity.**

- Works for which bids have been submitted and work which are yet to be completed) as on the date of this bid :
- a. Total value of work executed in last five years (year wise):.
  - b. Details of existing commitments and ongoing works.
  - c. Details of Works for which bids already submitted.



**1.7 Financial reports of the last five 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					Projected : Next two years	
	1	2	3	4	5	6	7
1. Total assets							
2. Current assets							
3. Total liabilities							
4. Current liabilities							
5. Profits Before taxes							
6. Profits After taxes							

**1.8 Evidence of access to financial resources to meet the qualification requirements:**

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.	

**1.9 Details of the bankers :Give details for e-payment also**

Banker	Name of the banker	
	Address of the banker	
	Telephone	Contact name ant title
	Fax	Telex
	Account number	Contractor has to give authorisation duly signed for E-payment to them

**1.10 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 Rs.

**1.11 Details of the major construction equipment to be used for the work :**

	Equipment type and capacity	Make and model	Minimum number
1			
2			

**1.12 Details of additional construction equipment to be purchased new for the project, indicating delivery times required in the form given below :**

	Equipment to be purchased new -type and capacity	Make and model	Delivery period	Number
1				
2				

**1.13. 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 resp. disc. Alternative names				

1.14 The bidder should list transport available for personnel, construction, plant, stores and machinery. Where transport is to be subcontracted the proposed arrangements should be clearly demonstrated.

1.15 The bidder should provide full details of his plant and maintenance facilities together with the full details of laboratory personnel, workshop personnel including fitters, mechanics, machinists etc.

1.16 Permanent Income Tax Account No. (PAN)

**1.17 DETAILS OF EARNEST MONEY/ PERFORMANCE SECURITY**

Deposit of Earnest Money by :

Draft No. :  
Drawn on :  
Amount (Rs.) :

}  
}  
}  
}

Bank Guarantee Details :  
Name of the Bank :  
Amount of BG. :  
Bank Guarantee valid upto :

1.18 OTHER DETAILS

(a) Details of registration/ enlistment with Government organisations/ PSUs/ Subsidiaries of Coal India.

(b) Certificate of registration as per statutory requirements under Sales Tax, Contract Labour Laws etc. as may be applicable

(A) Existing commitments and on going works

Desc. of works	Place & state	Contract no & date	Name & address of employer	Value of contract (Rs million)	Stipulated period of completion	Value of remaining to be completed	Anticipated date of completion
1	2	3	4	5	6	7	8

Signature of the Tenderer

Along with Seal/ Stamp

- NOTE :
1.

Separate sheets may be attached to furnish details, if necessary.
2.

All information furnished shall be serially arranged and supported with documentary evidence, bankers certificate, performance certificates from customers etc.

**AFFIDAVIT**

(NON JUDICIAL STAMP PAPER OF Rs 50/-)

I.....  
 ..... Partner/Legal Attorney Proprietor/Accredited Representative of  
 M/s. .... Solemnly declared that :

1. I/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 Bharat Coking Coal Limited and CMPDI.
3. All information furnished by me / us in respect of fulfilment of eligibility criteria and information given in this Bid is complete, correct and true.
4. All documents / credentials submitted along with this tender are genuine, authentic, true and valid.
5. If, any information or document submitted is found to be false /incorrect at any time, Employer may cancel my Bid and action as deemed fit may be taken against me /us including termination of the contract, forfeiture of all dues including Earnest Money and blacklisting of our firm and all Partners of the firm etc.

Signature of the Tenderer

Dated -----

**Seal of Notary**

**SECTION -4**

**CONDITIONS OF CONTRACT**

## SUB-SECTION – 4.1

**GENERAL TERMS AND CONDITIONS OF CONTRACT****1. DEFINITIONS :**

- i. The word "Company" or "Employer" or "Owner" wherever occurs in the conditions, means the Bharat Coking Coal Limited, Koyla Bhawan Complex, Dhanbad, 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.
- ii. 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.
- iii. The word "Contractor"/"Contractors" or "Manufacturer" wherever occurs 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.
- iv. "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.
- v. The term "sub-contractor", as employed herein, includes those having a direct contract with contractor either on piece rate, items rate, time rate or on any other basis and it includes one who furnishes work to a special design according to the plans or specifications of this work but does not include one who merely supplied materials.
- vi. "Consulting Engineer"/"Consultant" shall mean any firm or person duly appointed as such from time to time by the owner.
- vii. '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.
- viii. A 'Day' shall mean a day of 24 hours from midnight to midnight.
- ix. Engineer-in-charge/Designated Officer-in-charge will be clearly defined in the contract document. Engineer-in-charge/Designated Officer-in-charge who is of an appropriate seniority will be responsible for supervising and administering the contract, certifying payment due to the contractor, valuing 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 will be that of the Engineer-in-charge/Designated Officer-in-charge.
- x. 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.

- xi. 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.
- xii. "Specification" shall mean the technical specifications forming a part of the contract and such other schedules and drawings as may be mutually agreed upon.
- xiii. 'Contract price' shall mean the total sum for which tender is accepted by the company.
- xiv. '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 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.
- xv. "Letter of Acceptance" of the tender shall mean the official notice issued by the company notifying the contractor that his tender has been accepted.
- xvi. "Date of Contract" shall mean the date on which both the parties have signed the contract agreement.
- xvii. "Manufacturer's Works' or Contractor's Works" shall mean the place of work used by the Manufacturer, the Contractor, their collaborators or sub-contractors for the performance of the works.
- xviii. "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.
- xix. 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, judgement, direction etc. is understood to be a function of the Owner/Engineer/Engineer-in-Charge.
- xx. "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.
- xxi. "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.
- xxii. "Initial operation" shall mean the first integral operation of the complete equipment covered under the contract with sub-systems and supporting equipment in service.
- xxiii. "Trial Operation", "Reliability Test", Trial Run", "Complete Test" shall mean the extended period of time after the "Start-up" period. 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.

- xxiv. "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.
- xxv. "Commercial Operation" shall mean the condition of operation in which the complete equipment covered under the contract is officially declared by the owner to be available for continuous operation at different loads upto and including rated capacity. Such declaration by the owner however, shall not relieve or prejudice any of the contractor's obligation under this contract.
- xxvi. "Final Acceptance" shall mean the owner's written acceptance of the works performed under the contract, after successful completion of performance and guarantee tests.
- xxvii. "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.
- xxviii. "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,
- xxix. "Codes" shall mean the following, including the latest amendments, and/or replacements, if any :
- (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 thereunder.
    - (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 thereunder.
  - (c) Any other laws, rules, regulations and Acts applicable in the country with respect to labour, safety, compensation, insurance etc.
- xxx. Words importing singular only shall also include the plural and vice-versa where the context so requires.
- xxxi. Words importing "Person" shall include firms, companies, corporations, and associations or bodies of individuals, whether incorporated or not.
- xxxii. 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.



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

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

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

xxxvi "Bank Guarantee" shall mean the Bank Guarantee to be provided by ..... to .....

## **2. CONTRACT DOCUMENTS :**

The following documents shall constitute the contract documents :

- (i) Articles of Agreement,
- (ii) Notice Inviting Tender,
- (iii) Letter of Acceptance of Tender indicating deviations, if any, from the conditions of contract incorporated in the Tender Documents issued to the bidder and/ or the Bid submitted by the bidder,
- (iv) Conditions of contract, including general terms and conditions, additional terms and conditions, technical terms and conditions, erection terms and conditions, special conditions, if any etc. forming part of the Agreement,
- (v) Specifications, where it is part of Tender Documents,
- (vi) Scope of works/ Bills of quantities/ schedule of works/ quantities and
- (vii) Contract Drawings/ finalized work programme.

2.1 After acceptance of tender the Contractor shall be deemed to have carefully examined all Contract Documents to his satisfaction. If he shall have any doubt as to the meaning of any portion of the Contract Documents, he shall before signing the Contract, set forth the particulars thereof, and submit them to the Owner in writing in order that such doubt may be removed. The Owner will provide such clarifications as may be necessary in writing to the Contractor. Any information otherwise obtained from the Owner or the Engineer shall not in any way relieve the Contractor of his responsibility to fulfill his obligations under the Contract.

2.2 The Contractor shall enter into a Contract Agreement with the Owner within 60 (sixty) days from the date of 'Acceptance of Tender' or within such extended time as may be granted by the owner. The performance Bank Guarantee for the proper fulfillment of the contract shall be furnished by the contractor in the prescribed form within 30 (thirty) days of 'Acceptance of tender'. The performance Guarantee shall be as per terms prescribed in clause 31 of Instructions to Bidders of this tender.

2.3 The owner, after the issue of the Letter of Acceptance of Tender, will send one copy of the final agreement to the contractor for his scrutiny and approval.

2.4 The agreement, unless otherwise agreed to, shall be signed within 60 (sixty) days of the issue of the letter of Acceptance of tender, at the office of the owner on a date and time to be mutually agreed. The contractor shall provide for signing of the contract, performance guarantee in copies as required, appropriate power of attorney and other requisite materials. In case it is agreed mutually that the contract is to be signed beyond the stipulated time, the bid guarantee submitted with the tender will have to be extended accordingly.

- 2.5 The agreement will be signed in six originals and the contractor shall be provided with one signed original and the rest will be retained by the owner. None of these documents shall be used by the contractor for any purpose other than this contract and the contractor shall ensure that all persons employed for this contract strictly adhere to this and maintain secrecy, as required of such documents.
- 2.6 The contractor shall provide free of cost to the owner all the engineering data, drawings and descriptive materials submitted with the bid, in at least six (6) copies to form a part of the contract immediately after issue of letter of acceptance.
- 2.7 Subsequent to signing of the contract, the contractor at his own cost shall provide the owner with at least 6 (six) true copies of agreement within 30 (thirty) days after the signing of the contract.
- 2.8 The contract shall be considered as having come into force from the date of the letter of acceptance of tender issued by the owner.
- 2.9 The laws applicable to this contract shall be the laws in force in India. The courts of Jharkhand State, India shall have exclusive jurisdiction in all matters arising under this contract.
- 3.0 CONTRACT PERFORMANCE GUARANTEE/ SECURITY DEPOSIT :**
- 3.1 Security deposit shall consist of two parts
- a. Performance security to be submitted at award of work and
  - b. Retention money to be recovered from running bills. The security deposit shall bear no interest
- 3.1.1 Performance security should be 5% of contract amount and should be submitted within 28 days of receipt of the Letter of Acceptance, the successful Bidder in any of the form given below after which bid scrutiny/ earnest money will be refunded to the contractor.
- Bank Guarantee on a bank indicated by the Employer in the form given in Section 8 from any scheduled Indian Bank for full amount of 5% of the contract price after which the Bid Security/ Earnest Money will be refunded to the contractor.
  - or**
  - bank draft for the full amount of Contract Performance Security/ Security Deposit amounting to 5% of the contract price, in favour of Bharat Coking Coal Limited. Refer to clause 2 of section-1 about bank draft details (as for earnest money, other details and conditions of bank draft are applicable in this case also).
- 3.1.2 If performance security is provided by the successful bidders in the form of bank guarantee it shall be issued either –
- (a) at Bidder's option by a nationalized/ Scheduled Indian Bank or
- 3.1.3 Retention Money should be deducted at 5% from running bills. Total of performance security and Retention Money should not exceed 10% of contract amount or lesser sum indicated in the bid document.
- 3.2 Bank Guarantee shall be valid up to ninety (90) days after the end of Guarantee Period.

- 3.3 The Guarantee amount shall be payable to the Employer without any condition whatsoever.
- 3.4 The Performance Guarantee shall cover additionally the following guarantees to the Employer:
- (a) The successful bidder guarantees the successful and satisfactory operation of the equipment furnished and erected under the contract, as per the specifications and documents,
  - (b) The successful bidder further guarantees that the equipment provided and installed by him shall be free from all defects in design, material and workmanship and shall upon written notice from the employer fully remedy free of expenses to the Employer such defects as developed under the normal use of the said equipment within the period of guarantee specified in the relevant clause of the Conditions of Contract.
- 3.5 The Contract Performance Guarantee is intended to secure the performance of the entire Contract. However it is not construed as limiting the damages under clause entitled 'Equipment Performance Guarantee' in section Technical Conditions of Contract and damages stipulated in the other clauses in the bidding documents.
- 3.6 Bank Guarantee is to be submitted in the format prescribed by the company in Section 8. Bank Guarantee shall be irrevocable and it shall be from any Nationalised Bank/ Scheduled Bank.
- 3.7 The Company shall be at liberty to deduct/ appropriate from the Contract 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 Contract Performance Guarantee/Security Deposit shall have to be restored by Contractor subsequently.
- 3.8 The Contract Performance Guarantee will be returned to the Contractor without any interest at the end of the Guarantee Period.

#### **4.0 ASSIGNMENT AND SUBLETTING OF CONTRACT**

- 4.1 The contractor may, after informing the engineer and getting his written approval, assign or sub-let the contract or any part thereof other than for raw materials, for minor detail or any part of the plant for which makes are identified in the contract. Suppliers of the equipment not identified in the contract or any change in the identified supplier shall be subject to approval by the engineer. The experience list of the equipment vendors under consideration by the contractor for this contract shall be furnished to the engineer for approval prior to procurement of all such items/equipments. Such assignment sub-letting shall not relieve the contractor from any obligation, duty or responsibility under the contract. Any assignment as above without prior written approval of engineer shall be void.
- 4.2 For components/equipments procured by the contractors for the purposes of the contract, after obtaining the written approval of the owner, the contractor's purchase specifications and enquiries shall call for quality plans to be submitted by the suppliers along with their proposals. The quality plans called for from the vendors shall set out, during the various stages of manufacture and installation, the quality practices and procedures followed by the vendor's quality control organisation, the relevant reference documents/standards used, acceptance level, inspection documentation raised, etc. Such quality plans of the successful vendor shall be discussed and finalised in consultation with the engineer and shall form a part of the purchase order/contract between the contractor and the vendor. Within 3 weeks of the release of the same purchase order/contracts for such bought out items/ components, a copy of the same without price details but together with detailed purchase specifications, quality plans and delivery conditions shall be furnished to the engineer by the contractor.

## **5.0 PATENT RIGHTS AND ROYALTIES**

- 5.1 Royalties and fees for patent covering materials, articles, apparatus, devices, equipment or processes used in the works shall be deemed to have been included in the contract price. The contractor shall satisfy all demands that may be made at any time for such royalties or fees and he alone shall be liable for any damages or claims for patent infringements and shall keep the owner indemnified in that regard. The contractor shall, at his own cost and expense, defend all suits or proceedings that may be instituted for alleged infringement of any patent involved in the works, and, in case of an award of damages, the contractor shall pay for such award. In the event of any suit or other proceedings instituted against the owner, the same shall be defended at the cost and expense of the contractor who shall also satisfy/comply and decree, order or award made against the owner. But it shall be understood that no such machine, plant, work, material or thing has been used by the owner for any purpose or any manner other than that for which they have been furnished and installed by the contractor and specified under these specifications. Final payment to the contractor by the owner will not be made while any such suit or claim remains unsettled. In the event any apparatus or equipment, or any matter thereof furnished by the contractor, is in such suit or proceedings held to constitute infringement, and its use is enjoined, the contractor shall, at his option and at his own expense, either procure for the owner, the right to continue use of said apparatus, equipment or part thereof, replace it with non-infringing apparatus or equipment or modify it, so it becomes non-infringing.

## **6.0 TIME - THE ESSENCE OF CONTRACT**

- 6.1 The time and the date of completion of the works as stipulated in the contractor's proposal and accepted by the owner without or with modifications, if any and so incorporated in the award letter shall be deemed to be the essence of the contract. The contractor shall so organise his resources and perform his work as to complete it not later than the date agreed to.
- 6.2 Subsequent to the award of the contract, the contractor shall make available to the engineer, a detailed work programme, in line with the agreed contract network. Such programme shall be reviewed, updated and submitted to the Engineer, once every two month thereafter.

## **11.0 PACKING, FORWARDING AND SHIPMENT**

- 11.1 The contractor, wherever applicable, shall after proper painting, pack and crate all equipment in such a manner as to protect them from deterioration and damage during rail and road transportation to the site and storage at the site till the time of erection. The contractor shall be held responsible for all damages due to improper packing.
- 11.4 The following documents shall be sent by registered post to the owner within 3 days from the date of shipment, to enable the owner to make progressive payments to the contractor:
- Application for payment in the standard format of the owner (3 copies)  
 Invoice (6 copies)  
 Packing list (6 copies)  
 Pre-despatch clearance certificate, if any (3 copies)  
 Test certificate, wherever applicable (3 copies)
- 11.5 The contractor shall prepare detailed packing list of all packages and containers, bundles and loose material forming each and every consignment dispatched to site. The contractor shall further be responsible for making all necessary arrangements for loading, unloading and other handling right from his works up to the site and also till the equipment is erected, tested and commissioned. He shall be solely responsible for proper storage and safe custody of all equipment. The equipments will be routed through Central Stores, EKRA.

## **12.0 DEMURRAGE, WHARFAGE, ETC.**

- 12.1 All demurrage, wharfage and other expenses incurred due to delayed clearance of the material or any other reason shall be to the account of the contractor.

## **13.0 INSURANCE**

- 13.1 The contractor shall arrange, secure and maintain insurance as may be necessary and for all such amounts to protect his interests and the interests of the owner, against all risks as detailed herein in the joint names of the Owner and the Contractor with the condition that payments against all claims shall be payable by insurers to the owner as elaborated at clause 13.5. All premiums and other charges of the said insurance policies shall be paid by the contractor . The form and the limit of such insurance, as defined herein together with the under-writer thereof in each case shall be acceptable to the owner. However, irrespective of such acceptance, the responsibility to maintain adequate insurance coverage on comprehensive all risks basis at all time during the period of contract shall be that of the contractor alone. The contractor's failure in this regard shall not relieve him of any of his contractual responsibilities and obligations.
- 13.2 Any loss of damage to the equipment, during handling, transporting, storage and erection, till such time the plant is taken over by the owner, shall be to the account of the contractor. The contractor shall be responsible for preferring of all claims and make good for the damage or loss by way of repairs and/or replacement of the portion of the works damaged or lost. The transfer of title shall not in any way relieve the contractor of the above responsibilities during the period of the contract. The contractor shall provide the owner with a copy of all insurance policies and documents taken out by him in pursuance of the contract. Such copies of document shall be submitted to the owner immediately after such insurance coverage. The contractor shall also inform the owner in writing at least sixty (60) days in advance, regarding the expiry, cancellation and/or change in any of such documents and ensure revalidation/renewal, etc. as may be necessary well in time.
- 13.3 The risk that are to be covered under the insurance shall include, but not be limited to, the loss or damage in transit, theft, pilferage, riot, civil commotion, weather conditions, accidents of all kinds, fire, etc. The scope of such insurance shall cover the entire value of the works from time to time.
- 13.4 All costs on account of insurance liabilities covered under the contract will be on contractor's account and will be included in contract price. However, the owner may from time to time, during the pendency of the contract, ask the contractor in writing to limit the insurance coverage risks and in such a case, the parties to the contract will agree for a mutual settlement for reduction in contract price to the extent of reduced premium amounts.

13.5 All insurance claims, payable by the insurers, shall be paid to the Owner which shall be released to the contractor in installments as may be certified by the Engineer-in-charge for the purpose of rebuilding or replacement or repair of the works and/or goods destroyed or damaged for which payment was received from the insurers.

13.6 The clause entitled insurance under the section erection terms and conditions of contract of this volume, covers the additional insurance requirements for the portion of the works to be performed at the site of work.

#### **14.0 LIABILITY FOR ACCIDENTS AND DAMAGES**

**14.1** Under the contract, the contractor shall be responsible for loss or damage to the plant until the plant is taken over in accordance with clause entitled 'Taking Over' in section technical terms and conditions of contract of this volume .

#### **15.0 LIQUIDATED DAMAGES FOR DELAY IN COMPLETION**

15.1 If the contractor fails to maintain the required progress in terms of the agreed time and progress chart or to complete the work and clear the site on or before the contract or extended date of completion, he shall without prejudice to any other right or remedy available under the law to the company on account of such breach, pay as agreed compensation/liquidated damages @half percent (1/2 %)of the contract price per week of delay. The aggregate of such compensation/compensations shall not exceed 10 (ten) percent of the total value as shown in contract.This will also apply to items or group of items for which separate period of completion has been specified. The amount of compensation may be adjusted or setoff against any sum payable to the contractor under this or any other contract with the company.

15.1.1 The company, if satisfied ,that the works can be completed by the contractor within a reasonable time after the specified time of completion, may allow further extension of time at its discretion with or with out the levy of L.D. In the event of extension granted being with L.D., the company will be entitled without prejudice to any other right or remedy available in that behalf, to recover from the contractor as agreed damages equivalent to half percent of the contract value of the works for each week or part of the week subject to a ceiling of 10% of the contract price.

The company, if not satisfied ,that the works can be completed by the contractor, and in the event of failure on the part of the contractor to complete work with in further extension of time allowed as aforesaid, shall be entitled , without prejudice to any other right or remedy available in that behalf, to rescind the contract.

15.1.2 The company , if not satisfied with the progress of the contract and in the event of failure of the contract to recoup the delays in the mutually agreed time frame ,shall be entitled to terminate the contract.

15.1.3 In the event of such termination of the contract as described in clause 15.1.2 or 15.1.1 or both, the company, shall be entitled to recover L.D. up to ( 10% ) of the contract value and forfeit the security deposit made by the contractor besides getting the work completed by other means at the risk and cost of the contractor.

15.2 The company may, waive the payment of compensation, depending upon merit of the case, on request received from the contractor if the entire work is completed within the date as specified in the contract or as validly extended without stipulating any penalty.

## **16.0 CONTRACTOR'S DEFAULT**

- 16.1 If the contractor shall neglect to execute the works with the diligence and expedition or shall refuse or neglect to comply with any reasonable orders given to him, in writing by the engineer in connection with the works or shall contravene the provisions of the contract, the owner may give notice in writing to the contractor to make good the failure, neglect or contravention complained of. Should the contractor fail to comply with the notice within thirty (30) days from the date of service thereof, then and in such case the owner shall be at liberty to employ other workmen and forthwith execute such part of the works as the contractor may have neglected to do or if the owner shall think fit, it shall be lawful for him, without prejudice to any other right he may have under the contract, to take the works wholly or in part thereof and in that event the owner shall have free use of all contractor's equipment that may have been at the time on the site in connection with the works without being responsible to the contractor for fair wear and tear thereof and to the exclusion of any right of the contractor over the same, and the owner shall be entitled to retain and apply any balance which may otherwise be due on the contract by him to the contractor, or such part thereof as may be necessary, the payment of the cost of executing the said part of the works or of completing the works as the case may be. If the cost of completing the works or executing a part thereof as aforesaid shall exceed the balance due to the contractor, the contractor shall pay such excess. Such payment of excess amount shall be independent of the liquidated damages for delay which the contractor shall have to pay if the completion of works is delayed.
- 16.2 In addition, such action by the owner as aforesaid shall not relieve the contractor of his liability to pay liquidated damages for delay in completion of works as defined in clause 15.0 of this section
- 16.3 The termination of the contract under this clause shall not entitle the contractor to reduce the value of the performance bank guarantee nor the time thereof. The performance guarantee shall be valid for the full value and for the full period of the contract including guarantee period.
- 16.4 The bidding documents will clearly state that, if the contractor fails to complete the work and the order is cancelled, the amount due to him on account of work executed by him, if payable, shall be paid to him only after due recoveries as per the provisions of the contract and that too after alternative arrangements to complete the work has been made.

## **17.0 FORCE MAJEURE**

- 17.1 Force majeure is herein defined as any cause which is beyond the control of the contractor or the owner as the case may be which they could not foresee or with a reasonable amount of diligence could not have foreseen and which substantially affect the performance of the contract, such as:
- (a) natural phenomena, including but not limited to floods, draughts, earthquakes and epidemics:
  - (b) acts of any government, including but not limited to war, declared or undeclared, priorities, quarantines, embargoes, Provided either party shall within fifteen (15) days from the occurrence of such a cause notify the other in writing of such causes.
- 17.2 The bidding documents will clearly state that :
- (a) The successful bidder will advise, in the event of his having resort to this clause by a registered letter duly certified by the local chamber of commerce or statutory authorities, the beginning and end of the clause of delay, within fifteen days of the occurrence and cessation of such Force Majeure condition . In the event of delay lasting over two months, if arising out of Force Majeure, the contract may be terminated at the discretion of the company.

- (b) For delays arising out of Force Majeure, the bidder will not claim extension in completion date for a period exceeding the period of delay attributable to the causes of Force Majeure and neither company nor the bidder shall be liable to pay extra costs (like increase in rates, remobilisation advance, idle charges for labour and machinery etc.) Provided it is mutually established that the Force Majeure conditions did actually exist.
  - (c) If any of the Force Majeure conditions exists in the place of operation of the bidder even at the time of submission of bid he will categorically specify them in his bid and state whether they have been taken into consideration in their quotations.
- 17.3 The contractor or the owner shall not be liable for delays in performing his obligations resulting from any Force Majeure cause as referred to and/or defined above. The date of completion will, subject to hereinafter provided, be extended by a reasonable time eventhough such cause may occur after contractor's performance of his obligations has been delayed for other causes.

#### **18.0 DELAYS BY OWNER OR HIS AUTHORISED AGENT**

- 18.1 In case the contractor's performance is delayed due to any act of omission on the part of the owner or his authorised agents, then the contractor shall be given due extension of time for the completion of the works, to the extent such omission on the part of the owner has caused delay in the contractor's performance of his work. Regarding reasonableness or otherwise of the extension of time, the decision of the engineer shall be final.
- 18.2 Any delay in finalization of mutual agreement in regard to any of the contractor's claim/ compensation against any act of omission on the part of the owners or his authorised agents should not result in any work stoppage/ further delay on the part of the contractor.

#### **19.0 EXTENSION OF DATE OF COMPLETION**

- 19.1 On happening of any events causing delay as stated hereinafter, the contractor shall intimate immediately in writing the Engineer-in-Charge :
  - a. due to any reasons defined as Force Majeure.
  - b. non-availability of stores which are the responsibility of the owner to supply
  - c. non-availability or breakdown of tools and plant to be made available or made available by the owner
  - d. delay on the part of the contractors or tradesmen engaged by the owner not forming part of the contract, holding up further progress of the work
  - e. non-availability of working drawings/work programme in time, which are to be made available by the company during progress of the work
  - f. any other causes which, at the sole discretion of the company is beyond the control of the contractor.
- 19.2 A "Hindrance Register" shall be maintained by both the Company and the Contractor at site to record the various hindrances, as mentioned above, encountered during the course of execution.



- 19.3 The contractor may request the company in writing for extension of time within 14 days of happening of such event causing delay stating also, if practicable, the period for which extension is desired. The company may, considering the eligibility of the request, give a fair and reasonable extension of time for completion of the work. Such extension shall be communicated to the contractor in writing by the company through the Engineer-in-charge within 1 month of the date of receipt of such request. The contractor shall however use his best efforts to prevent or make good the delay by putting his endeavours constantly as may be reasonably required of him to the satisfaction of the Engineer-in-charge.
- 19.4 Provisional extension of time may also be granted by the Engineer -In-charge during the course of execution, on written request for extension of time within 15 (fifteen) days of happening of such events as stated above, reserving the company's right to impose/ waive liquidated damages at the time of granting final extension of time as per contract agreement.
- 19.5 When the period fixed for the completion of the contract is about to expire, the question of extension of the contract may be considered at the instance of the Contractor or the Company or the both. The extension will have to be by party's agreement, expressed or implied.
- 19.6 In case the Contractor does not apply for grant of extension of time within 15 (fifteen) days of hindrance occurring in execution of the work and the Company wants to continue with the work beyond the stipulated date of completion for reason of the work having been hindered, the Engineer-in-charge at his sole discretion can grant provisional extension of time even in the absence of application from the Contractor. Such extension of time granted by the Engineer-in-charge is valid provided the Contractor accepts the same either expressly or implied by his actions before and subsequent to the date of completion. Such extension of time shall be without prejudice to Company's right to levy compensation under the relevant clause of contract.

## **20.0 TERMINATION, SUSPENSION, CANCELLATION & FOR ECLOSURE OF CONTRACT**

- 20.1 The owner shall, in addition to other remedial steps to be taken as provided in the conditions of contract, be entitled to cancel the contract in full or in part, if the contractor
- a. makes default in proceeding with the works with due diligence and continues to do so even after a notice in writing from the Engineer-in-charge, then on the expiry of the period as specified in the notice
- OR**
- b. commits default/breach in complying with any of the terms and conditions of the contract and does not remedy it or fails to take effective steps for the remedy to the satisfaction of the Engineer-in-charge, then on the expiry of the period as may be specified by the Engineer-in-charge in a notice in writing
- OR**
- c. fails to complete the work or items of work with individual dates of completion, on or before the date/dates of completion or as extended by the company, then on the expiry of the period as may be specified by the Engineer-in-charge in a notice in writing
- OR**
- d. shall offer or give or agree to give any person in the service of the company or to any other person on his behalf any gift or consideration of any kind as an inducement or reward for act/acts of favour in relation to the obtaining or execution of this or any other contract for the company.

**OR**

- e. shall try to obtain a contract with the company by way of of ring tendering or other non-bonafide method of competitive tendering.

**OR**

- f. transfers, sublets, assigns the entire work or any portion there of without the prior approval in writing from the Engineer-in-charge. The Engineer-in-charge may by giving a written notice, cancel the whole contract or portion of it in default.

- 20.2 The owner shall in such an event give fifteen (15) days notice in writing to the contractor of his decision to do so.

The contractor upon receipt of such notice shall discontinue the work on the date and to the extent specified in the notice, make all reasonable efforts to obtain cancellation of all orders and contracts to the extent they are related to the work terminated and terms satisfactory to the owner, stop all further sub-contracting or purchasing activity related to the work terminated, and assist the owner in maintenance, protection, and disposition of the works acquired under the contract by the owner.

- 20.3 In the event of such a termination, the contractor shall be paid compensation, equitable and reasonable dictated by the circumstances prevalent at the time of termination.

- 20.4 The contract shall stand terminated under the following circumstances unless the owner is satisfied that the legal representatives of the individual contractor or of the proprietor of the proprietary concern and in the case of partnership the surviving partners, are capable of carrying out and completing the contract and the owner shall in any way not be liable to payment of any compensation to the estate of deceased contractor and/or to the surviving partners of the contractor's firm on account of the termination of the contract.:

- a. If the contractor being an individual in the case of proprietary concern or in the case of a partnership firm any of its partners is declared insolvent under the provisions of insolvency act for the time being in force, or makes any conveyance or assignment of his effects or composition or arrangement for the benefit of his creditors amounting to proceedings for liquidation or composition under any insolvency act.
- b. In the case of the contractor being a company, its affairs are under liquidation either by a resolution passed by the company or by an order of court, not being a voluntary liquidation proceedings for the purpose of amalgamation or reorganisation, or a receiver or manager is appointed by the court on the application by the debenture holders of the company, if any.
- c. If the contractor shall suffer an execution being levied on his/their goods, estates and allow it to be continued for a period of 21 days.

- d. On the death of the contractor being a proprietary concern or of any of the partners in the case of a partnership concern and the company is not satisfied that the legal representative of the deceased proprietor or the other surviving partners of the partnership concern are capable of carrying out and completing the contract. The decision of the company in this respect shall be final and binding which is to be intimated in writing to the legal representative or to the partnership concern.

- 20.5 If the contractor is an individual or a proprietary concern and the individual or the proprietor dies and if the contractor is a partnership concern and one of the partners dies, then unless the owner is satisfied that the legal representatives of the individual contractor or of the proprietor of the proprietary concern and in the case of partnership the surviving partners, are capable of carrying out and completing the contract the owner shall be entitled to cancel the contract as to its incomplete part without being in any way liable to payment of any compensation to the estate of deceased contractor and/or to the surviving partners of the contractor's firm on account of the cancellation of the contract.

The decision of the owner that the legal representatives of the deceased contractor or surviving partners of the contractor's firm cannot carry out and complete the contract shall be final and binding on the parties. In the event of such cancellation the owner shall not hold the estate of the deceased contractor and/or the surviving partners of the estate of the deceased contractor and/or the surviving partners of the contractor's firm liable to damages for not completing the contract.

- 20.6 On cancellation of the contract or on termination of the contract, the Engineer-in-charge shall have powers

- a. to take possession of the site and any materials, constructional plant, implements, stores, etc. thereon.
- b. to carry out the incomplete work by any means at the risk of the contractor
- c. to determine the amount to be recovered from the contractor for completing the remaining work or in the event the remaining work is not to be completed the loss/damage suffered, if any, by the company after giving credit for the value of the work executed by the contractor up to the time of termination/cancellation less on a/c payments made till date and value of contractor's materials, plant, equipment, etc., taken possession of after termination/cancellation.
- d. to recover the amount determined as above, if any, from any moneys due to the contractor or any account or under any other contract and in the event of any shortfall, the contractor shall be called upon to pay the same on demand.

The need for determination of the amount of recovery of any extra cost/ expenditure or of any loss/ damage suffered by the company shall not however arise in the case of termination of the contract for death/demise of the contractor as stated in 20.4(d).

- 20.7 Suspension of work - The company shall have power to suspend the progress of the work or any part thereof and the Engineer-in-charge may direct the contractor in writing to suspend the work, for such period and in such manner as may be specified therein, on account of any default on the part of the contractor, or for proper execution of the work for reasons other than any default on the part of the contractor, or on ground of safety of the work or part thereof. In the event of suspension for reason other than any default on the part of the contractor, extension of time shall be allowed by the company equal to the period of such suspension. Any necessary and demonstrable costs incurred by the contractor as a result of such suspension of the works will be paid by the owner, provided such costs are substantiated to the satisfaction of the engineer. The owner shall not be responsible for any liabilities if suspension or delay is due to some default on the part of the contractor or his sub contractor.

The work shall, throughout the stipulated period of contract, be carried out with all due diligence on the part of the contractor. In the event of termination or suspension of the contract, on account of default on the part of the contractor, as narrated hereinbefore, the security deposit and other dues of his work or any other work done under this company shall be forfeited and brought under the absolute disposal of the company provided, that the amount so forfeited shall not exceed 10% of the contract value.

- 20.8 Foreclosure of contract in full or in part - If at any time after acceptance of the tender, the company decides to abandon or reduce the scope of the work for any reason whatsoever the company, through its Engineer-in-charge, shall give notice in writing to that effect to the contractor. In the event of abandonment/reduction in the scope of work, the company shall be liable

- a. to pay the contractor at the contract rates full amount for works executed and measured at site up to the date of such abandonment/reduction in the work.
- b. to pay reasonable amount assessed and certified by the Engineer-in-charge of the expenditure incurred, if any, by the contractor on preliminary works at site. e.g. temporary access roads, temporary construction for labour and staff quarters, office accommodation, storage of materials, water storage tanks and supply for the work including supply to labour/staff quarters, office, etc.
- c. to pay for the materials brought to site or to be delivered at site, which the contractor is legally liable to pay, for the purpose of consumption in works carried out or were to be carried out but for the foreclosure, including the cost of purchase and transportation and cost of delivery of such materials. The materials to be taken over by the company should be in good condition and the company may allow at its discretion the contractor to retain the materials in full or part if so desired by him and to be transported by the contractor from site to his place.
- d. to take back the materials issued by the company but remaining unused, if any, in the work on the date of abandonment/reduction in the work, at the original issued price less allowance for any deterioration or damage caused while in custody of the contractor
- e. to pay for the transportation of tools and plants of the contractor from site to contractor's place or to any other destination, whichever is less.

The contractor shall, if required by the Engineer-in-charge, furnish to him books of accounts, papers, relevant documents as may be necessary to enable the Engineer-in-charge to assess the amount payable in terms of part 20.8(b), (c) and (e) above, the contractor shall not have any claim for compensation whatsoever either for abandonment or for reduction in the scope of work, other than those as specified above.

## **21.0 NO WAIVER OF RIGHTS**

Neither the inspection by the owner or the engineer or any of their officials, employees or agents nor any order by the owner or the engineer for payment of money or any payment for or acceptance of, the whole or any part of the works by the owner or the engineer, nor any extension of time, nor any possession taken by the engineer shall operate as a waiver of any provision of the contract, or of any power herein reserved to the owner, or any right to damages herein provided, nor shall any waiver of any breach in the contract be held to be a waiver of any other or subsequent breach.

## **22.0 CERTIFICATE NOT TO AFFECT RIGHT OF OWNER AND LIABILITY OF CONTRACTOR**

No interim payment certificate of the engineer, nor any sum paid on account, by the owner, nor any extension of time for execution of the works granted by the engineer shall affect or prejudice the rights of the owner against the contractor or relieve the contractor of his obligations for the due performance of the contract, or be interpreted as approval of the works done or of the equipment furnished and no certificate shall create liability for the owner to pay for alterations, amendments, variations or additional works not ordered, in writing, by the engineer or discharge the liability of the contractor for the payment of damages whether due, ascertained, or certified or not, or any sum against the payment of which he is bound to indemnify the owner, nor shall any such certificate nor the acceptance by him of any sum paid on account or otherwise affect or prejudice the rights of the contractor against the owner.

## **23.0 GRAFTS AND COMMISSIONS ETC.**

Any graft, commission, gift or advantage given, promised or offered by or on behalf of the contractor or his partner, agent, officers, director, employee or servant or any one of his or their behalf in relation to the obtaining or to the execution of this or any other contract with the owner, shall, in addition to any criminal liability which it may incur, subject the contractor to the cancellation of this and all other contracts and also to payment of any loss or damage to the owner resulting from any cancellation. The owner shall then be entitled to deduct the amount so payable from any moneys otherwise due to the contractor under the contract.

## **24.0 LANGUAGE AND MEASURES**

All documents pertaining to the contract including specifications, schedules notices, correspondence, operating and maintenance instructions, drawings or any other writing shall be written in English language. The metric system of measurement shall be used exclusively in the contract.

## **25.0 RELEASE OF INFORMATION**

The contractor shall not communicate or use in advertising, publicity, sales releases or in any other medium photographs or other reproduction of the works under this contract, or descriptions of the site, dimensions, quantity, quality or other information, concerning the works unless prior written permission has been obtained from the owner.

## **26.0 CONSTRUCTION OF THE CONTRACT**

- 26.1 Notwithstanding anything stated elsewhere in the bid documents, the contract to be entered into will be treated as a divisible supply and erection contract. The supply portion of the contract will relate to the supply of equipment and materials and the erection portion will relate to the handling at the site, storage, erection, construction, testing, commissioning etc. as defined in the bid documents. Both contracts will contain a cross breach clause specifying that breach of any one contract will also constitute breach of the other contract and the whole contract combined. The contractor will pay the sales tax for the supply of equipment and materials in accordance with law and the same will be reimbursed by the owner as a part of the total contract price on actuals. The sales tax should be included in the total bid price in the proposal and should also be indicated separately.

- 26.2 The contract shall in all respects be construed and governed accordingly to Indian Laws.
- 26.3 It is clearly understood that the total consideration for the contract(s) has been broken up into various components only for the convenience of payment of advance under the contract(s) and for the measurement of deviations or modifications under the contract(s).

#### **27.0 COMPLETION OF CONTRACT**

Unless otherwise terminated under the provisions of any other relevant clause, this contract shall be deemed to have been completed at the expiration of the guarantee period as provided for under the clause entitled 'Guarantee' in this section.

#### **28.0 ENFORCEMENT OF TERMS**

The failure of either party to enforce at any time of the provisions of this contract or any rights in respect thereto or to exercise any option herein provided, shall in no way be construed to be a waiver of such provisions, rights or options or in any way to affect the validity of the contract. The exercise by either party of any of its rights herein shall not preclude or prejudice either party from exercising the same or any other right it may have hereunder.

#### **29.0 ENGINEER'S DECISION**

- 29.1 In respect of all matters which are left to the decision of the engineer including the granting or withholding of the certificates, the engineer shall, if required to do so by the contractor give in writing a decision thereon.
- 29.2 If in the opinion of the contractor, a decision made by the engineer is not in accordance with the meaning and intent of the contract, the contractor may file with the engineer within fifteen (15) days after receipt of the decision, a written objection to the decision. Failure to file an objection within the allotted time will be considered as acceptance of the engineer's decision and the decision shall become final and binding.
- 29.3 The engineer's decision and the filing of the written objection thereto shall be a condition precedent to the right to any legal proceedings. It is the intent of the agreement that there shall be no delay in the execution of the works and the decision of the engineer as rendered shall be promptly observed.

#### **31.0 TRAINING OF OWNER'S PERSONNEL**

- 31.1 The contractor shall undertake to train free of cost, engineering personnel selected and sent by the owner at the works of the contractor unless otherwise specified in the technical specifications. The period and the nature of training for the individual personnel shall be agreed upon mutually between the contractor and the owner. These engineering personnel shall be given special training in the shops, where the equipment will be manufactured and/or their collaborator's works and where possible, in any other plant where equipment manufactured by the contractor or his collaborator is under installation or test, to enable those personnel to become familiar with the equipment being furnished by the contractor.
- 31.2 All travelling and living expenses for the engineering personnel to be trained during the total period of training will be borne by the owner. These engineering personnel while undergoing training shall be responsible to the contractor for discipline.
- 31.3 In the event of the owner, for any reason, failing to avail of the training facilities, he shall not be entitled for any rebate whatsoever on this account.

**32.0 POWER TO VARY OR OMIT WORK**

- 32.1 No alterations, amendments, omissions, suspensions or variations of the works (hereinafter referred to as 'Variation') under the contract as detailed in the contract documents, shall be made by the contractor except as directed in writing by the engineer, but the engineer shall have full power subject to the provision hereinafter contained from time to time during the execution of the contract, by notice in writing, to instruct the contractor to make such variation without prejudice to the contract. The contractor shall carry out such variation and be bound by the same conditions as far as applicable as though the said variation occurred in the contract documents. If any suggested variation would, in the opinion of the contractor, if carried out, prevent him from fulfilling any of his obligations or guarantees under the contract, he shall notify the engineer thereof in writing and the engineer shall decide forthwith, whether or not the same shall be carried out and if the engineer confirms his instructions, contractor's obligations and guarantees shall be modified to such an extent as may be mutually agreed. Any agreed difference in cost occasioned by any such variation shall be added to or deducted from the contract price as the case may be.
- 32.2 In the event of the engineer requiring any variation, such reasonable and proper notice shall be given to the contractor to enable him to work his arrangements accordingly, and in cases where goods or materials are already prepared or any design, drawings or pattern made or work done requires to be altered, a reasonable and agreed sum in respect thereof shall be paid to the contractor.
- 32.3 In any case in which the contractor has received instructions from the engineer as to the requirement of carrying out the altered or additional substituted work which either then or later on, will in the opinion of the contractor, involve a claim for additional payments, the contractor shall immediately and in no case later than thirty (30) days, after receipt of the instructions aforesaid and before carrying out the instructions, advise the engineer to that effect. But the engineer shall not become liable for the payment of any charges in respect of any such variations, unless the instructions for the performance of the same shall be confirmed in writing by the engineer.
- 32.4 If any variation in the works, results in reduction of contract price, the parties shall, agree, in writing, so to the extent of any change in the price, before the contractor proceeds with the change.
- 32.5 In all the above cases, in the event of a disagreement as to the reasonableness of the said sum, the decision of the engineer shall prevail.
- 32.6 Notwithstanding anything stated above in this clause, the engineer shall have the full power to instruct the contractor, in writing, during the execution of the contract, to vary the quantities of the items or groups of items. The contractor shall carry out such variations and be bound by the same conditions, as though the said variations occurred in the contract documents. However, the contract price shall be adjusted at the rates and the prices provided for the original quantities in the contract.

**33.0 GUARANTEE**

- 33.1 The contractor shall warrant that the equipment will be new and in accordance with the contract documents and be free from defects in material and workmanship for a period of twelve (12) calendar months commencing immediately upon the satisfactory completion of the trial operations. The contractor's liability shall be limited to the replacement of any defective parts in the equipment of his own manufacture or those of his sub-contractors, under normal use and arising solely from faulty design, materials, and/or workmanship provided always that such defective parts are repairable at the site and are not in the meantime essential in the commercial use of the plant. Such replaced defective parts shall be returned to the contractor unless otherwise arranged. No repairs or replacements shall normally be carried out by the engineer when the plant is under the supervision of the contractor's supervisory engineers.

**34.0 REPLACEMENT OF DEFECTIVE PARTS AND MATERIALS**

- 34.1 If during the progress of the works the engineer shall decide and inform in writing to the contractor, that the contractor has manufactured any plant or part of the plant unsound or imperfect or has furnished any

plant inferior than the quality specified, the contractor on receiving details of such defects or deficiencies shall at his own expense within seven (7) days of his receiving the notice, or otherwise, within such time as may be reasonably necessary for making it good, proceed to alter, re-construct or remove such work and furnish fresh equipment up to the standards of the specifications. In case the contractor fails to do so, the engineer may on giving the contractor seven (7) days' notice in writing of his intentions to do so, proceed to remove the portion of the works so complained of and, at the cost of the contractor, perform all such work or furnish all such equipment provided that nothing in this clause shall be deemed to deprive the owner of or affect any rights under the contract which the owner may otherwise have in respect of such defects and deficiencies.

- 34.2 The contractor's full and extreme liability under this clause shall be satisfied by the payments to the owner of the extra cost, of such replacement procured, including erection, as provided for in the contract, such extra cost being the ascertained difference between the price paid by the owner for such replacements and the contract price portion for such defective plant and repayments of any sum paid by the owner to the contractor in respect of such defective plant. Should the owner not so replace the defective plant, the contractor's extreme liability under this clause shall be limited to repayment of all sums paid by the owner under the contract for such defective plant.

### **35.0 DEFENCE OF SUITS**

If any action in court is brought against the owner or engineer or an officer or agent of the owner. for the failure or neglect on the part of the contractor to perform any acts, matters, covenants or things under the contract, or for damage or injury caused by the alleged omission or negligence on the part of the contractor, his agents, representatives or his subcontractors, workmen, suppliers or employees, the contractor shall in all such cases indemnify and keep the owner, and the engineer and/or his representative, harmless from all losses, damages, expenses or decrees arising of such action.

### **36.0 LIMITATIONS OF LIABILITIES**

The final payment by the owner in pursuance of the contract shall mean, the release of the contractor from all his liabilities under the contract. Such final payment shall be made only at the end of the guarantee period as detailed in clause 33 above and till such time as the contractual liabilities and responsibilities of the contractor, shall prevail. All other payments made under the contract shall be treated as on account payments.

### **37.0 MARGINAL NOTES**

The marginal notes to any clause of the contract shall not affect or control the construction of such clause.

### **38.0 TAXES, PERMITS & LICENCES**

The contractor shall be liable and pay all Indian taxes , duties, levies, lawfully assessed against the owner or the contractor in pursuance of the contract. In addition the contractor shall be responsible for payment of all Indian duties, levies and taxes lawfully assessed against the contractor for his personal income and property only. This clause shall be read in conjunction with clause 12.3 of section Instruction to Bidders.



### **39.0 PROGRESS REPORTS AND PHOTOGRAPHS**

During the various stages of the works in the pursuance of the contract, the contractor shall at his own cost submit periodic progress reports as may be reasonably required by the engineer with such materials as charts, net-works, photographs, test certificates, etc. such progress report shall be in the form and size as may be required by the engineer and shall be submitted in at least three (3) copies.

### **40.0 LONG TERM AVAILABILITY OF SPARES**

- 40.1 The contractor shall guarantee the long term availability of spares to the owner for the full life of the equipments covered under the contract. The contractor shall guarantee that before going out of production of spare parts of the equipment covered under the contract, he shall give the owner at least twelve (12) months advance notice so that the latter may order his bulk requirement of spares, if he so desires. The same provision will also be applicable to sub-contractor. Further, in case of discontinuance of manufacture of any spares by the contractor or his sub-contractors the contractor will provide the owner two years in advance, with full manufacturing drawings, material specifications and technical information required by the owner for the purpose of manufacture of such items.
- 40.2 Further, in case of discontinuance of supply of spares by the contractor or his sub-contractors the contractor will provide the owner with full information for replacement of such spares with other equivalent makes, if so required by the owner.
- 40.3 The contractor shall provide the owner with a "directory" of his sub-contractors giving the addresses and other particulars of his sub-contractors. The owner, if he so desires, shall have the right to procure the spares directly from sub-contractors.

### **41.0 PAYMENT**

- 41.1 The payment to the contractor for the performance of the works under the contract will be made by the owner as per the guidelines and conditions specified herein. All payment made during the contract shall be on account payments only. The final payment will be made on completion of all the works and on fulfillment by the contractor of all his liabilities under the contract.

**41.2 CURRENCY OF PAYMENT**

All payments under the contract shall be in Indian Rupees only.

**41.3 DUE DATES FOR PAYMENT**

Owner will make progressive payment as and when the payment is due as per the terms of payment set forth in the accompanying technical specifications. Payment will become due and payable by the owner within thirty (30) days from the date of receipt of contractor's bill/invoice/debit note by the owner, provided the documents submitted are complete in all respects.

**41.4 PAYMENT SCHEDULE**

The contractor shall prepare and submit to the engineer for approval, a break-up of the contract price. This contract price break-up shall be interlinked with the agreed detailed work completion programme of the contractor setting forth his starting and completion dates for the various key phases of works prepared as per condition of this section. Any payment under the contract shall be made only after the contractor's price break-up is approved by the engineer. The aggregate sum of the contractor's price break-up shall be equal to the lump sum contract price.

**41.5 APPLICATION FOR PAYMENTS**

41.5.1 The contractor shall submit application for the payment.

41.5.2 Each such application shall state the amount claimed and shall set forth in detail, in the order of the payment schedule, particulars of the works including the works executed at site and of the equipment shipped/brought on to the site pursuant to the contract up to the date mentioned in the application and for the period covered since the last preceding certificate, if any.

41.5.3 Every interim payment certificate shall certify the contract value of the works executed up to the date mentioned in the application for the payment certificate, provided that no sum shall be included in any interim payment certificate in respect of the works that, according to the decision of the engineer, does not comply with the contract, or has been performed, at the date of certificate prematurely.

**41.6 MODE OF PAYMENT**

The payments due on receipt of equipment and materials, and those for the inland transportation and the erection portion of the works shall be made direct to the contractor by the owner.

**41.7 TERMS OF PAYMENTS**

41.7.1 The terms of payment for the price components of the equipment and its erection are detailed herein for each equipment package. A certain percentage of the equipment and erection costs, for each package shall be paid as initial advance on fulfillment of the following, by the contractor:

**i) FOR THE PRICE-COMPONENT OF EQUIPMENT**

a) Issue of letter of acceptance of tender

- b) Submission of an unconditional Bank Guarantee covering the advance amount which shall be initially kept valid till expiry of the month after the schedule date for successful completion of trial operations. The proforma of Bank Guarantee for advance is enclosed in section 6. The value of Bank Guarantee (other security) for advance shall be allowed to be reduced every six months after first running account bill/stage payment under the contract, if the value of such B.G (Security) is more than Rs. five hundred thousand (500,000) and validity is more than one year. The cumulative amount of reduction at any point of time shall not exceed 75% of the advance corresponding to cumulative value of supplies/work completed as per a certificate to be issued by the engineer-in-charge. It should be clearly understood that the reduction in the value of advance bank guarantee or other security as above shall not in any way dilute the contractor's responsibilities and liabilities under the contract including in respect of supplies/work for which the reduction in the value of bank guarantee (or other security) is allowed.
- c) Submission of an unconditional Bank Guarantee towards contract performance guarantee valid up to ninety (90) days after the end of the guarantee period, in accordance with Clause 3.0 .
- d) Submission of a detailed work completion programme based on the work-schedule stipulated in the letter  
of award and its approval by owner.

**ii) FOR THE ERECTION PRICE-COMPONENT**

- a) On establishment of his office at site preparatory to mobilisation of his erection establishment.
- b) Submission of an unconditional bank guarantee for an equivalent amount, which shall be initially kept valid till expiry of the month after the schedule date for successful completion of trial operations. The proforma of bank guarantee for advance is enclosed in section 6.
- c) Signing of contract agreement.

**41.7.2** All further payments (refer to clause no. : 41.7.4 of this Section) under the contract shall be made as stipulated in the technical specifications after signing the contract agreement. The payments linked with despatch of materials shall only be made after production of all despatch documents as specified in L/C conditions and/or in the relevant contract conditions which will inter-alia include the material despatch clearance certificate issued by the owner. In case of erection, progress payments shall only be made after the issue of certificates by the engineer's field quality surveillance representative for the successful completion of quality check points involved in the quantum of work billed.

**41.7.3 INLAND TRANSPORTATION & INSURANCE**

Inland transportation (including port handling) and inland insurance charges shall be paid to the contractor on pro-rata to the value of the equipment received at site and on production of the invoices by the contractor. However, wherever equipment wise inland transportation charges have been called for in the bid proposal sheets and have been furnished by the contractor, the payment of inland transportation charges shall be made after receipt of equipment at site based on the charges thus identified by the contractor in his proposal and incorporated in the contract. The aggregate of all such pro-rata payments shall however, not exceed the total amount quoted by the bidder in his bid and incorporated in the contract.

**41.7.4 Payment :** Since the total job is on turn-key basis, any payment to the Contractor before the final payment shall be treated as provisional payment towards the total contract value.

The Contractor may at intervals of not less than one month submit claims/ bills for payment on account of work done after proper scrutiny and certification of the same by the Employer. The progressive payment shall be made in respect of the following :

- a) Design engineering
- b) Civil construction including foundation and buildings
- c) Structural fabrication and erection
- d) Supply of equipment
- e) Machinery Erection
- f) Trial Run and commissioning
- g) Final Bill after successful performance test etc.

All such payments shall be made by the Employer through Account Payee Cheque within a month from the date of the submission of claims/bills. Payment will also be governed by Clauses 31.1.1, 31.1.3 and 31.7 of Instructions to Bidders. Any sum due from the Contractor shall be deducted from the first or next subsequent on account of payments as the case may be, in general the following procedure of payment shall be followed :

#### 41.7.4.1 Design and Engineering.

- a) 80% payment on completion of approval of system, mechanical, electrical, civil, structural design, drawings etc. as per contract on pro-rata basis.
- b) 10% payment on Preliminary acceptance of the works after start-up and trial operation as per clause 14.1/14.2 of General Technical Conditions (GTC).
- c) 10% on issue of final acceptance certificate of the works after performance and guarantee test as per clause 14.3 of GTC.

#### 41.7.4.2 Supply of Equipment :

- a) 80% payment on receipt of the equipment conforming to stipulated specifications and quality in good condition at site to be certified by the site engineer.
- b) 10% on preliminary acceptance of the works after start-up and trial operation as per clause 14.1/14.2 of GTC
- c) 10% on issue of final acceptance certificate of the works after performance and guarantee test as per clause 14.3 of GTC

#### 41.7.4.3 Civil/Structural Works :

- a) 80% payment on progress of work completed, duly measured and certified by the engineer.
- b) 10% payment on preliminary acceptance of the works after start-up and trial operation as per clause 14.1/14.2 of GTC
- c) 10% on issue of final acceptance certificate of the works after performance and guarantee test as per clause 14.3 of GTC

#### 41.7.4.4 Installation & Commissioning :

- a) 80% progress payment based on the installation and commissioning of plant and equipment duly certified by site engineer.
- b) 10% payment on preliminary acceptance of the works after start-up and trial operation as per clause 14.1/14.2 of GTC
- c) 10% on issue of final acceptance certificate of the works after performance and guarantee test as per clause 14.3 of GTC

**41.7.4.5 Final Bill :**

As soon as possible after completion of the works to the satisfaction of the Employer the Contractor shall forward a certified final bill. It shall be accompanied by all relevant vouchers, such as royalty clearance certificate (if any) from appropriate authorities, submission of copies of working drawings, technical documents as required documents showing therein all additions and alternations etc. in the process of execution, completion certificate for embedded and covered up works, plant handing over certificate etc. as applicable. The Contractor shall be paid full and final payment only after deduction of amounts paid against on account bill and any other amount due etc. payable by Contractor.

**42.0 SETTLEMENT OF DISPUTES**

It is incumbent upon the contractor to avoid litigation and disputes during the course of execution. However, if such disputes take place between the contractor and the department, effort shall be made first to settle the disputes at the company level.

The contractor should make request in writing to the Engineer-in-charge for settlement of such disputes/ claims within 30 (thirty) days of arising of the cause of dispute/ claim failing which no disputes/ claims of the contractor shall be entertained by the company.

If differences still persist, the settlement of the dispute with Govt. Agencies shall be dealt with as per the Guidelines issued by the Ministry of Finance, Govt. of India in this regard. In case of parties other than Govt. Agencies, the redressal of the dispute may be sought in the Court of Law.

**43.0 TAXES**

All taxes, levies, cess, royalties, whether local, municipal, provincial or central pertaining to the contract are payable during the entire periods of contract, shall be to the contractor/ contractors account and shall be deemed to have been included in the contracted rate for the work to be executed by the contractor. The Company shall not be liable for any taxes or levies etc. whatsoever in connection with this contract.

The Company reserves the right to deduct/ withhold any amount towards taxes/ Statutory levies, as may be required under the Statute or in terms of direction from any Authority from the amount as directed by the appropriate Authority and the Company shall only provide with certificate towards deduction and shall not be responsible for any reason whatsoever.

This clause is to be read with clause 2.6 of ADDITIONAL TERMS AND CONDITIONS.

Necessary " C " form will be issued as applicable.

**SERVICE TAX-** service tax if any applicable to this contract will be reimbursed by the company at actual on production of documentary proof.

◇◇◇◇◇◇

## **SUB-SECTION -4.2**

### **ADDITIONAL TERMS AND CONDITIONS OF CONTRACT**

## SUB-SECTION – 4.2

**ADDITIONAL TERMS & CONDITIONS OF CONTRACT**

The following additional terms & conditions are also acceptable to the company. The tenderers are requested not to quote any additional conditions in their tender.

**1. MOBILISATION ADVANCE :**

- i) In the case of works whose estimated value is more than Rs.100.00 lakhs , a maximum of 10% of the total contract value of work will be paid as mobilisation advance subject to submission of Bank Guarantee for equal amount.
- ii) Mobilisation Advance against survey, soil investigation, design and engineering will be paid in two equal instalments - one after signing of the agreement and the second after the system design drawings have been completed and detailed design work is to be taken up by the contractor.
- iii) Mobilisation Advance against supply of equipments shall be released only after the contractor has finalised their vendors/suppliers for the specific equipment and the amount of advance shall be proportionate to the value of equipment for which vendors/suppliers have been finalised vis-à-vis the total value of equipments offered in the contract limited to 10% of the contract value.
- iv) Mobilisation Advance against works contract for site activities shall be paid in two equal instalments. First installment shall be paid after the contractor has opened their site office and having finalised their subcontractors. The second installment shall be paid for taking procurement action of construction materials like reinforcing steel and structural steel by the contractor.
- v) The mobilisation advance shall be recovered from the bills of the contractor from the second running on account bills onward @ 20% of the advance amount paid.
- vi) The value of Bank Guarantee may be reduced to the extent such advance is recovered by the company subject to the conditions that the value of Bank Guarantee amount at any time is more than the recoverable outstanding advance. Bank Guarantee shall be irrevocable and from a Nationalised Bank /Scheduled Bank.
- vii) Interest on mobilisation advance will be charged as per the rate of CIL's borrowing rate under cash credit arrangement as varying from time to time.

**2.0 PRICE VARIATION CLAUSE :**

- 2.1 The contract price shall remain firm without any price variation due to escalation for the portions of survey, geo-engineering investigations, design and engineering and supply of equipments, plant and machineries as envisaged in the scope of work and the price agreed thereon as per the contract except the statutory increase/decrease in taxes and duties such as excise duty, sales tax, import duty etc.
- 2.1.1 If the contract is to be extended beyond the stipulated period for completion of the work due to fault on the part of the contractor escalation on prices shall not be allowed further if not provided otherwise in the accepted contract .
- 2.2 For the portions of civil and structural works and erection and commissioning works of the plant & machineries, the price variation due to escalation shall be allowed to the extent as detailed hereinafter

2.2.1 If the prices of materials (not being materials supplied at fixed issue rates by the company) and wages of labour, required for execution of the work, increase, the contractor shall be compensated for such increase as per provisions detailed below :

- a) The amount of the contract shall accordingly be varied, subject to the condition that such compensation for variation in prices shall be available only for the work done during the stipulated period of the contract as per the work programme agreed including such period for which the contract is validly extended under the provisions of the contract without any penal action.
- b) The base date for working out such price variation shall be thirty (30) days prior to the date set for opening of the bids or the revised price bid whichever is later.
- c) The compensation of Price variation shall be worked out at quarterly intervals and shall be with respect to the cost of work done during the previous three months . The first such payment shall be made at the end of three months after the month (Excluding) in which the tender was accepted and thereafter at three months' interval.

#### 2.2.1.1 PRICE VARIATION FOR LABOUR:

The amount paid to the contractor for the work done shall be adjusted for increase or decrease in the cost of labour and the cost shall be calculated quarterly in accordance with the following formula:

$$V_L = W \times \frac{A}{100} \times \frac{L - L_0}{L_0}$$

Where :

$V_L$  = Variation in labour cost i.e. increase or decrease in the amount in rupees to be paid or recovered.

$W$  = Value of work done during the period under reckoning to which the price variation relates as indicated in clause no. 2.3 of the ' ADDITIONAL TERMS & CONDITIONS OF CONTRACT'.

$A$  = Component of labour expressed as percentage of the total value of work adopted from **Table-1**

$L_0$  = Minimum wages for unskilled workers payable as per the Minimum Wages Act / Rules of the State or Central Government ., whichever is more , applicable to the place of work as on the last date stipulated for receipt of the Price bids or Revised Price bids whichever is later.

$L$  = Revised minimum wages of unskilled workers corresponding to  $L_0$  during the period to which the escalation relates.

#### 2.2.1.2 Price Variation on Materials :

The amount to be paid to the contractor for the work done shall be adjusted for increase or decrease in the cost of materials and the cost shall be calculated quarterly in accordance with the following formula:

$$V_m = W \times \frac{B}{100} \times \frac{M - M_0}{M_0}$$



Where :

$V_m$  = Variation in material cost i.e. increase or decrease in the amount in rupees to be paid or recovered.

$W$  = Value of work done during the period under reckoning to which the price variation relates as indicated in clause no. 2.3 of the ' ADDITIONAL TERMS & CONDITIONS OF CONTRACT'.

$B$  = Component of material expressed as percentage of the total value of work adopted from **Table-1**

$M$  = Average All India Wholesale Price Index for all commodities for the period to which price variation relates as published by the RBI Bulletin , Ministry of Industry & Commerce, Govt. Of India.

$M_0$  = All India Wholesale Price Index for all commodities as published by the RBI Bulletin , Ministry of Industry & Commerce , Govt. Of India , relating to the last date on which the price bids or revised price bids whichever is later were stipulated to be received.

### 2.2.1.3 PRICE VARIATION ON POL :

The amount to be paid to the contractor for the work done shall be adjusted for increase or decrease in the cost of POL and the cost shall be calculated quarterly in accordance with the following formula:

$$V_f = W \times \frac{C}{100} \times \frac{F - F_0}{F_0}$$

Where :

$V_f$  = Variation in the cost of fuel , oil & lubricants increase or decrease in the amount in rupees to be paid or recovered.

$W$  = Value of work done during the period under reckoning to which the price variation relates as indicated in clause no. 2.3 of the ' ADDITIONAL TERMS & CONDITIONS OF CONTRACT'.

$C$  = Component of POL expressed as percentage of the total value of work adopted from **Table-1**

$F$  = Average Index Number for Wholesale Price for the group of fuel , power, light and lubricants as published by Economic Advisor , Ministry of Industry , Govt. Of India for the period to which price variation relates .

$F_0$  = Index Number for Wholesale Price for the group of "fuel , power, light and lubricants" as published by Economic Advisor , Ministry of Industry , Govt. Of India prevalent on the last date of receipt of price bids whichever is later.

### 2.3 WHILE CALCULATING THE VALUE OF "W" THE FOLLOWING MAY BE NOTED. :

The cost on which the escalation/price variation shall be payable shall be reckoned as 85% of the cost of work as per the bills to which escalation relates , and from this amount the value of materials supplied or services rendered at the prescribed charges under the relevant provisions of the contract , and proposed to recovered in the particular bill , shall be deducted before the amount of compensation for

escalation/price variation is worked out. Further the cost shall not include any work for which payment is made at prevailing market rates.

- 2.4 In the event the price of materials and/ or wages of labour required for execution of the work decreases , there shall be downward adjustment of the work so that such price of materials and/or wages of labour shall be deductible from the cost of work under this contract and in this regard the formulae hereinbefore stated under this clause shall mutatis /mutandis apply.

For all other works not listed above , the component of labour , material and POL of the total cost of work shall be as specifically indicated in the tender document.

The price variation clause as stated above will be applied for extended time frame of a contract by following the principles as under

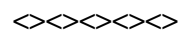
- i) Normally, if and when it is understood that a contract is not going to be completed within the scheduled time period, the contract is kept operative by extending the time of completion provisionally. During this provisional extended period the operation of the Price Variation Clause will remain suspended.
- ii) If and when it is decided at the end of the successful completion of the work that the delay was due to causes not attributable to the contractor, then the Price Variation Clause will be revived and applied as if the scheduled date of completion has been shifted to the approved extended date.
- iii) If it is decided at the end of successful completion of the work that the delay was due to the fault of the contractor then the Price Variation Clause will not be revived and no payment will be made to the contractor on this account. Additionally the Clause related to Compensation for delay will be applied.
- iv) In some cases the total delay may be partially due to causes not attributable to the contractor and partially due to his fault. It may be difficult to exactly quantify the total delay proportionately in such cases. The Price Variation Clause under such condition will be made operative for the entire extended time period by freezing the relevant indices on the date of the scheduled date of completion as originally fixed in the contract/ agreement. At the same time the Clause related to the compensation for delay will also be applied.

## **2.5 CEILING ON PRICE VARIATION DUE TO ESCALATION**

There shall be a ceiling on price variation due to escalation covered under clauses mentioned hereinbefore on the whole contract, limited to 10% of the 'contract price' only.

## **2.6 VARIATION IN THE TAXES, DUTIES, LEVIES ETC.**

Other statutory variation due to increase in taxes, duties, levies etc. by Govt. (Central or State or Local ) as of thirty (30) days prior to the date of opening of the part-I of the bid or the revised price bid, whichever is later, with the taxes, duties, levies etc. during the manufacture/works/supply, as the case may be, shall be born by the owner. Similarly decrease in taxes, duties, levies etc. shall be returned/deducted to/by the owner.



**Table - 1**

**Value of A , B & C in the Price variation formula in the 'Additional Terms and Conditions of Contract :**

Sl.	Particulars	A	B	C	Remarks
No.		(Labour	(Material	(POL	
1.		component )	component )	component )	
	For Building works	25	75	NIL	
2.	For Road works	15	80	05	
3.	For external sewerage, external water supply and external electrification	10	90	NIL	
4.	For external water supply, external sanitary and external electrification (Through labour rate contract)	75	25	NIL	
5.	For steel structural works	15	85	NIL	
6.	For steel structural works with Department free supply of rolled steel sections (Through labour rate contract)	75	25	NIL	
7.	For Coal Handling Plant Civil works	25	75	NIL	
8.	For underground civil works such as Incline Privage ,Shaft Sinking etc.	35	65	NIL	
9	For Erection and Commissioning of P&M	65	35	NIL	

◇◇◇◇◇◇◇◇

## **SUB-SECTION -4.3**

### **GENERAL TECHNICAL CONDITIONS**

## **SUB-SECTION – 4.3**

### **GENERAL TECHNICAL CONDITIONS**

#### **1.0 GENERAL**

This part covers technical conditions pursuant to the contract and will form an integral part of the contract. The following provisions shall supplement all the detailed technical specifications and requirements brought out in the accompanying technical specifications. The contractor's proposal shall be based on the use of equipment and materials complying fully with the requirements, specified herein. It is recognised that the contractor may have standardised on the use of certain components, materials, processes or procedures different than those specified herein. Alternate proposals offering similar equipment based on the manufacturer's standard practice will also be considered provided such proposals meet the specified designs, standard and performance requirements and are acceptable to the owner.

#### **2.0 LIMIT OF CONTRACT**

Equipment furnished shall be complete in every respect with all mountings, fittings, fixtures and standard accessories normally provided with such equipment and/or needed for erection, completion and safe operation of the equipment as required by applicable codes though they may not have been specifically detailed in the technical specifications unless included in the list of exclusions. All similar standard components/parts of similar standard equipment provided, shall be inter-changeable with one another.

#### **3.0 EQUIPMENT PERFORMANCE GUARANTEE**

- 3.1 The performance tests of the equipment under the scope of the contract are detailed in the technical specifications. These guarantee shall supplement the general performance guarantee provisions covered under general terms & conditions of contract in clause entitled "Guarantee".
- 3.2 Liquidated damages for not meeting performance guarantee during the performance and guarantee tests shall be assessed and recovered from the contractor, as detailed in the technical specifications. Such liquidated damages shall be without any limitation whatsoever and shall be in addition to damages, if any payable under any other clauses of conditions of contract.

#### **4.0 ENGINEERING DATA**

- 4.1 The furnishing of engineering data by the contractor shall be in accordance with the schedule for each set of equipment as specified in the technical specifications. The review of these data by the engineer will cover only general conformance of the data to the specifications and documents, interfaces with the equipment provided under the specifications, external connections and of the dimensions which might affect plant layout. This review by the engineer may not indicate a thorough review of all dimensions, quantities and details of the equipment, materials, any devices or items indicated or the accuracy of the information submitted. This review and/or approval by the engineer shall not be construed by the contractor, as limiting any of his responsibilities and liabilities for mistakes and deviations from the requirements, specified under these specifications and documents.
- 4.2 All engineering data submitted by the contractor after final process including review and approval by the engineer shall form part of the contract documents and the entire works covered under these specifications shall be performed in strict conformity, unless otherwise expressly requested by the engineer in writing.

## 5.0 DRAWING

- 5.1 All drawings submitted by the contractor including those submitted at the time of bid shall be sufficiently detailed to indicate the type, size, arrangement, weight of each component, break-up for packing and shipment, the external-connections, fixing arrangements required, the dimensions required for installation and interconnections with other equipment and materials, clearances and spaces required between various portions of equipment and any other information specifically requested in the specifications.
- 5.2 Each drawing submitted by the contractor shall be clearly marked with the name of the owner, the unit designation, the specifications title, the specification number and the name of the project. If standard catalogue pages are submitted the applicable items shall be indicated therein. All titles, notings, markings and writings on the drawing shall be in English. All the dimensions should be in metric units.
- 5.3 The Contractor shall make his drawings in AutoCAD format and shall supply the drawings in CDs along with hardcopies.
- 5.3.1 Copies of drawings returned to the contractor will be in the form of a print with the owner's marking or print made from CDs for computer based drawings.
- 5.4 The drawings submitted by the contractor shall be reviewed by the engineer as far as practicable within four (4) weeks and shall be modified by the contractor if any modifications and/or corrections are required by the engineer. The contractor shall incorporate such modifications and/or corrections and submit the final drawings for approval. Any delay arising out of failure by the contractor to rectify the drawings in good time shall not alter the contract completion date.
- 5.5 Approval by the Nodal Officer or his Nominee the contractor shall submit specifications and drawings showing the proposed Temporary Works to the Nodal Officer/Engineer-In-Charge or his nominee, who is to approve them if they comply with the specification and drawings. The contractor shall be responsible for design of Temporary Works.  
  
The Nodal Officer/Engineer-In-Charge or nominee's approval shall not alter the contractor's responsibility for design of the Temporary Works.
- 5.6 The drawings sent for approval to the engineer shall be in quintuplicate. One print of such drawings will be returned to the contractor by the engineer marked approved/ approved with corrections. The contractor shall thereupon furnish the owner with nine prints and one reproducible original of the drawings after incorporating all corrections.
- 5.7 Further work by the contractor shall be in strict accordance with these drawings and no deviation shall be permitted without the written approval of the engineer, if so required.
- 5.8 All manufacturing and fabrication work in connection with the equipment prior to the approval of the drawings shall be at the contractor's risk. The contractor may make nay changes in the design which are necessary to make the equipment conform, to the provisions and intent of the contract and such changes will again be subject to approval by the engineer. Approval of contractor's drawings or work by the engineer shall not relieve the contractor of any of his responsibilities and liabilities under the contract.
- 5.9 Drawings shall include all installation and detailed piping drawings wherever applicable. All piping 100 mm and larger shall be routed in detail and smaller pipe

shall be shown schematically or by isometric drawings. All drawings shall be fully corrected to agree with actual as built construction.

**5.10 Operating and Maintenance Manual** : If "as built" drawings and/or operating and maintenance manuals are required the contracts shall supply them by the dates stated in the contract data.

If the contractor does not supply the drawings and/or manuals by the dates stated in the contract data, or they do not receive the Nodal Officer or his nominee's approval, the Nodal Officer or his nominee shall withhold the amount stated in the contract data from payments due to the contractor.

**6.0 INSTRUCTION MANUALS**

6.1 The contractor shall submit to the engineer, preliminary instruction manuals for all the equipment, covered under the contract within the time agreed upon between the owner & the contractor. The final instruction manuals complete in all respects shall be submitted by the contractor thirty (30) days before the first shipment of the equipment. The instruction manuals shall contain full details and drawings of all the equipment furnished, the erection procedures, testing procedures, operation and maintenance procedures of the equipment. These instruction manuals shall be submitted in the form of one (1) reproducible original and twelve (12) copies.

6.2 If after the commissioning and initial operation of the plant, the instruction manuals require any modifications/ additions/changes, the same shall be incorporated and the updated final instruction manuals in the form of one (1) reproducible original and twelve (12) copies shall be submitted by the contractor to the owner.

6.3 The contractor shall furnish to the owner, twelve (12) sets of spare parts catalogue.

6.4 In addition, the contractor shall supply two sets of all the document, specifications and as built drawings in CDs to CMPDI. The documents supplied shall be in easily readable, search & printable format.

**7.0 FIRST FILL OF CONSUMABLE, OILS AND LUBRICANTS**

All the first fill of consumable such as oils, lubricants and essential chemicals etc., which will be required to put the equipment covered under the scope of the specifications, into successful trial operation, shall be furnished by the contractor unless specifically excluded under the exclusions in the specifications and other documents.

**8.0 MANUFACTURING SCHEDULE**

The contractor shall submit to the engineer his manufacture and delivery schedules for all equipment within thirty (30) days from the date of the letter of acceptance of tender. Such schedules shall be in line with the detailed net-work for all phases of the work of the contractor. Such schedules shall be reviewed, up-dated and submitted to the engineer, once every two (2) months thereafter, by the contractor. Schedule shall also include the materials and equipment purchased from outside suppliers.

**9.0 REFERENCE STANDARDS**

9.1 The codes and/or standards referred to in these specifications shall govern, in all cases wherever such references are made. In case of a conflict between such codes and/or standards and the specifications, the latter shall govern. Such codes and/or standards referred to shall mean the latest revisions, amendments/changes adopted

and published by the relevant agencies. In case of any further conflict in this matter, the same shall be referred to the engineer whose decision shall be final and binding.

- 9.2 Other internationally acceptable standards which ensure equal or higher performance than those specified shall also be accepted.

## **10.0 DESIGN IMPROVEMENT**

- 10.1 The engineer or the contractor may propose changes in the specification of the equipment or quality thereof and if the parties agree upon any such changes the specification shall be modified accordingly.
- 10.2 If any such agreed upon change is such that it affects the price and schedule of completion, the parties shall agree in writing as to the extent of any change in the price and/or schedule of completion before the contractor proceeds with the change. Following such agreement the provision thereof, shall be deemed to have been amended accordingly.

## **11.0 QUALITY ASSURANCE**

### **11.1 Quality Assurance Programme**

To ensure that the equipment and services under the scope of this contract whether manufactured or performed within the contractor's works or at his sub-contractor's premises or at the owner's site or at any other place of work are in accordance with the specifications, the contractor shall adopt suitable quality assurance programme to control such activities at all points necessary. Such programme shall be outlined by the contractor and shall be finally accepted by the engineer after discussions before the issue of letter of acceptance of tender. A quality assurance programme of the contractor shall generally cover the following :

- a. his organisation structure for the management and implementation of the proposed quality assurance programme:
- b. documentation control system:
- c. qualification data for bidder's key personnel:
- d. the procedure for purchase of materials, parts components and selection of sub-contractor's services including vendor analysis, source inspection, incoming raw-material inspection, verification of materials purchased etc.:
- e. system for shop manufacturing and site erection control including process control and fabrication and assembly controls:
- f. control of non-conforming items and system for corrective actions:
- g. inspection and test procedure both for manufacture and field activities:
- h. control of calibration and testing of measuring and testing equipment:
- i. system for indication and appraisal of inspection status:
- j. system for quality audits:
- k. system for authorising release of manufactured product to the owner:
- l. system for maintenance of records:
- m. system for handling storage and delivery: and
- n. a quality plan detailing out the specific quality control procedure adopted for controlling the quality characteristics relevant to each item of equipment furnished and each work at different stages executed at work site.

### **11.2 Quality Assurance Documents**

The contractor shall be required to submit the following Quality Assurance Documents within three weeks after despatch of the equipment :

- i. all non-destructive examination procedures stress relief and weld repair procedure actually used during fabrication.



- ii. welder and welding operator qualification certificates.
- iii. welder identification list, listing welder's and welding operator's qualification procedure and welding identification symbols.
- iv. material mill test reports on components as specified by the specification.
- v. the inspection plan with verification, inspection plan check points, verification sketches, if used, and methods used to verify that the inspection and testing points in the inspection plan were performed satisfactorily.
- vi. sketches and drawings used for indicating the method of traceability of the radiographs to the location on the equipment.
- vii. all non-destructive examination result reports including radiography interpretation reports.
- viii. stress relief time temperature charts.
- ix. factory test results for testing required as per applicable codes and standard referred in the specifications.
- x. the engineer or his duly authorised representative reserves the right to carry out quality audit and quality surveillance of the systems and procedures of the contractor/his vendor's quality management and control activities.

## **12.0 ENGINEER'S SUPERVISION**

- 12.1 To eliminate delays and avoid disputes and litigation it is agreed between the parties to the contract that all matters and questions shall be referred to the engineer and his decision shall be final.
- 12.2 The work shall be performed under the direction and supervision of the engineer. The scope of the duties of the engineer, pursuant to the contract, will include but not be limited to the following:
  - a. interpretation of all the terms and conditions of these documents and specification.
  - b. review and interpretation of all the contractor's drawings, engineering data etc.
  - c. witness or authorise his representative to witness tests and trials either at the manufacturer's works or at site, or at any place where work is performed under the contract.
  - d. inspect, accept or reject any equipment, material and work under the contract.
  - e. issue certificate of acceptance and/or progressive payment and final payment certificates.
  - f. review and suggest modifications and improvements in completion schedules from time to time.
  - g. supervise the quality assurance programme implementation at all stages of the works.
  - h. to receive and endorse the despatch documents enabling the contractor to clear the consignments.

## **13.0 INSPECTION, TESTING AND INSPECTION CERTIFICATE**

- 13.1 The engineer, his duly authorised representative and/or outside inspection agency acting on behalf of the owner shall have at all reasonable times access to the contractor's premises or works and shall have the power at all reasonable times to inspect and examine the materials and workmanship of the works during its manufacture or erection and if part of the works is being manufactured or assembled at other premises or works, the contractor shall obtain for the engineer and for his duly authorised representative permission to inspect as if the works were manufactured or assembled on the contractor's own premises or works.

- 13.2 The contractor shall give the Engineer/Inspector fifteen (15) days written notice of any material being ready for testing . Such tests shall be to the contractor's account except for the expenses of the Inspector. The Engineer/Inspector, unless witnessing of the tests is virtually waived, will attend such tests within fifteen (15) days of the date on which the equipment is notified as being ready for test/inspection, failing which the contractor may proceed with the test which shall be deemed to have been made in the Inspector's presence and he shall forthwith forward to the Inspector duly certified copies of tests in triplicate.
- 13.3 The Engineer or Inspector shall within fifteen (15) days from the date of inspection as defined herein give notice in writing to the contractor, of any objection to any drawings and all or any equipment and workmanship which in his opinion is not in accordance with the contract. The contractor shall give due consideration to such objections and shall either make the modifications that may be necessary to meet the said objections or shall confirm in writing to the Engineer/Inspector giving reasons therein, that no modifications are necessary to comply with the contract.
- 13.4 When the factory tests have been completed at the contractor's or sub-contractor's works, the Engineer/Inspector shall issue a certificate to this effect within fifteen (15) days after completion of tests but if the tests are not witnessed by the Engineer/Inspector, the certificate shall be issued within fifteen (15) days of the receipt of the contractor's test certificate by the Engineer/Inspector. Failure of the Engineer/Inspector to issue such a certificate shall not prevent the contractor from proceeding with the works. The completion of these tests or the issue of the certificate shall not bind the owner to accept the equipment should it, on further tests after erection, be found not to comply with the contract.
- 13.5 In all cases where the contract provides for tests whether at the premises or works of the contractor or of any sub-contractor, the contractor, except where otherwise specified, shall provide free of charge such items as labour, materials, electricity, fuel, water, stores, apparatus and instruments as may be reasonably demanded by the Engineer/Inspector or his authorised representative to carry out effectively such tests of the equipment in accordance with the contract and shall given facilities to the Engineer/Inspector or to his authorised representative to accomplish testing.
- 13.6 The inspection by Engineer and issue of Inspection Certificate thereon shall in no way limit the liabilities and responsibilities of the contractor is respect of the agreed quality assurance programme forming a part of the contract.

#### **14.0 TEST**

##### **14.1 Start up**

- 14.1.1 On completion of erection of the equipment and before start-up, each item of the equipment shall be thoroughly cleaned and then inspected jointly by the Engineer and the contractor for correctness and completeness of installation and acceptability of start-up, leading to initial pre-commissioning tests at site. The list of pre-commissioning tests to be performed shall be as mutually agreed and included in the contractor's quality assurance programme.
- 14.1.2 The contractor's commissioning/start-up engineers specifically identified as far as possible shall be responsible for carrying out all the pre-commissioning tests. On completion of inspection, checking and after the pre-commissioning tests are satisfactorily over, the complete equipment shall be placed on initial operation during which period the complete equipment shall be operated integral with sub-systems and supporting equipment as a complete plant referred hereinafter as plant.

## 14.2 Trial Operation

- 14.2.1 The plant shall then be on trial operation during which period all necessary adjustments shall be made while operating over the full load-range enabling the plant to be made ready for performance and guarantee tests.
- 14.2.2 The duration of trial operation of the complete equipment shall be seven (7) days out of which at least seventy two (72) hours shall be continuous operation on full load or any other duration as may be agreed to, between the engineer and the contractor. The trial operation shall be considered successful, provided that each item of the equipment can operate continuously at the specified operating characteristics, for the period of trial operation.
- 14.2.3 For the period of trial operation, the time of operation with any load shall be counted. Minor interruptions not exceeding four (4) hours at a time, caused during the continuous operation shall not affect the total duration of trial operation. However, if in the opinion of the engineer, the interruption is long, the trial operation shall be prolonged for the period of interruption.
- 14.2.4 A trial operation report comprising of observations and recordings of various parameters to be measured in respect of the above trial operation shall be prepared by the contractor. This report, besides recording the details of the various observations during trial run, shall also include the dates of start and finish of the trial operations and shall be signed by the representatives of both the parties. The report shall have sheets, recording all the details of interruptions occurred, adjustments made and any minor repairs done during the trial operation. Based on the observations, necessary modifications/ repairs to the plant shall be carried out by the contractor to the full satisfaction of the engineer to enable the later to accord permission to carry out performance and guarantee tests on the plant. However, minor defects which do not endanger the safe operation of the equipment, shall not be considered as reasons for withholding the aforesaid permission.

## 14.3 Performance and guarantee test

- 14.3.1 The final test as to the performance and guarantees shall be conducted at site, by the owner. Such tests will be commenced within a period of two (2) months after successful completion of trial operations. Any extension of time beyond the above two (2) months shall be mutually agreed upon.
- 14.3.2 These tests shall be binding on both the parties of the contract to determine compliance of the equipment with the performance guarantees.
- 14.3.3 The available instrumentation and control equipment will be used during such tests and the engineer will calibrate, all such measuring equipment and devices as far as practicable. However, unmeasurable parameters shall be taken into account in a reasonable manner by the engineer, for the equipment of these tests. The tests will be conducted at the specified load points and as near the specified cycle condition as practicable. The engineer will apply proper corrections in calculation, to take into account conditions which do not correspond to the specified conditions.
- 14.3.4 Any special equipment, tools and tackles required for the successful completion of the performance and guarantee tests shall be provided by the contractor, free of cost.
- 14.3.5 The guaranteed performance figures of the equipment shall be proved by the contractor during these performance and guarantee tests. Should the results of these tests show any decrease from the guaranteed values, the contractor shall modify the equipment as required to enable it to meet the guarantees. In such case,

performance and guarantee tests shall be repeated within one month, from the date the equipment is ready for re-tests and all cost for modifications including labour, materials and the cost of additional testing to prove that the equipment meets the guarantees, shall be borne by the contractor. Duration of performance guarantee tests will be of one month of which 6 (six ) days continuous on load operation is the minimum requirement and in case it fails , the process of performance guarantee tests will be repeated.

14.3.6 The specific tests to be conducted on equipment has been brought out in the technical specifications.

14.3.7 Performance and guarantee test shall make allowance for instrumentation errors as may be decided by the engineer-in-charge.

#### 14.4 TEST CODES

The provisions outlined in the ASME performance test codes or other international and Indian approved equivalents shall generally be used as a guide for all the above test procedures unless otherwise specified in the technical specifications.

#### 15.0 PACKING

15.1 All the equipment shall be suitably protected, coated, covered or boxed and crated to prevent damage or deterioration during transit, handling and storage at site till the time of erection. While packing all the materials, the limitation from the point of view of availability of railway wagon sizes in India should be taken into account. The contractor shall be responsible for any loss or damage during transportation, handling and storage due to improper packing.

#### 16.0 PROTECTION

All coated surfaces shall be protected against abrasions, impact, discoloration and any other damages. All exposed threaded portions shall be suitable protected with either a metallic or a non-metallic protecting device. All ends of all valves and pipings and conduit equipment connections shall be properly sealed with suitable devices to protect them from damage. The parts which are likely to get rusted, due to exposure to weather, should also be properly treated and protected in a suitable manner.

#### 17.0 PRESERVATIVE SHOP COATING

17.1 All exposed metallic surfaces subject to corrosion shall be protected by shop application of suitable coatings. All surfaces which will not be easily accessible after the shop assembly, shall before hand be treated and protected for the life of the equipment. All surfaces shall be thoroughly cleaned of all mill scale, oxide and other coatings and prepared in the shop. The surfaces that are to be finish painted after installation or require corrosion protection until installation, shall be shop painted with at least two coats of primer. Transformers and other electrical equipment, if included shall be shop finished with one or more coats of primer and two coats of high grade resistance enamel. The finished colours shall be as per manufacturer's standards, to be selected and specified by the engineering at a later date.

17.2 Shop primer for all steel surface which will be exposed to operating temperature below 95°C shall be selected by the contractor, after obtaining specific approval of the engineer regarding the quality of primer proposed to be applied. Special high temperature primer shall be used on surfaces exposed to temperatures higher than 95°C and such primers shall also be subject to the approval of the engineer.

- 17.3 All other steel surfaces which are not to be painted shall be coated with suitable dust preventive compound subject to the approval of the engineer.

#### **18.0 PROTECTIVE GUARDS**

Suitable guards shall be provided for protection of personnel on all exposed rotating and/or moving machine parts. All such guards with necessary spares and accessories shall be designed for easy installation and removal for maintenance purposes.

#### **19.0 DESIGN CO-ORDINATION**

The contractor shall be responsible for the selection and design of appropriate equipment to provide the best co-ordinated performance of the entire system. The basic design requirements are detailed out in Technical Specifications. The design of various components, sub-assemblies and assemblies shall be so done, so that it facilitates easy field assembly and maintenance. All the rotating components shall be so selected that the natural frequency of the complete unit is not critical at or close to the operating range of the unit.

#### **20.0 DESIGN CO-ORDINATION MEETING**

The contractor will be called upon to attend design co-ordination meetings with the engineer, other contractors and the consultants of the owner during the period of contract. The contractor shall attend such meetings at his own cost at the office of the General Manager(E&M), CMPDI, Ranchi or at mutually agreed venue as and when required and fully co-operate with such persons and agencies involved during those discussions.

#### **21.0 TOOLS AND TACKLES**

The contractor shall supply with the equipment one complete set of all special tools and tackles for the erection, assembly, dis-assembly and maintenance of the equipment. However, these tools and tackles shall be separately packed and brought on to site.

#### **22.0 NOISE LEVEL**

The equivalent 'A' weighted sound level measured at a distance of 1.5 metres above floor level in elevation and one metre horizontally from the base of any equipment furnished and installed under these specifications, expressed in decibels to a reference of 0.0002 microbar, shall not exceed 85 dBA.

#### **23.0 TAKING OVER**

Upon successful completion of all the tests to be performed at site on equipment furnished and erected by the contractor, the engineer shall issue to the contractor a taking over certificate as a proof of the final acceptance of the equipment. Such certificate shall not unreasonably be withheld nor will the engineer delay the issuance thereof, on account of minor omissions or defects which do not affect the commercial operation and/or cause any serious risk to the equipment. Such certificate shall not relieve the contractor of any of his obligations which otherwise survive, by the terms and conditions of the contract after issuance of such certificate.

#### **24.0 INDIAN STANDARDS**

Normally Indian Standards as published by BUREAU OF INDIAN STANDARDS shall be followed. Wherever relevant Indian Standard is not published by the BIS,

International Standards or American Standard or German Standard or British Standard, as decided by the Engineer in consultations with the Consultants employed by the Owner, shall be followed.

## **25.0 WELDING**

If the manufacturer has special requirements relating to the welding procedures for welds at the terminals of the equipment to be procured by the owner under separate specifications, the requirements shall be submitted to the engineer in advance of commencement of erection work.

## **26.0 LUBRICATION**

Equipment shall be lubricated by systems designed for continuous operation. Lubricant level indicators shall be furnished and marked to indicate proper levels under both stand-still and operating conditions.

## **27.0 EQUIPMENT BASES**

A cast iron or welded steel base plate shall be provided for all rotating equipment which is to be installed on a concrete/structural steel base unless otherwise agreed to by the engineer. Each base plate shall support the unit and its drive assembly, shall be of a neat design with pads for anchoring the units, shall have a raised lip all around, and shall have threaded drain connections.

## **28.0 RATING PLATES, NAME PLATES AND LABELS**

- 28.1 Each main and auxiliary items of plant is to have permanently attached to it in a conspicuous position a rating plate of non corrosive material upon which is to be engraved the manufacturer's name, equipment, type or serial number, together with details of the loading conditions under which the item of plant in question have been designed to operate, and such diagram plates as may be required by the engineer.
- 28.2 Each item of plant is to be provided with a nameplate or label designating the service of the particular equipment. The inscriptions are to be approved by the engineer or shall be as detailed in the appropriate sections of the technical specifications.
- 28.3 Such nameplates or labels are to be of white non-hygroscopic material with engraved black lettering or, alternatively, in the case of indoor circuit breakers, starters etc. of transparent plastic material with suitably coloured lettering engraved on the back.
- 28.4 Items of plant such as valves, which are subject to handling, are to be provided with an engraved chromium plated nameplate or label with engraving filled with enamel.
- 28.5 All such name plates, instruction plates, lubrication charts etc. shall be bilingual with Hindi inscription first, followed by English. Alternatively two separate plates one with Hindi and the other with English inscriptions may be provided.

## **29.0 COLOUR CODE FOR PIPE SERVICES**

All pipe services wherever applicable are to be painted in accordance with the owner's standard colour scheme, by the contractor.

**30.0 SERVICE BY THE OWNER**

30.1 The following services shall be provided by the owner :

i.Construction/ drinking water at one point within 100 metres of the work site ,charges to be decided by the company.

ii.Auxiliary power for construction at one point within 100 metres of the worksite , charges to be decided by the company.

30.2 In the event of the contractor requiring these services at parameters other than those specified above, for any systems, equipment, instrument etc. he shall make the necessary arrangements himself.

<><><><>

## **SUB-SECTION – 4.4**

### **ERECTION CONDITIONS OF CONTRACT**



## SUB-SECTION – 4.4 ERECTION

**CONDITIONS OF CONTRACT****1.0 GENERAL**

- 1.1 The following shall supplement the conditions already contained in the other parts of these specifications and documents and shall govern that portion of the work of this contract to be performed at site.
- 1.2 The contractor upon signing of the contract shall, in addition to a project coordinator, nominate another responsible officer as his representative at site suitably designated for the purpose of overall responsibility and co-ordination of the works to be performed at site. Such person shall function from the site office of the contractor during the pendency of contract.

**2.0 REGULATION OF LOCAL AUTHORITIES AND STATUTES**

- 2.1 The contractor shall comply with all the rules and regulations of local authorities during the performance of his field activities. He shall also comply with the minimum wages act, 1948 and the payment of wages act (both of the Government of India and the local State Government) and the rules made there under in respect of any employee or workman employed or engaged by him or his subcontractor. The contractor shall make all necessary payments of the Provident Fund for the workmen employed by him for the work as per the laws prevailing under provisions of CMPF and Allied Schemes and CMPF and Miscellaneous Provisions Act 1948.
- 2.2 All registration and statutory inspection fees, if any, in respect of his work pursuant to this contract shall be to the account of the contractor. However, any registration, statutory inspection fees lawfully payable under the provisions of the rules and regulations of the Government and any other statutory laws and its amendments from time to time during erection in respect of the plant equipment ultimately to be owned by the owner, shall be to the account of the owner. Should any such inspection or registration need to be arranged due to the fault of the contractor or his sub-contractor, the additional fees for such inspection and/or registration shall be borne by the contractor.

**3.0 OWNER'S LIEN ON EQUIPMENT**

The owner shall have lien on all equipment including those of the contractor brought to the site for the purpose of erection, testing and commissioning of the plant. The owner shall continue to hold the lien on all such equipment throughout the period of contract. No material brought to the site shall be removed from the site by the contractor and/or his sub-contractors without the prior written approval of the engineer.

**4.0 INSPECTION, TESTING AND INSPECTION CERTIFICATES**

The provisions of the clause entitled inspection testing and inspection certificates under section GTC shall also be applicable to the erection portion of the works. The engineer shall have the right to re-inspect any equipment though previously inspected and approved by him, at the contractor's works, before and after the same are constructed and/or erected at site. If by the above inspection, the engineer rejects any work or equipment, the contractor shall make good for such rejection either by replacement or modifications/repairs as may be necessary, to the satisfaction of the engineer. Such replacement will also include the replacement or re-execution of such of those works of other contractors and/or

agencies, which might have got damaged or affected by the replacements or rework done to the contractor's work.

## **5.0 ACCESS TO SITE AND WORKS ON SITE**

- 5.1 Suitable access to and possession of the site shall be accorded to the contractor by the owner in reasonable time.
- 5.2 The owner shall have the necessary foundations to be provided by him ready, as per the agreed schedule for the execution of the individual phases of works.
- 5.3 The works so far as it is carried out on the owner's premises, shall be carried out at such time as the owner may approve and the owner shall give the contractor reasonable facilities for carrying out the works.
- 5.4 In the execution of the works, no persons other than the contractor or his duly appointed representative, sub-contractor and workmen, shall be allowed to do work on the site, except by the special permission, in writing of the engineer or his representative.

## **6.0 CONTRACTOR'S SITE OFFICE ESTABLISHMENT**

The contractor shall establish a site office at the site and keep posted an authorised representative for the purpose of the contract. Any written order or instruction of the engineer or his duly authorised representative, shall be communicated to the said authorised resident representing the contractor and the same shall be deemed to have been communicated to the contractor at his legal address.

## **7.0 CO-OPERATION WITH OTHER CONTRACTORS**

- 7.1 The contractor shall co-operate with all other contractors or tradesmen of the owner, who may be performing other works on behalf of the owner and the workmen who may be employed by the owner and doing work in the vicinity of the works under the contract. The contractor shall also so arrange to perform his work as to minimise, to the maximum extent possible, interference with the work of other contractors and his workmen. Any injury or damage that may be sustained in the employees of the other contractors and the owner, due to the contractor's work shall promptly be made good at his own expense. The engineer shall determine the resolution of any difference or conflict that may arise between the contractor and other contractors or between the contractor and the workmen of the owner in regard to their work. If the works of the contractor is delayed because of any acts or omissions of another contractor, the contractor shall have no claim against the owner on that account other than an extension of time for completing his works.
- 7.2 The engineer shall be notified promptly by the contractor of any defects in the other contractor's works that could affect the contractor's works. The engineer shall determine the corrective measures if any, required to rectify this situation after inspection of the works and such decisions by the engineer shall be binding on the contractor.

## **8.0 DISCIPLINE OF WORKMEN**

The contractor shall adhere to the disciplinary procedure set by the engineer in respect of his employees and workmen at site. The engineer shall be at liberty to object to the presence of any representative or employees of the contractor at the site, if in the opinion of the engineer such employee has mis-conducted himself or be incompetent or negligent or otherwise undesirable and then the contractor shall

remove such a person objected to and provide in his place a competent replacement.

## **9.0 CONTRACTOR'S FIELD OPERATION**

- 9.1 The contractor shall keep the engineer informed in advance regarding his field activity plans and schedules for carrying out each part of the works. Any review of such plan or schedule or method of work by the engineer shall not relieve the contractor of any of his responsibilities towards the field activities. Such reviews shall also not be considered as an assumption of any risk or liability by the engineer or the owner or any of his representatives and no claim of the contractor will be entertained because of the failure or inefficiency of any such plan or schedule or method of work reviewed. The contractor shall be solely responsible for the safety, adequacy and efficiency of plant and equipment and his erection methods.
- 9.2 The contractor shall have complete responsibility for the conditions of the work site including the safety of all persons employed by him or his sub-contractor and all the properties under his custody during the performance of the work. This requirement shall apply continuously till the completion of the contractor and shall not be limited to normal working hours. The construction review by the engineer is not intended to include review of contractor's safety measures in, on or near the work-site, and their adequacy or otherwise.

## **10.0 PHOTOGRAPHS AND PROGRESS REPORT**

- 10.1 The contractor shall furnish three (3) prints each to the engineer of progress photographs of the work done at site. Photographs shall be taken as and when indicated by the engineer or his representative. Photographs shall be adequate in size and number to indicate various stages of erection. Each photograph shall contain the date, the name of the contractor and the title of the photograph.
- 10.2 The above photographs shall accompany the monthly progress report detailing out the progress achieved on all erection activities as compared to the schedules. The report shall also indicate the reasons for the variance between the scheduled and actual progress and the action proposed for corrective measures wherever necessary.

## **11.0 MAN-POWER REPORT**

- 11.1 The contractor shall submit to the engineer, on the first day of every month, a man hour schedule for the month, detailing the man hours scheduled for the month, skill wise and area-wise.
- 11.2 The contractor shall also submit to the engineer on the first day of every month, a man power report of the previous months detailing the number of persons scheduled to have been employed and actually employed, skill-wise and areas of employment of such labour.

## **12.0 PROTECTION WORK**

The contractor shall have total responsibility for protecting his works till it is finally taken over by the engineer. No claim will be entertained by the owner or the engineer for any damage or loss to the contractor's works and the contractor shall be responsible for the complete restoration of the damaged works to its original condition to comply with the specifications and drawings. Should any such damage to the contractor's works occur because of other party not under his supervision or control, the contractor shall make his claim directly with the party concerned. If dis-

agreement or conflict or dispute develops between the contractor and the other party or parties concerned regarding the responsibility for damage to the contractor's works the same shall be resolved as per the provisions of the clause 7.0 above entitled co-operation with other contractors. The contractor shall not cause any delay in the repair of such damaged works because of any delay in the resolution of such disputes. The contractor shall proceed to repair the work immediately and the cause thereof will be assigned pending resolution of such dispute.

### **13.0 EMPLOYMENT OF LABOUR**

- 13.1 The contractor will be expected to employ on the work only his regular skilled employees with experience of his particular work. No female labour shall be employed after darkness no persons below the age of eighteen years shall be employed.
- 13.2 All travelling expenses including provisions of all necessary transport to and from site lodging allowances and other payments to the contractor's employees shall be the sole responsibility of the contractor.
- 13.3 The hour of work on the site shall be decided by the owner and the contractor shall adhere to it. Working hours will normally be eight (8) hours per day- Monday through Saturday.
- 13.4 Contractor's employees shall wear identification badges while on work on site.
- 13.5 In case the owner becomes liable to pay any wages or dues to the labour or to any Government agency under any of the provisions of the Minimum Wages Act, Workmen compensation Act, Contract Labour Regulation Abolition Act, CMPF Act or any other law due to act of omission of the contractor, the owner may make such payments and shall recover the same from the contractor's bills.

### **14.0 FACILITIES TO BE PROVIDED BY THE OWNER**

#### **14.1 SPACE :**

The contractor shall advise the owner within thirty (30) days from the date of acceptance of the letter of award, about his exact requirement of space for his office, mess-rooms storage area, pre-assembly and fabrication areas, labour colony area, toilets, etc. The above requirement shall be reviewed by the engineer and space will be allotted to the contractor for construction of his temporary structures like office, storage sheds, labour and staff colony and other utilities etc. for his own as well as his sub-contractor's use.

#### **14.2 ELECTRICITY**

The contractor shall submit to the engineer within thirty (30) days from the date of acceptance of the award letter, his electrical power requirements, if any, to allow the planning of the temporary electrical distribution by the engineer. The contractor shall be provided with supply of electricity for the purposes of the contract, only at one point in the project site. The contractor shall make his own further distribution arrangement. All temporary wiring must comply with local regulations and will be subject to engineer's inspection and approval before connection to supply. Power supply for labour colonies shall also be provided at one point. The contractor shall be charged for the power supplied at work site and labour colonies at prevalent rate of power supplied by State Electricity Board. The electricity shall be supplied at one point at suitable voltage as available during construction. If any transformation of voltage required to suit the requirement of the contractor, the same may be done by the contractor as per their requirement at their cost.

### 14.3 WATER

Supply of water will be made available for the construction purposes at an agreed single point within 100 metres of the work site. And further distribution will be the responsibility of the contractor. The contractor shall be charged for the water supplied at work site @ 1% of the value of civil works and shall be deducted from the contractor's running/final bills.

## 15.0 FACILITIES TO BE PROVIDED BY THE CONTRACTOR

### 15.1 Tools, tackles and scaffoldings

The contractor shall provide all the construction equipment, tools, tackles and scaffoldings required for pre-assembly, erection, testing and commissioning of the equipment covered under the contract. He shall submit a list of all such materials to the engineer before the commencement of pre-assembly at site. These tools and tackles shall not be removed from the site without the written permission of the engineer.

### 15.2 Communication

The owner will extend the telephone & telex facilities, if available at site, for purposes of contract. The contractor shall be charged at actuals for such facilities.

### 15.3 First – aid

15.3.1 The contractor shall provide necessary first-aid facilities for all his employees, representatives and workmen working at the site. Enough number of contractor's personnel shall be trained in administering first-aid.

15.3.2 The owner will provide the contractor, in case of an emergency, the services of an ambulance for transportation to the nearest hospital.

### 15.4 Cleanliness

15.4.1 The contractor shall be responsible for keeping the entire area allotted to him clean and free from rubbish, debris etc. during the period of contract. The contractor shall employ enough number of special personnel to thoroughly clean his work area at least once in a day. All such rubbish and scrap material shall be stacked or disposed in a place to be identified by the engineer. Materials and stores shall be so arranged to permit easy cleaning of the area in areas where equipment might drip oil and cause damage to the floor surface, a suitable protective cover of a flame resistant, oil proof sheet shall be provided to protect the floor from such damage.

15.4.2 Similarly the labour colony, the offices and the residential areas of the contractor's employees and workmen shall be kept clean and neat to the entire satisfaction of the engineer. Proper sanitary arrangement shall be provided by the contractor, in the work areas, office and residential areas of the contractor.

## 16.0 LINES AND GRADES

All the works shall be performed to the lines, grades and elevations indicated on the drawings. The contractor shall be responsible to locate and layout the works. Basic horizontal and vertical control points will be established and marked by the engineer at site at suitable points. These points shall be used as datum for the works under the contract. The contractor shall inform the engineer well in advance

of the times and places at which he wishes to do work in the area allotted to him, so that suitable datum points may be established and checked by the engineer to enable the contractor to proceed with his works. Any work done without being properly located may be removed and/or dismantled by the engineer at contractor's expense.

#### **17.0 FIRE PROTECTION**

- 17.1 The work procedures that are to be used during the erection shall be those which minimise fire hazards to the extent practicable. Combustible materials, combustible waste and rubbish shall be collected and removed from the site at least once each day. Fuels, oils and volatile or flammable materials shall be stored away from the construction and equipment and materials storage areas in safe containers. Untreated canvas paper, plastic or other flammable flexible materials shall not at all be used at site for any other purpose unless otherwise specified. If any such materials are received with the equipment at the site, the same shall be removed and replaced with acceptable material before moving into the construction area or storage.
- 17.2 Similarly corrugated paper fabricated cartons etc. will not be permitted in the construction area either for storage or for handling of materials. All such materials used shall be water proof and flame resistant type. All the other materials such as working drawings, plants, etc. which are combustible but are essential for the works to be executed shall be protected against combustion resulting from welding sparks, cutting flames and other similar fire sources.
- 17.3 All the contractor's supervisory personnel and sufficient number of workers shall be trained for fire-fighting and shall be assigned specific fire protection duties. Enough of such trained personnel must be available at the site during the entire period of the contract.
- 17.4 The contractor shall provide enough fire protection equipment of the types and number for the ware-houses, office, temporary structures, labour colony area etc. Access to such fire protection equipment, shall be easy and kept open at all times.

#### **18.0 SECURITY**

The contractor shall have total responsibility for all equipment and materials in his custody stored, loose, semi-assembled and/or erected by him at site. The contractor shall make suitable security arrangements including employment of security personnel to ensure the protection of all materials, equipment and works from theft, fire, pilferage and any other damages and loss. All materials of the contractor shall enter and leave the project site only with the written permission of the engineer in the prescribed manner.

#### **19.0 CONTRACTOR'S AREA LIMITS**

The engineer will mark-out the boundary limits of access roads, parking spaces, storage and construction areas for the contractor and the contractor shall not trespass the areas not so marked out for him. The contractor shall be responsible to ensure that none of his personnel move out of the areas marked out for his operations. In case of such a need for the contractor's personnel to work out of the areas marked out for him, the same shall be done only with the written permission of the engineer.

## **20.0 CONTRACTOR'S CO-OPERATION WITH THE OWNER**

In cases where the performance of the erection work by the contractor affects the operation of the system facilities of the owner, such erection work of the contractor shall be scheduled to be performed only in the manner stipulated by the engineer and the same shall be acceptable at all times to the contractor. The engineer may impose such restrictions on the facilities provided to the contractor such as electricity, water, etc. as he may think fit in the interest of the owner and the contractor shall strictly adhere etc. such restrictions and co-operate with the engineer. It will be the responsibility of the contractor to provide all necessary temporary instrumentation and other measuring devices required during start-up and operation of the equipment systems which are erected by him. The contractor shall also be responsible for flushing and initial filling of all the oil and lubricants required for the equipment furnished and erected by him, so as to make such equipment ready for operation. The contractor shall be responsible for supplying such flushing oil and other lubricants unless otherwise specified elsewhere in these documents and specifications.

## **21.0 PRE-COMMISSIONING TRIALS AND INITIAL OPERATIONS**

The pre-commissioning trials and initial operations of the equipment furnished and erected by the contractor shall be the responsibility of the contractor as detailed in relevant clauses in section GTC. The contractor shall provide, in addition, test instruments, calibrating devices, etc. and the labour required for the successful performance of these trials. It is anticipated that the above test may prolong for a long time, the contractor's workmen required for the above test shall always be present at site during such trials.

## **22.0 MATERIALS HANDLING AND STORAGE**

- 22.1 All the equipment furnished under the contract and arriving at site shall be promptly received, unloaded and transported and stored in the storage spaces by the contractor.
- 22.2 Contractor shall be responsible for examining all the shipment and notify the engineer immediately or any damage, shortage, discrepancy, etc. for the purpose of engineer's information only. The contractor shall submit to the engineer every week a report detailing all the receipts during the week. However, the contractor shall be solely responsible for any shortages or damage in transit, handling and/or in storage and erection of the equipment at the site. Any demurrage, wharfage and other such charges claimed by the transporters, railways etc. shall be to the account of the contractor.
- 22.3 The contractor shall maintain an accurate and exhaustive record detailing out the list of all equipment received by him for the purpose of erection and keep such record open for the inspection of the engineer at any time.
- 22.4 All equipment shall be handled very carefully to prevent any damage or loss. No bare wire ropes, slings, etc. shall be used for unloading and/or handling of the equipment without the specific written permission of the engineer. The equipment stored shall be properly protected to prevent damage either to the equipment or to the floor where they are stored. The equipment from the store shall be moved to the actual location at the appropriate time so as to avoid damage of such equipment at site.
- 22.5 All electrical panels, control gear, motors and such other devices shall be properly dried by heating before they are installed and energised. Motor bearings, slip rings, commutators and other exposed parts shall be protected against moisture ingress and corrosion during storage and periodically inspected. Heavy rotating parts in assembled conditions shall be periodically rotated to prevent corrosion due to prolonged storage.
- 22.6 All the electrical equipment such as motors, generators, etc. shall be tested for insulation resistance at least once in three months from the date of receipt till the date of commissioning and a record of such measured insulation values maintained by the contractor. Such records shall be open for inspection by the engineer.

- 22.6 The contractor shall ensure that all the packing materials and protection devices used for the various equipment during transit and storage are removed before the equipment are installed.
- 22.7 The consumable and other supplies likely to deteriorate due to storage must be thoroughly protected and stored in a suitable manner to prevent damage or deterioration in quality by storage.
- 22.8 All the materials stored in the open or duty location must be covered with suitable weather-proof and flameproof covering materials wherever applicable.
- 22.9 If the materials belonging to the contractor are stored in areas other than those earmarked for him, the engineer will have the right to get it moved to the area earmarked for the contractor at the contractor's cost.
- 22.10 The contractor shall be responsible for making suitable indoor storage facilities to store all equipment which require indoor storage. Normally, all the electrical equipment such as motors, control gear, generators, exciters and consumable like electrodes, lubricants etc. shall be stored in the closed storage space. The engineer, in addition, may direct the contractor to move certain other materials which in his opinion will require indoor storage, to indoor storage areas which the contractor shall strictly comply with.

### **23.0 CONSTRUCTION MANAGEMENT**

- 23.1 The field activities of the contractors working at site, will be co-ordinated by the engineer and the engineer's decision shall be final in resolving any disputes or conflicts between the contractor and other contractors and tradesmen of the owner regarding scheduling and co-ordination of work. Such decision by the engineer shall not be a cause for extra compensation or extension of time for the contractor.
- 23.2 The engineer shall hold weekly meetings of all the contractors working at site, at a time and a place to be designated by the engineer. The contractor shall attend such meetings and take notes of discussions during the meeting and the decisions of the engineer and shall strictly adhere to those decisions in performing his works. In addition to the above weekly meetings, the engineer may call for other meetings either with individual contractors or with selected number of contractors and in such a case the contractor, if called will also attend such meetings.
- 23.3 Time is the essence of the contract and the contractor shall be responsible for performance this works in accordance with the specified construction schedule. If at any time, the contractor is falling behind the schedule, he shall take necessary action to make good for such delays by increasing his work force or by working overtime or otherwise accelerate the progress of the work to comply with the schedule and shall communicate such actions in writing to the engineer, satisfying that his action will compensate for the delay. The contractor shall not be allowed any extra compensation for such action.
- 23.4 The engineer shall however not be responsible for provision of additional labour and/or materials or supply or any other services to the contractor except for the coordination work between various contractors as set out earlier.



## **24.0 FIELD OFFICE RECORDS**

The contractor shall maintain at his site office up-to-date copies of all drawings, specifications and other contract documents and any other supplementary data complete with all the latest revisions thereto. The contractor shall also maintain in addition the continuous record of all changes to the above contract documents, drawings, specifications, supplementary data, etc. effected at the field and on completion of his total assignment under the contract shall incorporate all such changes on the drawings and other engineering data to indicate as installed condition of the equipment furnished and erected under the contract. Such drawings and engineering data shall be submitted to the engineer in required number of copies. Daily work programme with progress of the previous day and deployment of labour related to work programme and attendance of workmen deployed during the previous day shall be maintained in a register. This register shall be signed by authorised representative of the contractor which will then be checked and signed by the owner's representative. Every three months this register shall be deposited to the owner which shall then be owners property.

## **25.0 CONTRACTOR'S MATERIALS BROUGHT ON TO SITE**

- 25.1 The contractor shall bring to site all equipment, parts, materials, including construction equipment, tools and tackles for the purpose of the works with intimation to the engineer. All such goods shall, from the time of their being brought vest in the owner, but may be used for the purpose of the works only and shall not on any account be removed or taken away by the contractor without the written permission of the engineer. The contractor shall nevertheless be solely liable and responsible for any loss or destruction thereof and damage thereto.
- 25.2 The owner shall have a lien on such goods for any sum or sums which may at any time be due or owing to him by the contractor, under, in respect of or by reasons of the contract. After giving a fifteen (15) days' notice in writing of his intention to do so, the owner shall be at liberty to sell and dispose of any such goods, in such manner as he shall think fit including public auction or private treaty and to apply the proceeds in or towards the satisfaction of such sum or sums due as aforesaid.
- 25.3 After the completion of the works, the contractor shall remove from the site under the direction of the engineer the materials such as construction equipment, erection tools and tackles, scaffolding etc. with the written permission of the engineer. If the contractor fails to remove such materials, within fifteen (15) days of issue of a notice by the engineer to do so then the engineer shall have the liberty to dispose of such materials as detailed under clause 25.2 above and credit the proceeds thereto the account of the contractor.

## **26.0 PROTECTION OF PROPERTY AND CONTRACTOR'S LIABILITY**

- 26.1 The contractor shall be responsible for any damage resulting from his operations. He shall also be responsible for protection of all persons including members of public and employees of the owner and the employees of other contractors and sub-contractors and all public and private property including structures, buildings, other plants and equipment and utilities either above or below the ground.
- 26.2 The contractor will ensure provision of necessary safety equipment such as barriers, sign-boards, warning lights and alarms, etc. to provide adequate protection to persons and property. The contractor shall be responsible to give reasonable notice to the engineer and the owners of public or private property and utilities when such property and utilities are likely to get damaged or injured during the performance of his works and shall make all necessary arrangements with such owners, related to removal and/or replacement or protection of such property and utilities.

**27.0 PAINTING**

All exposed metal parts of the equipment including pipings, structure railing etc. wherever applicable, after installation unless otherwise surface protected, shall be first painted with at least one coat of suitable primer which matches the shop primer paint used, after thoroughly cleaning all such parts of all dirt, rust, scales, greases, oils and other foreign materials by wire brushing, scarping or sand blasting, and the same being inspected and approved by the engineer for painting. Afterwards, the above parts shall be finished with two coats of alloyed resin machinery enamel paints. The quality of the finish paint shall be as per the standards of ISI or equivalent and to be of the colour as approved by the engineer.

**28.0 INSURANCE**

28.1 In addition to the conditions covered under the clause entitled insurance in general terms and conditions of contract of this volume-1, the following provisions will also apply to the portion of the works to be done beyond the contractor's own or his sub-contractor's works.

**28.2 Workmen's compensation insurance**

This insurance shall protect the contractor against all claims applicable under the Workmen's Compensation Act 1948 (Government of India). This policy shall also cover the contractor against claims for injury, disability disease or death of his or his sub-contractor's employees, which for any reason are not covered under the Workmen's Compensation Act 1948. The liabilities shall not be less than

Workmen's compensation	As per statutory provisions
Employer's liability	As per statutory provisions

**28.3 Comprehensive Automobile Insurance**

This insurance shall be in such a form to protect the contractor against all claims for injuries, disability, disease and death to members of public including the owner's men and damage to the property of others arising from the use of motor vehicles during on or off the site operations, irrespective of the ownership of such vehicles.

**28.4 Comprehensive General Liability Insurance**

28.4.1 This insurance shall protect the contractor against all claims arising from injuries, disabilities, disease or death of members of public or damage to property of others, due to any act or omission on the part of the contractor, his agents, his employees, his representatives and sub-contractors or from riots, strikes and civil commotion. The insurance shall also cover all the liabilities of the contractor arising out of the clause entitled defence of suits under General Terms and Conditions of contracts of this volume.1

28.4.2 The hazards to be covered will pertain to all the works which and areas where the contractor, his sub-contractors, his agents and his employees have to perform work pursuant to the contract.

28.5 The above are only illustrative list of insurance covers normally required and it will be the responsibility of the contractor to maintain all necessary insurance coverage to the extent both in time and amount to take care of all his liabilities either direct or indirect, in pursuance of the contract.

## **29.0 UN-FAVOURABLE WORKING CONDITIONS**

The contractor shall confine all his field operations to those works which can be performed without subjecting the equipment and materials to adverse effects, during inclement weather conditions, like monsoon, storms, etc. and during other unfavourable construction conditions. No field activities shall be performed by the contractor under conditions which might adversely affect the quality and efficiency thereof, unless special precautions or measures are taken by the contractor in a proper and satisfactory manner in the performance of such works and with the concurrence of the engineer. Such unfavourable construction conditions will in no way relieve the contractor of his responsibility to perform the works as per the schedule.

## **30.0 PROTECTION OF MONUMENTS AND REFERENCE POINTS**

The contractor shall ensure that any finds such as relic, antiquity, coins, fossils, etc. which he might come across during the course of performance of his works either during excavation or elsewhere, are properly protected and handed over to the engineer. Similarly the contractor shall ensure that the bench marks, reference points, etc., which are marked out either with the help of engineer or by the engineer shall not be disturbed in any way during the performance of his works. If any work is to be performed which disturb such references, the same shall be done only after these are transferred to other suitable locations under the direction of the engineer. The contractor shall provide all necessary materials and assistance for such relocation of reference points etc.

## **31.0 WORK AND SAFETY REGULATIONS**

31.1 The contractor shall ensure proper safety of all the workmen, materials plant and equipment belonging to him or the Company or to others, working at or near the site. The contractor shall also be responsible for provision of all safety notices and safety equipment required both by the relevant legislation and the engineer-in-charge as he may deem necessary.

31.2 The contractor will notify well in advance to the engineer-in-charge of his intention to bring to the site any container filled with liquid or gaseous fuel or explosive or petroleum substance or such chemicals which may involve hazards. The engineer-in-charge shall have the right to prescribe the conditions, under which such container is to be stored, handled and used during the performance of the works and the contractor shall strictly adhere to and comply with such instructions. The engineer-in-charge shall have the right at his sole discretion to inspect any such container or such construction plant/equipment for which material in the container is required to be used and if in his opinion, its use is not safe, he may forbid its' use. No claim due to such prohibition shall be entertained by the owner. Nor the owner shall entertain any claim of the contractor towards additional safety provisions/conditions to be provided for constructed as per engineer-in-charge's instructions.

Further any such decision of engineer-in-charge shall not, in any way, absolve the contractor of his responsibilities, and in case, use of such a container or entry there of into the site area is forbidden by engineer-in-charge, the contractor shall use alternative methods with the approval of engineer-in-charge without any cost implication to Company or extension of work schedule.

31.3 Where it is necessary to provide and/or store petroleum products or petroleum mixtures and explosives, the contractor shall be responsible for carrying out such provision and/or storage in accordance with the rules and regulations laid down in Petroleum Act 1934, Explosives Act 1948, and Petroleum and Carbide of Calcium Manual Published by the Chief Inspector of Explosives of India. All such storage shall have prior approval of the engineer-in-charge. In case, any approvals are necessary from the Chief Inspector (Explosive) or any statutory authorities, the contractor shall be responsible for obtaining the same.

- 31.4 All equipment used in construction and erection by contractor shall meet Indian, International Standards and where such standards do not exist, the contractor shall ensure these to be absolutely safe. All equipment shall be strictly operated and maintained by the contractor in accordance with manufacturer's operation manual and safety instructions and per Guidelines/Rules of the Company in this regard.
- 31.5 Periodical Examinations and all tests for all lifting/hoisting equipment and tackles shall be carried out in accordance with the relevant provisions of Factories Act 1948, Indian Electricity Act 1910 and associated Laws/Rules enforced from time to time. A register of such examinations and tests shall be properly maintained by the contractor and will be promptly produced as and when desired by engineer-in-charge or by the person authorised by him.
- 31.6 The contract shall be fully responsible for the safe storage of his and his subcontractors radioactive sources in accordance with BARC/DAE Rules and other applicable provisions. All precautionary measures stipulated by BARC/DAE in connection with use, storage and handling of such material will be taken by contractor.
- 31.7 The contractor shall provide suitable safety equipment of prescribed standard to all employee and workmen according to the need, as may be directed by engineer-in-charge who will also have right to examine these safety equipment to determine their suitability, reliability, acceptability and adaptability.
- 31.8 Where explosives are to be used, the same shall be used under the direct control and supervision of an expert, experienced, qualified and competent person strictly in accordance with the code practices/rules framed under Indian Explosives Act pertaining to handling, storage and use of the explosives.
- 31.9 The contractor shall provide safe working conditions to all workmen and employees at the site including safe means of access, railings, stairs, ladders, scaffoldings etc. The scaffoldings, stairs, ladders etc. shall be erected under the control and supervision of an experienced and competent person. For erection, good and standard quality of material only shall be used by the contractor.
- 31.10 The contractor shall not interfere or disturb electric fuses, wiring and other electrical equipment belonging to the owner or other contractors under any circumstances, whatsoever, unless expressly permitted in writing by the Company to handle such fuses, wiring or electrical equipment.
- 31.11 Before the contractor connects any electrical appliances to any plug or socket belonging to the other contractor or owner, he shall:
- a satisfy the engineer that the appliances is in good working condition
  - b inform the engineer of the maximum current rating, voltage and phases of the appliances.
  - c obtain permission of the engineer detailing the sockets to which the appliances may be connected.
- 31.12 The engineer will not grant permission to connect until he is satisfied that:
- a) the appliance is in good condition and is fitted with a suitable plug.
  - b) the appliance is fitted with a suitable cable having two earth conductors, one of which shall be an earthed metal sheath surrounding the cores.
- 31.13 No electric cable is in use by the contractor/owner will be disturbed without prior permission. No weight of any description will be imposed on any cable and no ladder or similar equipment will rest against or attached to it.

- 31.14 No repair work shall be carried out on any live equipment. The equipment shall must be declared safe by engineer-in-charge and a permit to work shall be issued by engineer-in-charge before any repair work is carried out by the contractor. While working on electric lines/equipments whether alive or dead, suitable type and sufficient quantity of tools will have to be provided by contractor to electricians/workmen/officers.
- 31.15 The contractor shall employ necessary number of qualified, full time electricians/ electrical supervisors to maintain in his temporary electrical installations.
- 31.16 The contractor employing more than 250 workmen whether temporary, casual, probationer, regular or permanent or on contract, shall employ at least one full time officer exclusively as safety officer to supervise safety aspects of the equipment and workmen who will co-ordinate with the project safety officer. In case of work being carried out through sub-contractor's, the sub-contractor's workmen/employees will also be considered as the contractor's employees/workmen for above purpose. The name and address of a such safety officer of contractor will be promptly informed in writing to engineer-in-charge with a copy to safety officer-in charge before he starts work or immediately after any change of the incumbent is made during currency of the contract.
- 31.17 In case any accident occurs during the construction/erection or other associated activities undertaken by the contractor thereby causing any minor or major or fatal injury to his employees due to any reason, whatsoever, it shall be the responsibility of the contractor to promptly inform the same to the company's engineer-in-charge in prescribed form and also to all the authorities envisaged under the applicable laws.
- 31.18 The engineer-in-charge shall have the right at his sole discretion to stop the work, if in his opinion the work is being carried out in such a way that it may cause accidents and endanger the safety of the persons and/or property, and/or equipment. In such cases, the contractor shall be informed in writing about the nature of hazards and possible injury/accident and he shall comply to remove short comings promptly. The contractor after stopping the specific work, can, if felt necessary, appeal against the order of stoppage of work to the General Manager of the project within 3 days of such stoppage of work and decision of the project G.M in this respect shall be conclusive and binding on the contractor.
- 31.19 The contractor shall not be entitled for any damages/compensation for stoppage of work due to safety reasons as provided in para 31.18 above and the period of such stoppage of work will not be taken as an extension of time for completion of work and will not be the ground for waiver of levy of liquidated damages.
- 31.20 The contractor shall follow and comply with all the Company safety rules relevant provisions of applicable laws pertaining to the safety of workmen, employees, plant and equipment as may be prescribed from time to time without demur, protest or content or reservation. In case of any inconformity between statutory requirement and the Company safety rules referred above, the later shall be binding on the contractor unless the statutory provisions are more stringent.
- 31.21 If the contractor fails in providing safe working environment as per the Company safety rules or continues the work even after being instructed to stop work by engineer-in-charge as provided in para 31.18 above, the contractor shall promptly pay to the Company, on demand i.e. by the owner compensation at the rate of Rs. 5,000/= per day or part there of till the instructions are complied with and so certified by engineer-in-charge. However in case of accident taking place causing injury to any individual, the provisions contained in para 31.22 shall also apply in addition to compensation mentioned in this para.

- 31.22 If the contractor does not take all safety precautions and/or fails to comply with the safety rules as prescribed by the Company or under the applicable laws for the safety of the equipment and plant and for the safety of personnel and the contractor does not prevent hazardous conditions which cause injury to his own employees or employees of other contractors, or the Company employees or any other person who are at site or adjacent thereto, the contractor shall be responsible for payment of compensation under the relevant provisions of the workmen's compensation act and rules framed thereunder or any other applicable laws as applicable from time to time.

Permanent disablement shall have same meaning as indicated in workmen's compensation act. The compensation mentioned above shall be in addition to the compensation payable to the workmen/employees under the relevant provisions of the workmen's compensation act and rules framed thereunder or any other applicable laws as applicable from time to time.

In case the owner is made to pay such compensation then the contractor is liable to reimburse the owner such amount.

### **32.0 CODE REQUIREMENTS**

The erection requirements and procedures to be followed during the installation of the equipment shall be in accordance with the relevant Indian standards codes of practices or in their absence appropriate International standards, Indian Boiler Regulations, ASME codes and accepted good engineering practice, the engineer's drawings and other applicable Indian recognised codes and the laws and regulations of the Government of India.

### **33.0 FOUNDATION DRESSING AND GROUTING**

- 33.1 The surfaces of foundations shall be dressed to bring the top surface of the foundations to the required level, prior to placement of equipment/equipment bases on the foundations.
- 33.2 All the equipment bases and structural steel base plates shall be grouted and finished as per these specifications unless otherwise recommended by the equipment manufacturer.
- 33.3 The concrete foundation surfaces shall be properly prepared by chipping, grinding as required to bring the type of such foundation to the required level, to provide the necessary roughness for bondage and to assure enough bearing strength. All laitance and surface film shall be removed and cleaned.

### 33.4 GROUTING MIX

The grouting mixtures shall be composed of Portland cement, sand and water. The Portland cement to be used shall conform to ISI No. 269 or equivalent, sand shall conform to ISI No.383/2386 or equivalent. The grout proportions for flat based where the grouting space does not exceed 35 mm shall be 50 Kg bag of cement to 75 Kg of sand. Only the required quantity of water shall be added so as to make the mix quaky and flowable and the mix shall not show excess water on top when it is being puddled in place. For thicker grout beds upto 65 mm, the amount of sand shall be increased to 105 Kg per bag of cement. Bases which are hollow and are to be filed full of grouting shall be filled to a level of 25 mm above the outside rim with a mortar mix in the volumetric proportions of one bag of cement and 1.5 bags sand and 1.5 part 6 mm granite gravel. An acceptable plasticiser may be added to the grout mixes in a proportion recommended by the plasticisers manufacturer . All such grouts shall be thoroughly mixed for not less than five minutes in an approved mechanical mixer and shall be used immediately after mixing.

### 33.5 PLACING OF GROUT

- 33.5.1 After the base has been prepared, its alignment and level has been checked and approved and before actually placing the grout a low dam shall be set around the base at a distance that will permit pouring and manipulation of the grout. The height of such dam shall be at least 25 mm above the bottom of the base. Suitable size and number of chains shall be introduced under the base before placing the grout, so that such chains can be moved back and forth to push the grout into every part of the space under the base.
- 33.5.2 The grout shall be poured either through grout holes if provided or shall be poured at one side or at two adjacent sides giving it a pressure head to make the grout move in a solid mass under the base and out in the opposite side. Pouring shall be continued until the entire space below the base is thoroughly filled and the grout stands at least 25 mm higher all around than the bottom of the base. Enough care should be taken to avoid any air or water pockets beneath the bases.

### **33.6 FINISHING OF THE EDGES OF THE GROUT**

The poured grout should be allowed to stand undisturbed until it is well set. Immediately thereafter, the dam shall be removed and grout which extends beyond the edges of the structural or equipment base plates shall be out off flush and removed. The edges of the grout shall then be pointed and finished with 1:2 cement mortar pressed firmly to bond with the body of the grout and smoothed with a tool to present a smooth vertical surface. The work shall be done in a clean and scientific manner and the adjacent floor spaces, exposed edges of the foundations, and structural steel and equipment base plates shall be thoroughly cleaned of any spillage of the grout.

### **33.7 CHECKING OF EQUIPMENT AFTER GROUTING**

After the grout is set and cured, the contractor shall check and verify the alignment of equipment, alignment of shafts of rotating machinery, the slopes of all bearing pedestals, centring of rotors with respect to their sealing bores, couplings, etc. as applicable and the like items to ensure that no displacement had taken place during grouting . The values recorded prior to grouting shall be used during such post grouting check-up and verifications. Such pre and post grout records of alignment details shall be maintained by the contractor in a manner acceptable to the engineer.

### **34.0 SHAFT ALIGNMENTS**

All the shafts of rotating equipment shall be properly aligned to those of the matching equipment to as perfect an accuracy as practicable. The equipment shall be free from excessive vibration so as to avoid over-heating of bearings or other conditions which may tend to shorten the life of the equipment. All bearings, shafts and other rotating parts shall be thoroughly cleaned and suitably lubricated before starting. All alignment should be checked through alignment cheker or condition monitoring equipment in the presence of the engineer-in-charge.

### **35.0 DOWELING**

All the motors and other equipment shall be suitably doweled after alignment of shafts with tapered machined dowels as per the direction of the engineer.

### **36.0 CHECK OUT OF CONTROL SYSTEMS / POWER SUPPLY**

After completion of wiring, cabling furnished under separate specifications and laid and terminated by the owner, the contractor shall check out the operation of all control systems for the equipment furnished and installed under these specifications and documents. The contractor shall get the drawings pertaining to the control system, power supply etc. approved from Directorate General of Mine Safety (DGMS) or any other appropriate authority as necessary, wherever required as per the rules and regulations of the of Indian Mines Act governed by D.G.M.S.

### **37.0 COMMISSIONING SPARES**

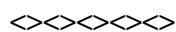
The contractor shall make arrangement for an adequate inventory at site of necessary commissioning spares prior to commissioning of the equipment furnished and erected so that



any damage or loss during this commissioning activities necessitating the requirements of spares will not come in the way of timely completion of the works under the contract.

### **38.0 CABLING**

- 38.1 All cables shall be supported by conduits or cable tray run in air or in cable channels. These shall be installed in exposed runs parallel or perpendicular to dominant surfaces with right angle turn made of symmetrical bends or fittings. When cables are run on cable trays, they shall be clamped at a minimum interval of 2000 mm or otherwise as directed by the engineer.
- 38.2 Each cable, whether power or control , shall be provided with a metallic or plastic of an approved type, bearing a cable reference number indicated in the cable and conduit list (prepared by the contractor), at every 5 metre run or part there of and at both ends or the cable adjacent to the terminations. Cable routing is to be done in such a way that cables are accessible for any maintenance and for easy identification.
- 38.3 Sharp bending and kinking of cables shall be avoided. The minimum radii for PVC insulated cables 1100 V grade shall be 15D, where D is the over all diameter of the cable. Installation of other cables like high voltage, coaxial, screened, compensating, mineral insulated shall be in accordance with the cable manufacturer's recommendations. Wherever cables cross roads and water, oil, sewage or gas lines, special care should be taken for the protection of the cables in designing the cable channels.
- 38.4 In each cable run some extra length shall be kept at a suitable point to enable one to two straight through joints to be made should the cable develop fault at a later date.
- 38.5 Control cable terminations shall be made in accordance with wiring diagrams, using identifying codes subject to engineer's approval. Multicore control cable jackets shall be removed as required to train and terminate the conductors. The cable jacket shall be left on the cable, as far as possible, to the point of the first conductor branch. The insulated conductors from which the jacket is removed shall be neatly twined in bundles and terminated. The bundles shall be firmly but not tightly tied utilising plastic or nylon ties or specially treated fungus protected cord made for this purpose. Control cable conductor insulation shall be securely and evenly cut.
- 38.6 The connectors for control cables shall be covered with a transparent insulating sleeve so as to prevent accidental contact with ground or adjacent terminals and shall preferably terminate Elmex terminals and washers. The insulating sleeve shall be fire resistant and shall be long enough to over-pass the conductor insulation. All control cables shall be fanned out and connection made to terminal blocks and test equipment for proper operation before cables are corded together.



## **SECTION – 5**

# **MISCELLANEOUS FORMS**

### **CONTENTS**

#### **FORMS OF SECURITY**

#### **FORM OF BANK GUARANTEE**

#### **FORM OF ARTICLE OF AGREEMENT**

#### **INTIGRITY PACT**

#### **ELECTRONIC FUND TRANSFER**

## SECTION - 5

**BANK GUARANTEE****PROFORMA FOR EARNEST MONEY DEPOSIT/BID SECURITY**  
**(TO BE STAMPED IN ACCORDANCE WITH STAMP ACT)**

(TO BE ISSUED BY ANY NATIONALISED/ SCHEDULED BANK AUTHORISED BY RBI TO  
ISSUE A BANK GUARANTEE) To :

Bharat Coking Coal Limited.,  
P.O. : Koyla Bhawan,  
Dist : Dhanbad ( Jharkhand )

WHEREAS \_\_\_\_\_ [name and address of Bidder] (hereinafter called "the Bidder") shall be submitting its Bid dated \_\_\_\_\_ [date of the Bid] 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 Bharat Coking Coal,Limited, Koyla Bhawan Complex,Dhanbad,Jharkhand (hereinafter called "the Employer") for the sum of \_\_\_\_\_ [amount of the 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 \_\_\_\_\_ 200\_.

THE CONDITION 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. If 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.

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 its 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 (a) or (b) specifying the occurred condition or conditions.

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	_____

**BANK GUARANTEE PROFORMA FOR MOBILISATION ADVANCE***(TO BE STAMPED IN ACCORDANCE WITH STAMP ACT)**(TO BE ISSUED BY ANY NATIONALISED/SCHEDULED BANK**AUTHORISED BY RBI TO ISSUE A BANK GUARANTEE)*

To :

Bharat Coking Coal Limited.,  
P.O. : Dhanbad,                      Dist. :  
Dhanbad (Jharkhand.)

In consideration of the Bharat Coking Coal Koyla Bhawan Complex, Dhanbad, Jharkhand (hereinafter called to as the "Employer" which expression shall unless repugnant to the context or meaning thereof, include all successors, administrators and assigns) having awarded to \_\_\_\_\_ *[Name & Address of the Contractor]* (hereinafter called to as "Contractor" which expression shall unless repugnant to the context of meaning thereof include its successors, administrators, executors and assigns) the work \_\_\_\_\_ *[Name of the Work]* by issue of Letter of Award No. \_\_\_\_\_ *[Work Order/Letter on Intent No.]* and the same having been unequivocally accepted by the Contractor resulting into a Contract Agreement dated \_\_\_\_\_ valued at \_\_\_\_\_ *[value of Work Order]* (hereinafter called 'the Contract') and the Employer having agreed to make a Mobilisation Advance payment with interest to the Contractor amounting to \_\_\_\_\_ *[Amount of guarantee in words and figures)]* for execution of the said Contract as an advance against Bank Guarantee of equivalent amount furnished by the Contractor.

We, \_\_\_\_\_ *[Name of the Bank]* of \_\_\_\_\_ *[address of the Bank]* (hereinafter called to as 'the Bank' which expression shall unless repugnant to the context of meaning thereof, include all successors, administrators and assigns) do hereby undertake to pay to the said Employer on demand an amount not exceeding \_\_\_\_\_ *[amount of guarantee in words and figures]* against any loss or damage caused to or suffered or would be caused to or suffered by the said Employer by reasons of any breach by the said Contractor of any terms and conditions contained in the said Contract without any demure reservation, recourse, contest or protest and/or without any reference to the Contractor. Any such demand made by the Employer on the Bank shall be conclusive and binding notwithstanding any difference between the Employer and the Contractor or any dispute pending before any court, tribunal, arbitrator or any other authority. We agree that the guarantee herein contained shall be irrevocable and shall continue to be enforceable till the advance amount is liquidated.

The Employer shall have the fullest liberty without affecting in way the liability of the Bank under this Guarantee from time to time to vary the advance or to extend the time for performance of the Contract by the Contractor. The Employer shall have the fullest liberty without affecting this Guarantee to postpone from time to time the exercise of any powers vested in them or of any right which they might have against the Contractor and the exercise the same at any time in any manner and either to enforce or to forebear or to enforce any covenants contained or implied in the Contract, between the Employer and the Contractor or any other course or remedy or security available to the Employer. The Bank shall not be released of its obligations under these presents by an exercise by the Employer of its liberty with reference to matter aforesaid or any of them or by reason of any other act of forbearance or any of them or by reason of any other act of forbearance or other acts of omission or commission on the part of the Employer or any other indulgence shown by the Employer or any other matter or thing whatsoever which under law would, but for this

provision, have the effect of relieving the Bank. The Bank also agrees that the Employer at its option shall be entitled to enforce this Guarantee against the Bank as a Principal debtor in first instance, without proceeding against the Contractor and notwithstanding any security or other Guarantee that the Employer may have in relation to the Contractor's liabilities.

Dated this \_\_\_\_\_ day of \_\_\_\_\_ at \_\_\_\_\_

For and on behalf of the Bank.

Signature \_\_\_\_\_

Name \_\_\_\_\_

Designation \_\_\_\_\_

Common Seal of Bank \_\_\_\_\_

**BANK GUARANTEE PROFORMA FOR PERFORMANCE SECURITY/GUARANTEE**  
**(TO BE STAMPED IN ACCORDANCE WITH STAMP ACT)**

**(TO BE ISSUED BY ANY NATIONALISED/SCHEDULED BANK**  
**AUTHORISED BY RBI TO ISSUE A BANK GUARANTEE)**

To:

Bharat Coking Coal Limited.,  
P.O. : Dhanbad,                      Dist. :  
Dhanbad (Jharkhand.)

In consideration of the Bharat Coking Coal Limited, having its Registered office at P.O. Koyla Bhawan , Dist. Dhanbad (Jharkhand.) (hereinafter called to as the “Employer” which expression shall unless repugnant to the context or meaning thereof, include all successors, administrators and assigns) having awarded to \_\_\_\_\_ *[Name & Address of the Contractor]* (hereinafter called to as “Contractor” which expression shall unless repugnant to the context of meaning thereof include its successors, administrators, executors and assigns) the work \_\_\_\_\_ *[Name of the Work]* by issue of Letter of Award No. \_\_\_\_\_ *[Work Order/Letter of Intent No.]* and the same having been unequivocally accepted by the Contractor resulting into a Contract Agreement dated \_\_\_\_\_ valued at \_\_\_\_\_ *[value of Work Order]* (hereinafter called ‘the Contract’) and the Employer having agreed to accept Performance Bank Guarantee of \_\_\_\_ *[indicate figure]*% of the Contract Sum \_\_\_\_\_ *[amount in figures and words]* from a Nationalized/Scheduled Bank for due performance of the work executed by the Contractor as per the terms & conditions contained in the said Contract.

We, \_\_\_\_\_ *[name of the Bank]*, of \_\_\_\_\_ *[address of the Bank]* (hereinafter called to as “Bank” which expression shall unless repugnant to the context or meaning thereof, include its successors, administrators, executors and assigns) do hereby guarantee and undertake to pay the Employer immediately on demand and or, all money payable by the Contractor to the extent of \_\_\_\_\_ *[amount of guarantee in figures and words]* , at any time from \_\_\_\_\_ to \_\_\_\_\_ without any demur, reservation, recourse, contest or protest and/or without any reference to the Contractor. Any such demand made by the Employer on the Bank shall be conclusive and binding notwithstanding any difference between the Employer and the Contractor or any dispute pending before any Court, Tribunal, Arbitrator or any other authority. We agree that the Guarantee herein contained shall be irrecoverable and shall continue to be enforceable as per the terms & conditions contained in the said Contract.

The Employer shall have the fullest liberty without affecting in any way the liability of the Bank under this Guarantee, from time to time, to extend the validity of time of Performance of the Contract by the Contractor. The Employer shall have the fullest liberty without affecting this Guarantee, to postpone, from time to time, the exercise of any powers vested in them or of any right which they might have against the Contractor, and to exercise the same at any time in any manner, and either to enforce or to forebear or to enforce any covenants contained or implied in the Contract, between the Employer and the Contractor or any other course or remedy or security available to the Employer. The Bank shall not be released of its obligations under these presents by any exercise by the Employer of its liberty with reference to matter aforesaid or any of them or by reason of any other act of

forbearance or other acts of omission or commission on the part of the Employer or any other indulgence shown by the Employer or by any other matter or thing whatsoever which under law would, but for this provision, have the effect of relieving the Bank. The Bank also agrees that the Employer at its option shall be entitled to enforce this Guarantee against the Bank as a Principal Debtor in first instance, without proceeding against the Contractor and notwithstanding any security or other Guarantee that the Employer may have in relation to the Contractor's liabilities.

Dated this \_\_\_\_\_ day of \_\_\_\_\_ at \_\_\_\_\_

For and on behalf of the Bank.

Signature \_\_\_\_\_

Name \_\_\_\_\_

Designation \_\_\_\_\_

Common Seal of Bank \_\_\_\_\_

**FORMAT FOR CONTRACT AGREEMENT**  
**(On Non- Judicial Stamp Paper)**

Agreement No.

Dated:

THIS ARTICLE OF AGREEMENT made on this \_\_\_\_\_ day of \_\_\_\_\_ 200\_ between the Bharat Coking Coal Limited, a Employer registered under the Indian Companies Act. 1956 with its registered office at Dhanbad and a Subsidiary of Coal India Limited, Govt. of India Undertaking, P.O. Dhanbad (Pin-826005) Dist. : Dhanbad (Jharkhand), (hereinafter referred to as the Employer which expression where the context so admit shall include its successors in interest and assign) of the one Part and \_\_\_\_\_ (hereinafter referred to as "the Contractor" which expression where the context so admit shall include its heirs, executors, administrators legal representatives, successors in business and assign) of the other part.

WHEREAS, the Employer invited bid for the Work " \_\_\_\_\_ " and the bid of the Contractor has been accepted by the Employer vide their Letter No \_\_\_\_\_ dt. \_\_\_\_\_ for a sum of \_\_\_\_\_ [Contract sum in figure & words]

WHEREAS the Contractor has agreed to execute the works on the terms & conditions as stipulated in the Bid and subsequent amendments thereto for a sum of \_\_\_\_\_ [Contract sum in figure & words] for successful completion of the work.

**NOW THIS AGREEMENT WITNESSETH AND IT IS HEREBY AGREED AS FOLLOWS:**

1. In pursuance of the Agreement aforesaid and in consideration for the payment of the sum of \_\_\_\_\_ [Contract sum in figure & words] and/or such sum as may be payable to the contractor, the Contractor shall upon and subject to the said terms & conditions execute and complete the work shown upon in the said drawings and described in the said scope of work as provided for in the said conditions.
2. The time shall be considered as one of the essence of the contract and time for completion of the contract shall be 36 (Thirty Six) months from the date of commencement of work.
3. The parties hereto shall respectively and faithfully abide by and submit themselves to the terms & conditions and stipulations contained in this agreement and perform and discharge their part of contract accordingly.
4. This final Agreement has been arrived at between the parties after due consideration of the correspondences, documents, meetings and negotiations held from time to time. The following documents shall constitute the Contract between the Employer and the Contractor. And each shall be read and construed as an integral part of the Contract



<u>Part</u>	<u>Description of Documents</u>
1.	Article of Agreement.
2.	Detailed Bid Notice.
3.	Notification of Award
4.	The Bid and Prices Schedules submitted by the Contractor
5.	Conditions of Contract
5.	Financial terms and conditions
6.	Billing Schedule
7.	Technical Specifications and drawings
8.	Any Other Documents

5. The Contract shall be executed within the purview of the Indian Laws.

In witness whereof the parties hereto have hereunder affixed their signatures at Dhanbad on the day, month and year written as above.

### **SIGNED, SEALED AND DELIVERED**

Signed on behalf of the Contractor

Signed on behalf of the Employer

Designation

Designation

In the presence of

Bharat Coking Coal Limited.  
P.O. : Dhanbad, Dist. : Dhanbad  
(Jharkhand.)  
Pin : 826005

WITNESS - 1

WITNESS - 1

(Signature)

(Signature)

(Name in Block Letters)

(Name in Block Letters)

Official Address:

Official Address:

WITNESS - 1

WITNESS - 1

(Signature)

(Signature)

(Name in Block Letters)

(Name in Block Letters)

Official Address:

Official Address:

## INTEGRITY PACT

Between

BHARAT COKING COAL LIMITED (BCCL) hereinafter referred to as “The  
Principal”

And

.....hereinafter referred to as “The Bidder/Contractor”

### **Preamble**

The Principal intends to award, under laid down organizational procedures, contract/s for ----- . The Principal values full compliance with all relevant laws and regulations, and the principles of economic use of resources, and of fairness and transparency in its relations with its Bidder/s and Contractor/s.

In order to achieve these goals, the Principal cooperates with the renowned international Non-Governmental Organisation “Transparency International” (TI). Following TI’s national and international experience, the Principal will appoint an external independent Monitor who will monitor the tender process and the execution of the contract for compliance with the principles mentioned above.

### **Section 1 – Commitments of the Principal**

(1) The Principal commits itself to take all measures necessary to prevent corruption and to observe the following principles:-

1. No employee of the Principal, personally or through family members, will in connection with the tender for, or the execution of a contract, demand, take a promise for or accept, for him/herself or third person, any material or immaterial benefit which he/she is not legally entitled to.
2. The Principal will, during the tender process treat all Bidders with equity and reason. The Principal will in particular, before and during the tender process, provide to all Bidders the same information and will not provide to any Bidder confidential/additional information through which the Bidder could obtain an advantage in relation to the tender process or the contract execution.

3. The Principal will exclude from the process all known prejudiced persons.
- (2) If the Principal obtains information on the conduct of any of its employees which is a criminal offence under the relevant Anti-Corruption Laws of India, or if there be a substantive suspicion in this regard, the Principal will inform its Vigilance Office and in addition can initiate disciplinary actions.

### **Section 2 – Commitments of the Bidder/Contractor**

- (1) The Bidder/Contractor commits itself to take all measures necessary to prevent corruption. He commits himself to observe the following principles during his participation in the tender process and during the contract execution.
  1. The Bidder/Contractor will not, directly or through any other person or firm, offer, promise or give to any of the Principal's employees involved in the tender process or the execution of the contract or to any third person any material or immaterial benefit which he/she is not legally entitled to, in order to obtain in exchange any advantage of any kind whatsoever during the tender process or during the execution of the contract.
  2. The Bidder/Contractor will not enter with other Bidders into any undisclosed agreement or understanding, whether formal or informal. This applies in particular to prices, specifications, certifications, subsidiary contracts, submission or non-submission of bids or any other actions to restrict competitiveness or to introduce cartelisation in the bidding process.

3. The Bidder/Contractor will not commit any offence under the relevant Anti-corruption Laws of India; further the Bidder/Contractor will not use improperly, for purposes of competition or personal gain, or pass on to others, any information or document provided by the Principal as part of the business relationship, regarding plans, technical proposals and business details, including information contained or transmitted electronically.
  4. The Bidder/Contractor will, when presenting his bid, disclose any and all payments he has made, is committed to or intends to make to agents, brokers or any other intermediaries in connection with the award of the contract.
- (2) The Bidder/Contractor will not instigate third persons to commit offences outlined above or be an accessory to such offences.

**Section 3 – Disqualification from tender process and exclusion from future contracts**

If the Bidder, before contract award has committed a transgression through a violation of Section 2 or in any other form such as to put his reliability or credibility as Bidder into question, the Principal is entitled to disqualify the Bidder from the tender process or to terminate the contract, if already signed, for such reason.

1. If the Bidder/Contractor has committed a transgression through a violation of Section 2 such as to put his reliability or credibility into question, the Principal is entitled also to exclude the Bidder/Contractor from future contract award processes. The imposition and duration of the exclusion will be determined by the severity of the transgression. The severity will be determined by the circumstances of the case, in particular the number of transgressions, the position of the transgressions within the company hierarchy of the Bidder and the amount of the damage. The exclusion will be imposed for a minimum of 6 months and maximum of 3 years.
2. The Bidder accepts and undertakes to respect and uphold the Principal's absolute right to resort to and impose such exclusion and further accepts and undertakes not to challenge or question such exclusion on any ground, including the lack of any hearing before the decision to resort to such exclusion is taken. This undertaking is given freely and after obtaining independent legal advice.
3. If the Bidder/Contractor can prove that he has restored/recouped the damage caused by him and has installed a suitable corruption prevention system, the Principal may revoke the exclusion prematurely.
4. A transgression is considered to have occurred if in light of available evidence no reasonable doubt is possible.

#### **Section 4 – Compensation for Damages**

1. If the Principal has disqualified the Bidder from the tender process prior to the award according to Section 3, the Principal is entitled to demand and recover from the Bidder liquidated damages equivalent to 3 % of the value of the offer or the amount equivalent to Earnest Money Deposit/Bid Security, whichever is higher.

2. If the Principal has terminated the contract according to Section 3, or if the Principal is entitled to terminate the contract according to section 3, the Principal shall be entitled to demand and recover from the Contractor liquidated damages equivalent to 5% of the contract value or the amount equivalent to Security Deposit/Performance Bank Guarantee, whichever is higher.
3. The bidder agrees and undertakes to pay the said amounts without protest or demur subject only to condition that if the Bidder/Contractor can prove and establish that the exclusion of the Bidder from the tender process or the termination of the contract after the contract award has caused no damage or less damage than the amount or the liquidated damages, the Bidder/Contractor shall compensate the Principal only to the extent of the damage in the amount proved.

#### **Section 5 – Previous transgression**

1. The Bidder declares that no previous transgression occurred in the last 3 years with any other Company in any country conforming to the TI approach or with any other Public Sector Enterprise in India that could justify his exclusion from the tender process.
2. If the Bidder makes incorrect statement on this subject, he can be disqualified from the tender process or the contract, if already awarded, can be terminated for such reason.

#### **Section 6 – Equal treatment of all Bidders/Contractor/Subcontractors**

1. The Bidder/Contractor undertakes to demand from all subcontractors a commitment in conformity with this Integrity Pact, and to submit it to the Principal before contract signing.

2. The Principal will enter into agreements with identical conditions as this one with all Bidders, Contractors and Subcontractors.
3. The Principal will disqualify from the tender process all bidders who do not sign this Pact or violate its provisions.

**Section 7 – Criminal charges against violating  
Bidders/Contractors/Subcontractors**

If the Principal obtains knowledge of conduct of a Bidder, Contractor or Subcontractor, or of an employee or a representative or an associate of a Bidder, Contractor or Subcontractor, which constitutes corruption, or if the Principal has substantive suspicion in this regard, the Principal will inform the Vigilance Office.

**Section 8 – External Independent Monitor/Monitors  
(three in number depending on the size of the contract)  
(to be decided by the Chairperson of the Principal)**

1. The Principal appoints competent and credible external independent Monitor for this Pact. The task of the Monitor is to review independently and objectively, whether and to what extent the parties comply with the obligations under this agreement.
2. The Monitor is not subject to instructions by the representatives of the parties and performs his functions neutrally and independently. He reports to the Chairperson of the Board of the Principal.



3. The Contractor accepts that the Monitor has the right to access without restriction to all Project documentation of the Principal including that provided by the Contractor. The Contractor will also grant the Monitor, upon his request and demonstration of a valid interest, unrestricted and unconditional access to his project documentation. The same is applicable to Subcontractors. The Monitor is under contractual obligation to treat the information and documents of the Bidder/Contractor/Subcontractor with confidentiality.
4. The Principal will provide to the Monitor sufficient information about all meetings among the parties related to the Project provided such meetings could have an impact on the contractual relations between the Principal and the Contractor. The parties offer to the Monitor the option to participate in such meetings.
5. As soon as the Monitor notices, or believes to notice, a violation of this agreement, he will so inform the Management of the Principal and request the Management to discontinue or heal the violation, or to take other relevant action. The monitor can in this regard submit non-binding recommendations. Beyond this, the Monitor has no right to demand from the parties that they act in a specific manner, refrain from action or tolerate action.
6. The Monitor will submit a written report to the Chairperson of the Board of the Principal within 8 to 10 weeks from the date of reference or intimation to him by the 'Principal' and, should the occasion arise, submit proposals for correcting problematic situations.
7. Monitor shall be entitled to compensation on the same terms as being extended to/provided to Outside Expert Committee members/Chairman as prevailing with Principal.
8. If the Monitor has reported to the Chairperson of the Board a substantiated suspicion of an offence under relevant Anti-Corruption Laws of India, and the

Chairperson has not, within reasonable time, taken visible action to proceed against such offence or reported it to the Vigilance Office, the Monitor may also transmit this information directly to the Central Vigilance Commissioner, Government of India.

9. The word 'Monitor' would include both singular and plural.

### **Section 9 – Pact Duration**

This Pact begins when both parties have legally signed it. It expires for the Contractor 12 months after the last payment under the respective contract, and for all other Bidders 6 months after the contract has been awarded.

If any claim is made/ lodged during this time, the same shall be binding and continue to be valid despite the lapse of this pact as specified above, unless it is discharged/determined by Chairperson of the Principal.

### **Section 10 – Other provisions**

1. This agreement is subject to Indian Law. Place of performance and jurisdiction is the Registered Office of the Principal, i.e. Dhanbad (Jharkhand)
2. Changes and supplements as well as termination notices need to be made in writing. Side agreements have not been made.
3. If the Contractor is a partnership or a consortium, this agreement must be, signed by all partners or consortium members.
4. Should one or several provisions of this agreement turn out to be invalid, the remainder of this agreement remains valid. In this case, the parties will strive to come to an agreement to their original intentions.

5. -----  
-----

-

For the Principal

For the Bidder/Contractor

Place.....

Witness 1 : .....

Date .....

Witness 2 : .....

**FOR PAYMENT TO CONTRACTORS (Note: To be submitted in Triplicate)**

PROFORMA FOR COLLECTING PAYMENT THROUGH ELECTRONIC MODE INCLUDING ELECTRONIC FUND TRANSFER (EFT) & ELECTRONIC CLEARING SYSTEM (ECS)

1	Vendor/ supplier/ contractor/ customer's name & address (with telephone number & Fax number)	
2	Particulars of Bank Account	
	a) Bank Name	
	b) Branch Name (Including RTGS Code)	
	Address	
	Telephone No. & Fax No.	
	c) 9 – Digit Code Number of the Bank & Branch (Appearing on the MICR Cheque issued on the bank) or 5 digit code number of SBI	
	d) Account Type (S.B. Account/ Current Account or Cash Credit with code 10/11/13)	
	e) Ledger No./ Ledger Folio No.	
	f) Account Number (Core Banking) & Style of Account (As appearing on the cheque Book)	

**3. DATE OF EFFECT:**

I hereby declare that the particulars given above are correct & complete. If the transaction is delayed or not effected at all for reasons of incomplete or incorrect information, I would not hold the user institution responsible. I have read the option invitation letter and agree to discharge responsibility expected of me as a participant under the scheme. Any bank charges levied by the bank of such e-transfer shall be borne by us.

Date:-

( \_\_\_\_\_ )  
Signature of customer/ vendor/  
supplier/ contractor

Certified that the particulars furnished above are correct as per our records.

( \_\_\_\_\_ )  
Signature of the authorized  
officials from the Bank

**TENDER DOCUMENT**  
**FOR**  
**Planning, Design, Engineering, Construction, Fabrication,**  
**Supply, Erection, Trial-run, Commissioning and Testing of**  
**5 Nos. Feeder Breakers Complete with its attachment,**  
**Capable of Crushing Coal Lumps of maximum size (1500 x**  
**1500 x 1200 mm) to (-) 100 mm 3-dimensional of Capacity**  
**400 TPH with Installation, Commissioning including Civil**  
**Works like RCC Retaining Wall, Foundation etc Complete**  
**(on TurnKey Basis).**

**AT**  
**BHARAT COKING COAL LIMITED,DHANBAD**  
**PART-II**  
**TECHNICAL SPECIFICATION**

**Bharat Coking Coal Ltd.**  
(A Subsidiary of Coal India Ltd.)  
Civil Engineering Department, Koyla Nagar,Dhanbad- 826005 (Jharkhand)

## CONTENTS OF BIDDING DOCUMENTS

<b>Vol.</b>	<b>Description</b>	<b>Section</b>
	<b>Commercial (PART-1)</b>	
	<b>PART-1 Commercial</b>	
	Tender Notice	Section-1
	Instructions to Bidders	Section-2
	Forms of Bid & Qualification Information	Section-3
	Conditions of Contract	Section-4
	Miscellaneous Forms	Section-5
	<b>Technical Specifications (PART-2)</b>	<b>Section-6</b>
	1. Preamble	Sub-Section-6.1
	2. Scope of Supply, Works & Technical Specifications E&M	Sub-Section-6.2
	3. Technical Specifications - Civil	Sub-Section-6.3

**CONTENTS                      OF SECTION-6**  
**TECHNICAL SPECIFICATION**  
**(MECHANICAL, ELECTRICAL & CIVIL)**

<b>Sl.no</b>	<b>Description</b>
1	Sub-Section-6.1: Preamble
2	Sub-Section-6.2 : Scope of Supply, works & Technical Specifications E&M
3	Sub-Section-6.3 : Technical specification-civil

## **SUB-SECTION-6.1**

### **PREAMBLE**



## SUBSECTION – 6.1

### PREAMBLE

**Location:** The feeder breakers will be installed at the following locations

1. Lodna Area - 2 Nos: At 6No&9No Railway siding at North Tisra and South Tisra under Lodna area of BCCL
2. Bastacolla Area- 2Nos: At Golukdih, Ganodih CHP of Bastacolla Area of BCCL
3. Sijua Area -1No : At Jogda Siding of Mudidih colliery of Sijua area of BCCL

### **Distance:**

1. Bastacolla Area : 8KM s from Dhanbad Rly. Station
2. Lodna Area : 18-20 KMs from Dhanbad Rly Station
3. Sijua Area : 20-22 KMs from Dhanbad Rly Station

### **Climate:**

The climate is Tropical with hot Summer. Temperature during summer goes as high as 46<sup>0</sup> C. In winter temperature varies from 4<sup>0</sup> C to 20<sup>0</sup> C (Nov-Feb). The average rainfall is 1600 mm(June to Sept).

## SUB-SECTION-6.2

### SCOPE OF SUPPLY, WORKS & Technical Specifications (E&M)

**Scope : This Specification Covers Design, Manufacture, Testing before Dispatch, Supply, Delivery at Site, Installation and Commissioning of Feeder Breaker of 400TPH of (-) 100 mm Size, 3-Dimensional**

**Scope of supply :**

- i) Feeder Breaker shall be of fixed type on strong civil foundation complete in all respect ie; with mechanicals, electrical motors, control panels, other accessories and lubrication system to perform satisfactorily at rated capacity of 400 TPH, (-)100 mm in all three dimensions,
- ii) Metering devices such as Pressure gauges, Ammeter, Voltmeters, Clock/hour meter, indicators etc.
- iii) Tools & Tackles for repair maintenance, assembling & dismantling.
- iv) Furnishing of operational, maintenance and spare parts manual, supported by illustrative pamphlets and literature of manufactures.
- v) Initial fill of oil, grease, lubricants & other consumable.
- vi) Schematic diagram of the components of the system
- vii) Detailed drawings of electrical power system, control system etc. 2 copies with each machine
- viii) Expert service personnel for supervision of installation, commissioning operation & maintenance (including training of site technicians)
- ix) Provision for installation of belt conveyor below the (-)100 mm size, 3-dimensional discharge point (in case of double stage crusher the discharge point will be of the output of second stage crusher/sizer). However this conveyor is not in the scope of this supply.

**Duty Conditions:**

The Feeder Breaker will receive ROM coal (size 1500x1500x1200mm) mixed with sand stone directly from the rear discharge Dumpers/or other means and break it down to (-) 100 mm size in all three dimensions and to be discharged on to the belt conveyor as required. The feeder breaker will be heavy duty type suitable for operation round the clock. The design will be robust enough to work in tropical condition and to withstand the impact of large boulders of dumper discharge

It shall also be capable of starting in choke feed condition/full load condition and to deal with material in rainy season without adversely affecting its performance

parameters. The Feeder Breaker shall be fixed type on strong civil foundation on surface and shall be available for round the clock operation through all seasons.

### **Hopper :**

The hopper will be of low height construction at the rear end from the base and designed to receive ROM coal directly from rear discharge dumpers. The design should be robust enough to take the discharge shock loads of coal/shale. It shall be all welded steel construction fitted with wear resistant liners on bottom and sides. The minimum hopper capacity will be 30 Cu.m. There should be arrangement for easy evacuation of the coal/shale in case of any break down. It shall be so designed that no left over material remain in operation.

### **Feeder Breaker :**

- 1) The Feeder Breaker shall be robust and suitably designed for easy maintenance. It should have an overload relief system and water spray arrangements (water supply will be provided by BCCL at pressure of 2kg/sqcm).
- 2) The bearings shall be heavy duty spherical roller/suitable type to sustain high shocks due to impact and crushing loads.
- 3) The Feeder Breaker will have suitable positive arrangement by adjustment to achieve the output product size of (-) 100 mm in all three dimensions.
- 4) The constructional features shall be such that it provides easy approach to all the components for inspection, maintenance, repairs etc.
- 5) It shall have a feed size of 1500x1500x1200mm.
- 6) The feeder breaker should be equipped with a matching rock breaker of adequate capacity to break large size lumps which may occasionally be fed to the crusher. Rock Breaker shall be of sufficient reach to cover the hopper with the vertical reach upto top of deck plate.

### **Other Technical Features :**

- (a) All gear boxes & motors shall be of foot /flange mounted type.
- (b) Fluid coupling of suitable duty will be provided with crusher motor , and chain conveyor motor.
- (c) The components shall be easily accessible for maintenance works. The machine shall be provided with centralized lubrication system.
- (d) The drive should have adequately rated control gear with an inter locked off load isolator with provision
  - i) For sequence operation
  - ii) For adequate protection system like thermal overload trip devices, Earth fault devices, under voltage release to detect low voltage, single phase, reverse phase and ground fault sensing devices.

- iii) For manual/Auto control switch shall with solid state relays.
- (e) All electrical motors should be of continuously rated and will conform to BIS and should be able to withstand voltage regulation of  $\pm 10\%$
- (f) The motors will be TEFC squirrel cage induction motor., Voltage  $415\text{ V} \pm 10\%$ ,  $3\phi$ ,  $50\text{HZ} \pm 3\%$
- (g) All cables and control gears will conform to relevant BIS
- (h) Motors above 75 KW will be provided with star delta starter of relevant BIS
- (i) Power cables shall be of 3.3KV grade, PVC insulated ,PVC sheathed standard aluminum conductor,armoured of suitable sizes as per HP/KW of the motors, conforming to relevant BIS.

Copy of the relevant BIS should be attached with the offer where ever applicable

### **OPERATOR'S CABIN**

A standard cubicle type operator's cabin shall be provided along with the machine. The cabin should be of enclosed type and provided with a fan and seat for operator's comfort. All control instruments,levers etc shall be grouped together on a panel for ease of operation and overall good visibility, a light preferably CFL will be provided in the cabin for proper visibility.

### **Hydraulic System :**

The hydraulic system if provided shall be of electrically driven complete with all accessories and have suitable capacity oil reservoir with fluid level sight gauges and breather. It shall be suitably designed for efficient operation and shall require minimum maintenance with relief valve protection. The hydraulic pump and motor shall be of reputed make only with proven quality and designed for continuous rating and longer service life.

The relief setting(maximum) shall be nearly twice above the normal operating pressure and system component shall be rated two and half times the normal operating pressure. There shall be provision for protection against low fluid level,high temperature and low pressure. The machine should automatically stop in case of low fluid level, low pressure or high temperature. The heat dissipation capacity of the system shall be sufficient so that on continuous operation,the oil temp. does not exceed 70 degree C given the ambient temperature of 50 degree C in shade.

**Fail Safe System :**

The equipment shall be complete with necessary protective devices so that in case of any emergency it stops functioning to avoid any major breakdown. The protective devices shall comprise of the following :

- i) A shear pin/equivalent mechanical fuse to ensure that the electric motor is not overloaded on encountering very hard material.
- ii) A speed sensing switch linked to the speed in case of rotary crusher which senses the roll speed and trips the motor when the roll speed falls below the designed minimum when encountering hard material.
- iii) Sequence control – the power to feed arrangement and crusher motor shall be cut off, if the evacuation arrangements stops due to any reason.
- iv) All moving/rotating parts, coupling etc. shall be properly guarded and lock out switch (lock out switch should be of push button type of suitable design) shall be provided on machine that overrides the other (normal operation) for maintenance purpose/ in case of emergency.

**Past Performance :**

The tenderers are required to furnish the following details in support of past experience in manufacture /supply of this type of equipment (if any)

- i) Name and address of organizations which are using similar type and capacity equipments.
- ii) The performance certificate from the users of similar type of equipment including the total hours run and tonnage handled.
- iii) Details of service and spare parts facilities available along with address of such centre.
- iv) Details of Indian Agent and their service establishment in case of imported offer.
- v) Capacity of the firm in manufacturing of such equipment with annual turnover for last 3 years
- vi) Various facilities available for such manufacturing work
- vii) Inspection and quality control facilities available with the firm
- viii) Parties claiming to be qualified on the strength of any collaborator shall produce positive proof of permanent collaboration approved and cleared by the Govt. of India
- ix) Percentage of imported components and programme for 100% indigenization(if any) must be given. Value of foreign component shall be indicated. How the parties propose to supply the spares should be indicated.

**List of Equipments to be supplied**

- 1) Feeder Breaker
- 2) Rock Breaker attachment
- 3) Hopper
- 4) Operators Cabin
- 5) Electrical Motors of required capacity(Squirrel cage induction motor at 415V± 10%,50Hz,3phase
- 6) Gear Boxes of suitable size and capacity of adequate service factor
- 7) All power cables, control cables as required
- 8) All feed arrangements for output capacity of 400TPH (-)100mm,3 dimensional

Any other attachments/accessories which may be required for output capacity of 400TPH (-)100mm,3 dimensional

Company will provide single point power supply at 415V upto incoming of control gears/starters bank

**Availability :**

The machine shall have guaranteed availability of minimum 85%

Availability will be calculated over 365 days of operation and following formula shall apply.

$$\% \text{ Availability} = \frac{\text{Production shift Hours} - \text{Downtime Hours}}{(\text{Production shift Hours} - \text{Maintenance Hours})} \times 100$$

Where ,    Production shift Hours    = 24 Hours per day  
                  Maintenance Hours        = 4 Hours per day(maximum)  
                  Breakdown Hours            = Breakdown hours will be counted from the moment the equipment goes under breakdown to the moment the equipment is made operational which includes time spent on waiting for spares, service experts etc.

Down time Hours        = Maintenance hours + Breakdown hours

Maintaining Log Book : Log Book will be maintained shift wise and will be available for examination and signature by the supplier's representative

### **Warranty/Guarrantee**

The machine shall be guaranteed to give the rated capacity of 400 TPH, output of (-)100mm in all three dimensions.

- 1) The equipment will be warranted against any manufacturing defects/workmanship for a period 12 months from the date of commissioning . Any defect observed on this account shall be attended to immediately and in no case beyond a period of one month.
- 2) In the event of any breakdown or failure of performance due to defects in material design, workmanship spare parts etc. BCCL shall promptly notify the bidder in writing of any claims arising under this warranty. The repairs, replacement or rectification work shall be carried out by the bidder at site at no cost to the company within 21 days of settlement of warranty claims.  
(At no cost to the company means ,the bidder has to bear all the expenses upto destination site ie: Ex works price, excise/custom duty,sales tax,insurance,transportation charges etc. as applicable to ensure free delivery of warranty replacement at BCCL colliery sites).
- 3) Warranty repairs will have to be attended to by the bidder at site and all services and spares will have to be provided at site free of cost including all freight, duties including customs duty,taxes etc.
- 4) The bidder must ensure that there is no major breakdown due to manufacturing design defect during the warranty period in case such breakdown occurs the company will reserve the right to extend the warranty period suitably as per the availability clause.
- 5) The availability of the equipment shall not be less than 85% for 12 months from the date of commissioning of the equipment.

### **Painting:**

The entire equipment shall be painted with bright anti corrosive paints after two coats of red oxide primer.

### **Important :**

Other technical data to be furnished by the bidder as per Annexure-I, Annexure-II

### **Spare Parts :**

Supplier shall ensure the availability of spares for full lifetime of the equipment after completion of guarantee period.

**Installation :**

The equipments are to be installed on the civil foundation adjacent to the retaining walls. The equipments are to be installed ,commissioned and to be handed over after trial run at the following location.

- a) Bastacolla Area – 2nos
- b) Lodna Area - 2nos
- c) Sijua Area - 1no

All power cable terminals shall be stud type with power cable lugs of tinned copper, crimping ring type. All metallic body, enclosures etc. of the electrical equipments like starters/control gears,motors are to be earthed by double GI wire of required size but not lesser than 6 SWG for maintaining continuity with the system earthing.



ANNEXURE –I**Other Basic Data :**

- 1) **Material to be handled**
  - (a) ROM coal containing shale and sand stone up to 10% - 20% of total feed
  - (b) Bulk Density : 0.8 to 1.3 Te per Cu.M
  - (c) Moisture content : 10 to 15%

The Feeder Breaker shall be able to deal with wet and sticky material in rainy season also.

**2) Application Requirement :**

- i) Output Capacity - 400 TPH
- ii) Feed Size - (Largest Lump) 1500x1500x1200MM
- iii) Percentage of largest Lump size in the feed – up to 20%
- iv) Desired output product size - (-) 100mm in all three dimensions
- v) Discharge Dumpers - Generally by Rear discharge
- vi) Number of stage - Single/Double

In case of two stage crushing the bidder has to provide necessary arrangements to carry the first stage output to second stage smoothly without any spillage/obstruction

**TECHNICAL DATA SHEET** ( To be filled in by the bidder)

- 1) Make :
- 2) Type :
- 3) Feed details :
- 4) Max. Lump Size(MM)
- 5) Max. hardness for which the equipment may be used :
- 6) Percentage of shale/sand stone permitted :
- 7) Max. permitted moistures content in feed :
- 8) Percentage of max. lump size permissible in the feed :
- 9) Output product size (MM)
- 10) Capacity(TPH) at product size (-)100MM
- 11) Percentage of oversize and max. lump size/mm that may be present in the output product :
- 12) Total Motor rating (KW) :
- 13) Crusher Type :
- 14) Crusher Drive :
- 15) Weight of Feeder Breaker without motor :
- 16) Weight of the heaviest part :
- 17) Total weight of the machine :
- 18) Dimension of the trailer/Platform :
- 19) Details of Hydraulic Pump/Power pack :
  - Make :
  - Flow capacity and pressure:
- 20) Details of hydraulic motors :
  - Make:
  - Capacity:
- 21) Chain conveyor details( if applicable) / Feeder Conveyor
- 22) Reduction arrangement & Service factor :
- 23) Deck plate thickness :
- 24) Any other parameters :

All platforms will be provided with chequered plate floors and should be fenced. Suitable ladders should be provided for approach to elevated positions with hand rail.

List of Vendors**Mechanical :**

Feeder Breaker : Atlas Copco(I R)/L&T/Elecon/Mcnally Sayaji/Bharat West Falia  
Gear Boxes : Elecon/Greaves Cotton/Flender/Gears India/Allen berry/  
 McNeil gears/David Brown/Allen Rank/ Radicon /NAW/Fenner

Fluid Coupling : Voith/Pembril/ Eleconfluid drive/Fluidomat/Elecon/MBE/  
 TRF/L&T/APHMEL

Coupling : Elecon/NAW/Fenner/HI:CLIEF/Wellman- Bibby/ESBIHI FLEX  
 Pvt

**Electricals**

Motors: Kirloskar/BHEL/Siemens/ATHON Electric motors/Jyoti/NGEF/  
 ABB/Crompton Greaves/Bharat Bijlee/Integrated electric company  
 Ltd/Laxman hydraulics Pvt Ltd.

Motor Control centres/ : NGEP/L&T/Andrew Yule/GE Industries/Jyoti/Siemens/  
Starters BharatCutler Hammer/ABB/Easun Egg/Crompton  
 Greaves/Kirloskar Systems/Schneider/Control &Switch  
 Gear company/Standard electricals Ltd  
 /Jolly Engg/Trans Gietz/ M/s SAIT/Mine line pvt Ltd/  
 M/s Amiya Industries Kolkata.

Power Cable : Cable Corporation/Fort Gloster/Universal cables/Nicco/  
 Asean/Premier Cables/Hindustan cables/Incab/Havells/Radiant Laser  
 cables/Skytone/Lumino/ Siechem, Chennai

LT contactors : Siemens/L&T/Bharatiya Industries Ltd/GE Industrial/Andrew Yule  
 Jyoti/Havells/Kirloskar systems/ABB/Telemecanique

Push button/Indicating Lamp : L&T/Siemens/Essen/BCH/Bharatiya Industries Ltd  
 Rass controls

Relays : GEC Alsthom/L&T/ Universal Electric/ Siemens/ Kirloskar systems  
 A V K/ S EG Controls Ltd BCH/ Easun  
 Reyroll/ABB/Andrew Yule.

### **SUB-SECTION-6.3**

#### **TECHNICAL SPECIFICATION (CIVIL)**

#### **1.1 TECHNICAL SPECIFICATION FOR PREPARATION OF SITE AND EARTHWORK IN FOUNDATIONS AND TRENCHES :**

##### **1.1.1 SCOPE :**

This shall include all work involved in grading, excavation, shoring, filling around foundations and disposal of spoil etc.

To arrange for boring and subsurface data regarding nature of soil, sub-soil water etc. shall be arranged by the contractor. The Contractor must satisfy himself of the character and volume of all works under this item and expected surface, subsurface and/or subsoil water to be encountered. He must also satisfy himself about general conditions of site and ascertain existing and future obstructions likely to come up during the execution of the Contract to carry out the work within this scope.

In general all relevant IS/CPWD/NBO codes/specifications shall be followed.

##### **1.1.2 GRADING ETC :**

The area to be excavated shall be cleared out of fences, trees, logs, stumps, bush, vegetation, rubbish, slush etc. and levelled up. Trees up to 30 cm girth shall be uprooted. Trees above 30 cm girth to be cut, shall be approved by the Engineer and then marked. Felling of trees shall include taking out roots up to 60 cm 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 otherwise. The trees shall be cut in suitable pieces as instructed by the Engineer.

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.

### **1.1.3 CLASSIFICATION :**

All earthwork shall be classified under the following categories :

#### **1.1.3.1 Ordinary Soil :**

This shall include all kinds of soil, dry or wet, which can generally be excavated with spades, except soil containing 50 percent or more of kankar, moorum and/or shingle and soft or hard rock.

#### **1.1.3.2 Hard Soil :**

The soil, dry or wet, containing 50 per cent or more of kankar, moorum and/or shingle or other types of hard soil that usually requires use of pick axes shall be classified under this item. The decision of the Engineer in the matter of classification of this type of soil shall be final and binding on the Contractor. This class shall also include excavation in consolidated brick ballast and mud concrete.

#### **1.1.3.3 Soft and Decomposed Rock :**

This shall include rock, boulders, chalk, slate, laterite and all other materials which in the opinion of the Engineer is rock, but does not need blasting and could be removed with picks, crow bars and wedges. The mere fact that the Contractor resorts to blasting for reason of his own, shall not mean the rock to be classified as 'hard rock'. This shall also include excavation to macadam and tarred roads and paths.

#### **1.1.3.4 Hard Rock :**

This shall include rock or boulders which in the opinion of the Engineer, requires the use of blasting or chiselling for excavation. This shall include cutting of the existing structures coming in the way of excavation.

In case of any dispute regarding classification, the decision of the Engineer shall be final.

### **1.1.4 EXCAVATION FOR FOUNDATIONS AND TRENCHES :**

All excavations shall be done to the minimum dimensions as required for safety and working facility. Prior approval of the Engineer shall be obtained by the Contractor, in each individual case, for the method he proposes to adopt for the excavation, including dimensions, side slopes, shoring, dewatering,

disposal etc. This approval, however, shall not in any way make the Engineer responsible for any consequent loss or damage. The excavation must be carried out in the most expeditious and efficient manner.

Prior to starting the excavation, the ground level at the location shall be checked jointly with the Engineer. The rough excavation may be carried up to a maximum depth of 150 mm above the final level. The balance shall be excavated with special care. If directed by the Engineer, soft and undesirable spots shall be filled up as instructed by the Engineer.

If the excavation is done to a depth greater than that shown on the drawing, or directed by the Engineer, due to Contractor's fault, the excess depth shall be filled up to the required level with cement concrete not leaner than 1:4:8 ordinary concrete or richer as directed by the Engineer in each individual case.

#### **1.4.1.1 Protection :**

The Engineer shall be notified by the Contractor as soon as the excavation is expected to be complete in 24 hours' time so that it may be inspected by him at the earliest. Immediately after approval of the Engineer, the excavation must be covered up in the shortest possible time. But in no case the excavation shall be covered up or worked on before approval by the Engineer.

Excavated materials shall be placed beyond 1.5 metres from the edge of the pit or trench or half the depth of the pit or trench, whichever is more or further away, if directed by the Engineer.

Excavation shall not be carried out below the foundation level of structures close by until required precaution have been done.

Adequate fencing shall have to be made enclosing the excavation.

#### **1.1.4.2 Dewatering :**

All excavations shall be kept free of water. Grading in the vicinity of excavations shall be controlled to prevent surface water running into excavated areas. The Contractor shall remove by pumping or other means, as approved by the Engineer, any water inclusive of rain water and subsoil water accumulated in excavation and keep the trench dewatered until the construction of foundation structure is complete. Sumps made for dewatering must be kept clear of the foundations. Method of pumping shall be approved by the Engineer but in any case, the pumping arrangement shall be such that there shall be no movement of subsoil or blowing in due to differential head of water during pumping.

#### **1.1.4.4 Backfilling around foundations in pits, trenches, plinth or under floors :**

##### **1.1.4.4.1 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 backfilling shall generally be obtained from the spoil of excavation. But the Engineer shall have the option, in case of shortage of good selected earth obtained from excavation, to direct the Contractor to get the filling materials from approved borrow pits.

##### **1.1.4.4.2 Filling in pits and trenches around structures :**

As soon as the work in foundations has been accepted and measured, the spaces around the foundation structures in pits and trenches shall be cleared of all debris, brick bats, mortar droppings 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. Earth shall be rammed preferably with approved compaction machine. Usually, no manual compaction shall be allowed unless specifically permitted by the Engineer. The final surface shall be trimmed and levelled to proper profile as desired by the Engineer. In case of black cotton soil the backfilling shall be done with sand at the direction of the Engineer.

##### **1.1.4.4.3 Plinth filling :**

The plinth shall be similarly filled with earth as described hereinbefore in layers not exceeding 15 cm watered and consolidated with approved compaction machine or manually if specifically permitted by the Engineer. When the filling reaches the finished level, the surface shall be flooded with water for at least 24 hours, allowed to dry and then rammed and consolidated, in order to avoid any settlement at a later stage. The finished level of the filling shall be trimmed to the slope intended to be given to the floor. In case of black cotton soil replacement of top one metre soil with approved quality of sand shall be done.

#### **1.1.4.4.4 Backfilling excavated earth in trenches for water pipes and drains :**

##### **General :**

Earth used for filling shall be free from salt, organic or other foreign matter. All clods of earth shall be broken or removed. Where the excavated materials is mostly rock, the boulders shall be broken into pieces not bigger than 10 cm size in any direction, mixed with fine material consisting of decomposed rock, moorum or earth as available, so as to fill up the voids as far as possible and

then the mixture shall be used for filling.

#### **Filling in trenches**

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 15 cm., 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, in the same manner as mentioned in clause 2.1.4.4.2 hereinbefore. The remaining filling shall be done with rock filling of boulders as available to fill up the voids, watered rammed and consolidated.

#### **1.1.4.4.5 Sand filling in trenches and other places :**

At places backfilling shall be done with local sand if directed by the Engineer. 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 has inspected and approved the fill.

#### **1.1.4.5 I.S. CODES :**

All relevant IS codes/CPWD/NBO/International Standards shall be followed. A few of them are mentioned below :

- |          |   |
|----------|---|
| IS :1498 | - Classification of soil for General Engineering purpose. |
| IS :3764 | - Safety Code for excavation work.                        |
| IS :2293 | - Safety code for working with construction machinery.    |



## **1.2 TECHNICAL SPECIFICATION FOR FABRICATION OF STRUCTURAL STEELWORKS**

### **1.2.1 SCOPE :**

This specification covers general requirements for supply when specified, fabrication and delivery at site of structural and miscellaneous steel.

### **1.2.2 STEEL MATERIALS :**

Steel materials shall comply with the I.S. specifications laid down under Clause 2.2.15.1 and/or called for on the approved design drawings.

#### **1.2.2.1 SUPPLIED BY CONTRACTOR :**

Contractor shall furnish owner/Engineer duplicate copies of all mill orders covering the material ordered by him for this project and also the test reports received from the Mills for Owner's/Engineer's information check and verification.

### **1.2.3 DRAWINGS :**

1.2.3.1 Engineer reserves the right to make changes. Revisions to drawings are very likely to be made to reflect more updated requirements. Revisions to drawings and any new drawings made to include additional work by Contractor shall be considered a part of this specification and the Owner shall entertain no extra claim on this account.

1.2.3.2 Unless otherwise specified, the drawings and specifications are intended to include everything obviously requisite and necessary for the proper and entire completion of the work and the job shall be carried out accordingly for the completeness as required.

1.2.3.3 In the case of variations in drawings and specifications, the decision of the Engineer shall be final. Should Contractor in the execution of his work, finds discrepancies in the information furnished by Engineer, he shall refer such discrepancies to the Engineer before proceeding with such work.

### **1.2.4 FABRICATION :**

#### **1.2.4.1 General :**

All workmanship and finish shall be of the best quality and shall conform to the best approved method of fabrication. All materials shall be finished straight and shall be machined true and square where so specified. All holes and edges shall be free of burrs. Shearing and chipping shall be neatly and accurately done and all portions of work exposed to view shall be neatly finished. Material at the shops shall be kept clean and protected from weather.

**1.2.4.2 Connections :**

- 1.2.4.2.1 Shop connections shall be either by welding, riveting or high strength bolts.
- 1.2.4.2.2 All major field connections shall be of high strength bolt, but standard M.S. Bolts ( IS : 1363) may be used for field connections of light members such as purloins, girt, staircase stringers and landing beams, unless these bolts are permitted to be used by Engineer for other connections also.
- 1.2.4.2.3 High tensile bolts shall comply with the requirements of BS : 1083 heat treated to R quality or its equivalent in IS : 1367.
- 1.2.4.2.4 In all cases where bearing is critical, the unthreaded bolt shall bear on the members assembled. A washer of adequate thickness may be provided to exclude the threads from the bearing thickness, if a longer grip bolt has to be used for this purpose.
- 1.2.4.2.5 All members likely to collect rain water shall have drain holes provided.
- 1.2.4.2.6 Not more than one shop splice shall be provided to make up the full length of a member. Splicing near the mid span of any beam should be avoided. Splicing to be done after approval of the Engineer.

**Straightening :**

Rolled material, before being worked, shall be straightened, unless otherwise required/specified. If straightening or flattening is necessary, it shall be done by methods that will not injure the material. Long plates shall be straightened by passing through a mangle or levelling rolls and structural shapes by the use of mechanical or hydraulic bar straightening machines. Heating or forging shall not be resorted to without the prior approval of Engineer in writing.

**Cutting :**

Cutting may be shearing, cropping, sawing or machine flame cutting. All reentrant corners shall be shaped notch-free to a radius of at least 12 mm. Sheared or cropped edges shall be dressed to a neat workman like finish and shall be free from distortion and burrs. The machine flame cut edges shall be properly cleaned. Where machine flame cutting is permitted for high tensile steel, special care shall be taken to leave for high tensile steel, special care shall be taken to leave sufficient metal and all flame hardened material shall be removed by machining/edge planning.

- 1.2.4.4.1 Hand flame cutting shall be undertaken only if so permitted by Engineer and shall only be carried out by an expert in such work. Hand flame cut edges shall be ground smooth and straight.
- 1.2.4.4.2 Edge planning of sheared, cropped or gas cut edges is not intended unless the sheared, cropped or gas cut edges are such as to warrant it or specifically called for.

**1.2.4.5 Rolling and Forming :**

Plates for circular bins, bunkers, hoppers etc. shall be accurately laid off and rolled or formed to required profile/shape as called for on the drawings. Adjacent sections shall be match-marked for facilitating accurate assembly, welding and erection in the field.

**1.2.4.6 Punching and Drilling :**

- 1.2.4.6.1 Holes in secondary members such as purlins, girts, lacing bars etc. may be punched full size through material not over 12 mm thick. Holes must be cleaned out, without burr or ragged edges. Holes for all other connections shall be drilled accurately and the burrs removed effectively. Where several parts are to be drilled shall be first assembled, tightly clamped together and drilled through.
- 1.2.4.6.2 Sub-punching may be permitted before assembly, provided the holes are punched 3 mm smaller in diameter than the required size and reamed after assembly to the full diameter. The thickness of material punched shall not exceed 16 mm.
- 1.2.4.6.3 When batch drilling is carried out in one operation through two or more separable parts, these parts shall be separated after drilling and the burrs removed.
- 1.2.4.6.4 Holes for turned and fitted bolts shall be drilled to a slightly smaller diameter and reamed to a diameter equal to the nominal diameter of the shank or barrel subject to HB tolerance specified in IS : 919.
- 1.2.4.6.5 Where reamed members are taken apart for shipping or handling, the respective pieces reamed together shall be so marked that they may be reassembled in the same position in the final sitting up. No interchange of reamed parts will be permitted. Poor machining, over drilling and ovality in holes shall be cause for rejection. Burning holes with gas is strictly prohibited.

**1.2.4.7 Riveting :**

- 1.2.4.7.1 All rivet steel used shall conform to either IS : 1148 or IS : 1149 as may be applicable.
- 1.2.4.7.2 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 only 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 ( 1085<sup>0</sup>C) and driven while

1.2.4.7.3 hot. Rivets when heated and ready for driving, shall be free from slag, scale and carbon deposit. When driven, they shall completely fill the holes. Rivet heads shall be full, neatly made, concentric with the rivet holes and in full contact with the surface of the member, gripping the members firmly. A driven rivet when struck sharply on the head with a quarter pound rivet testing hammer, shall be free from movement and vibration. Loose, burnt or otherwise defective rivets shall be replaced free of cost. In removing rivets, care shall be taken not to injure the adjacent metal and if necessary, they shall be drilled or cut with a rivet buster or chisel.

1.2.4.7.4 Wherever practicable, machine riveting shall be carried out by using machines of the steady pressure type. When necessary to drive rivets with a pneumatic riveting hammer, a pneumatic bunker shall be used for holding up, when practicable.

#### **1.2.4.8 Bolting :**

##### **1.2.4.8.1 High Tensile Bolts :**

The material used for the manufacture of structural quality high tensile steel bolts, shall have a minimum tensile strength of 58 Kg/mm<sup>2</sup>. Other mechanical properties shall conform to grade St-58-HT of IS : 961.

1.2.4.8.2 Bolts, nuts and washers and other fastening materials shall be stored in racks off the ground with coating of suitable protective oil.

1.2.4.8.3 All bolts, nuts and washers shall conform to the relevant Indian Standards.

1.2.4.8.4 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 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 would prevent solid sitting of the parts. Contact surfaces shall be free of oil, paint, lacquer or galvanising.

1.2.4.8.5 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 (Kg.f)
20	8,300
22	10,200
25	11,900

Tightening shall be done by any one of the following methods :

#### 1.2.4.8.5.1 Turn-of-nut method :

When the turn-of-nut method is used to provide the bolt tension as specified above, there shall first be enough bolts brought to a 'Snug tight' condition to ensure that the parts of the joint are brought into good contact with each other. 'Snug tight' is defined as the tightness attained by a few impacts of an impact wrench or the full effort of a man using an ordinary sod wrench. Following this initial operation, bolts shall be placed in any remaining holes in the connection and brought to snug tightness. All bolts in the joint shall then be tightened additionally by the applicable amount of nut reaction specified in Table below with tightening progressing systematically from the most rigid part of the joint to its free edges. During this operation there shall be no rotation of the part not turned by the wrench.

Bolt length not exceeding 8 diameters or 200mm	Bolt length exceeding 8 diameters or 200mm	Remarks
1/2 turn	2/3 turn	
		Nut rotation is relative to bolt regardless of the element (nut or bolt) being turned. Tolerance on rotation 30° over or under.

Bolts may be installed without hardened washers when tightening is done by the turn-of-nut method. However, normal washers shall be used.

Bolts tightened by the turn-of-nut method may have outer face of nut match marked with protruding bolt point before final tightening, thus affording the inspector visual means of noting the actual out rotation. Such marks can be made by the wrench operator by suitable means after the bolts have been brought up snug tight.

#### 1.2.4.8.5.2 Calibrated Wrench Tightening :

When calibrated wrenches are used to provide the bolt tensions specified earlier their setting shall be such as to include a bolt tension 5% to 10% in excess of this value. These wrenches shall be calibrated at least once each working day by tightening in a device capable of indicating actual bolt tension, not less than three typical bolts of each diameter from the bolts being installed. Power wrenches shall be adjusted to stall or cut out at the selected tension. If manual torque wrenches are used, the torque indication corresponding to the calibrating tension shall be noted and used in the installation of all bolts of the tested lot. Nuts shall be in tightening motion when torque is measured. When using calibrated wrenches to install several bolts in a single joint, the wrench shall be turned to 'touch up' bolts previously tightened, which may have been loosened to the prescribed tension. Bolts tightened by means of a calibrated wrench shall be installed

with a hardened washer under the nut or bolt head, whichever is the element turned in tightening.

In either of the above two methods, because of bolt entering and wrench operation clearance, tightening may be done by turning the bolt while the nut is prevented from rotating.

Impact wrenches, if used, shall be of adequate capacity and sufficiently supplied with air to perform the required tightening of each bolt in approximately ten seconds.

#### **1.2.4.9 Welding :**

- 1.2.4.9.1 Electrodes for shielded-arc manual welds shall comply with the requirements of IS : 814 and shall be of an approved make.
- 1.2.4.9.2 The electrodes shall be suitable for use in the position and type of work as laid down in the above specifications and as recommended by the manufacturer.
- 1.2.4.9.3 Electrode flux covering shall be sound and unbroken. Broken or damaged coating shall cause the electrodes to be discarded. Covered electrodes for manual-arc welding shall be properly stored in an oven prior to use in a manner recommended by the manufacturer and only an hour's quota shall be issued to each welder from the oven.
- 1.2.4.9.4 Electrodes larger than 5 mm diameter shall not be used for root-runs in butt-welds.
- 1.2.4.9.5 Welding plant and accessories shall have capacity adequate for the welding procedure laid down and shall satisfy appropriate standards and be of approved make and quality. All the electrical plant in connection with the welding operation shall be properly and adequately earthed and adequate means of measuring the current shall be provided.
- 1.2.4.9.6 All welds shall be made only by welders and welding operators who have been properly trained and previously qualified by tests to perform the type of work required as prescribed in the relevant applicable standards.
- 1.2.4.9.7 All welds shall be free from defects like blow holes, slag inclusions, lack of penetration, undercutting, cracks etc. All welds shall be cleaned of slag or flux and show uniform sections, smoothness of weld metal, feather edge without overlap and freedom from porosity.
- 1.2.4.9.8 Fusion faces and surfaces adjacent to the joint for a distance of at least 50 mm on either side shall be absolutely free from grease, paint, loose scales, moisture or any other substance which might interfere with welding or adversely affect the quality of the weld. Joint surface shall be smooth, uniform and free from fins, tears, laminations etc. Preparation of fusion faces shall be done in accordance with the approved fabrication drawings by shearing, chipping, machining or machine flame cutting except that shearing shall not be used for thickness over 8 mm.

- 1.2.4.9.9 In the fabrication of cover-plated beams and built up members all shop splices in each component part shall be made before such component part is welded to other parts of the member. Wherever weld reinforcement interferes with proper fit-up between components to be assembled for
- 1.2.4.9.10 welding, these welds shall be ground flush prior to assembly.
- 1.2.4.9.10 The members to be joined by filled fillet welding shall be brought and held as close together as possible and in no event shall be separated by more than 3 mm. If the separation is 1.5 mm or greater the fillet weld size shall be increased by the amount of separation. This shall only apply if the surfaces are completely sealed by welds. In all other cases the fit-up shall be close enough to exclude water after painting.
- 1.2.4.9.11 The separation between facing surfaces of lap joints and butt joints with backing plate shall not exceed 1.5 mm. Abutting parts, to be butt welded, shall be carefully aligned and the correct root gap maintained throughout the welding operation. Mis-alignments greater than 25 percent of the thickness of the thinner plate or 3 mm whichever is smaller shall be corrected and in making the correction the parts shall not be drawn into a slope sharper than 2 degrees ( 1 in 27.5).
- 1.2.4.9.12 Pre-qualified welding procedure recommended by appropriate welding standards and known to provide satisfactory welds shall be followed. For non-standard procedures, qualification tests as prescribed in IS : 823 shall be made to verify the adequacy of the procedures. A welding procedure shall be prepared by Contractor and submitted to Engineer for approval before start of welding. This shall include all details of welding procedure with reference to provisions of IS : 823 & IS : 4353. Approval of the welding procedure by Engineer shall not relieve Contractor of his responsibility for correct and sound welding without undue distortion in the finished structure.
- 1.2.4.9.13 Submerged arc, automatic or semi-automatic welding shall generally be employed. Only where it is not practicable to use submerged arc welding, manual arc welding may be resorted to.
- 1.2.4.9.14 Voltage and current ( and polarity if direct current is used) shall be set according to the recommendations of the manufacturer of the electrode being used and suitability to thickness of material, joint, form etc.
- 1.2.4.9.15 The work shall be positioned for flat welding wherever practicable and overhead weld shall be avoided.
- 1.2.4.9.16 No welding shall be done when the surface of the members is wet nor during periods of high wind unless the welding operator and the work are properly protected.

- 1.2.4.9.17 In joints connected by fillet welds, the minimum sizes of single run fillet welds or first runs and minimum full sizes of fillet welds shall conform to the requirements of IS:816 and IS : 823.
- 1.2.4.9.18 Fillet welds larger than 8 mm shall be made with two or more passes.
- 1.2.4.9.19 All complete penetration butt welds made by manual arc welding, except when produced with the aid or backing material or welded in flat position, from both sides in square-edge material not over 8 mm thick with root opening not less than one-half the thickness of the thinner part joined, shall have the root of the initial layer gouged out on the back side before welding is started from that side and shall be so welded as to secure sound metal and complete fusion throughout the entire cross section.
- 1.2.4.9.20 Butt welds shall be terminated at the ends of joint in a manner that will ensure their soundness. There abutting parts are 20 mm or more in thickness run-on and run-off plates with similar edge preparation and having a width not less than the thickness of the thicker part joined shall be used. These extension pieces shall be removed upon completion of the weld and the ends of the weld made smooth and flush with the abutting parts. Where the abutting parts are thinner than 20 mm the extension pieces may be omitted but the ends of the butt welds shall then be chipped or gouged out to sound metal and side welded to fill up the ends to the required reinforcement.
- 1.2.4.9.21 Each layer of a multiple layer weld except root and surface runs may be moderately peened with light blows from a blunt tool. Care shall be exercised to prevent scaling or flaking of weld and base metal from overpeening.
- 1.2.4.9.22 No welding shall normally be done on parent material at a temperature below  $(-) 5^{\circ}\text{C}$ . However, if welding is to be undertaken at low temperatures, adequate precautions as recommended in relevant Indian Standards shall be taken. When the parent material is less than 40 mm thick and the temperature is between  $(-) 5^{\circ}\text{C}$  to  $0^{\circ}\text{C}$ , the surface around the joint to a distance of 100 mm or four times the thickness of the materials, whichever is greater, shall be preheated till it is hand warm. When the parent material is more than 40 mm thick, the temperature of the area mentioned above shall in no case be less than  $20^{\circ}\text{C}$ . All requirements regarding preheating of the parent material shall be in accordance with the relevant IS standard.
- 1.2.4.9.23 Electrodes other than low-hydrogen electrodes shall not be permitted for thickness of 75 mm and above.



1.2.4.9.24 Before commencing fabrication of a member or structure in which welding is likely to result in distortion and/or locked up stresses a complete programme of fabrication, assembly and welding shall be made and submitted to Engineer for approval. Such a programme shall include, besides other appropriate details, full particulars in regard to the following :

- i) Proposed preheating in components such as flanges and pre-setting of joints to offset expected distortion.
- ii) Make up of sub-assemblies proposed to be welded before incorporation on final assembly.
- iii) Proposed joint forms, classification of wire and flux or covered electrodes, welding process including fitting and welding sequences with directions in which freedom of movement is to be allowed.
- iv) Proposed number, spacing and type of strong-backs and details of jigs fixtures for maintaining proper fit-up and alignment during welding.
- v) Any other special features like assembling similar members back to back or stress relief.

If so desired by Engineer, mock up welding shall be carried out at Contractor's cost to establish the efficiency of the proposed programme, with any modification suggested by the Engineer, in limiting distortion or/and residual stress to acceptable levels.

1.2.4.9.25 Inspection of Welds :

All welds shall be inspected for flaws by any of the methods described under clause 'Inspection'. The choice of the method adopted shall be determined by Owner/Engineer.

1.2.4.9.26 The Contractor shall carry out tests which establish soundness of welds. In case the tests uncover defective work, such tests will be at Contractor's cost and the Contractor shall correct such defects at his own cost and prove the soundness of rectified work at his own cost.

1.2.4.9.27 The correction of defective welds shall be carried out as directed by Engineer without damaging the parent metal. When a crack in the weld is removed, magnetic particles inspection or any other equally positive means as prescribed by Engineer shall be used to ensure that the whole of the crack and material upto 25 mm beyond each end of the crack has been removed. Cost of all such tests and operations incidental to correction shall be to Contractor's account.

**1.2.4.10 Tolerances :**

The dimensional and weight tolerances for rolled shapes shall be in accordance with IS : 1852.

No rolled or fabricated member shall deviate from straightness by more than 1/1000 of the axial length or 10 mm whichever is smaller.

The length of members with both ends finished for contact shall have a tolerance of  $\pm 1$  mm.

Members without ends finished for contact bearing shall have a tolerance of  $\pm 1.5$  mm for members upto 10 metres long and a tolerance of  $\pm 3$  mm for members over 10 metres in length.

Lateral deviation between centre line of web plate and centre line of flange plate at contact surface in the case of built up sections shall not exceed 3 mm.

The combined warpage and tilt of flanges in welded built up sections shall not exceed 1/200th of the flange width or 3 mm whichever is smaller.

The deviation from flatness of welded plate girder web in the length between stiffeners or a length equal to the depth of the girder shall not exceed 1/150th of such length.

Deviations from the specified depth of welded girder measured at the centreline of the web shall not exceed  $\pm 3$  mm upto a depth of 1000 mm,  $\pm 5$  mm for depths above 1000 mm upto 2000 mm and + 8 mm and -5 mm for depths over 2000 mm.

**1.2.4.11 End Milling :**

Column ends bearing on each other or resting on base plates and compression joints designed for bearing shall be milled true and square to ensure proper bearing and alignment. Base plates shall also have their surfaces milled true and square.

**1.2.4.12 Erection of Altered and Rectified Steel :**

This includes transportation of the rectified components to the site of erection, lifting to the required position, aligning in position, inclusive of all erection bolts, tack welding final welding. Alterations and rectification of fabricated steel or dismantled steel shall be deemed to be fabrication work involving change in length of the member or in cross section, such as welding additional flanges or web plates or cutting already welded plates etc. Additions to fabricated steel such as additional cleat angles, plugging drills

holes, drilling additional holes and additional fabrication work of steel fabricated and stored at the fabrication shop shall not be deemed to be included as '*alterations*' and shall be done by the Contractor without any extra cost to the Owner. However, if any re-fabrication/erection is due to the change suggested by the Owner/Engineer shall be paid at the mutual agreed rate.

#### **1.2.5 INSPECTION :**

##### **1.2.5.1 General :**

Contractor shall give due notice to Engineer/Owner in advance of the materials or workmanship getting ready for inspection. All rejected material shall be promptly removed from the shop and replaced with new material for Engineer/Owner's approval or inspection. The fact that certain material has been accepted at Contractor's shop shall not invalidate final rejection at site by Owner/Engineer if it fails to be in proper condition or has fabrication inaccuracies which prevents proper assembly. No material shall be painted or despatched to site without the inspection and approval by Owner/Engineer unless such inspection is waived in writing by Engineer.

Shop inspection by Engineer or his authorised representative or submission of test certificates and acceptance thereof by Engineer shall not relieve the Contractor from the responsibility of furnishing material conforming to the requirement of these specifications, nor shall it invalidate any claim which the Owner may make because of defective or unsatisfactory material and of workmanship.

Contractor shall provide all the testing and inspection services and facilities for shop work.

For fabrication work carried out in the field, the standard of supervision and quality control shall be maintained as in shop fabricated work. The inspection and testing shall be conducted in a manner satisfactory to the Engineer.

##### **1.2.5.2 Material Testing :**

The inspection and tests on structural steel members shall be as set forth below :

- 1.2.5.2.1 If mill test reports are not available for any steel materials the same shall be got tested by the Contractor to Engineer's satisfaction. The costs of such tests will be borne by the Contractor.

##### **1.2.5.3 Test on welds :**

- 1.2.5.3.1 Where root and intermediate passes of weld is examined by magnetic particle testing, such testing shall be carried out throughout its entire length in

accordance with ASTM Specification E-109. In the case of completed welds, such tests shall be carried out in accordance with ASTM Specification E-109 or E-138 as decided by Engineer. If heat treatment is performed, the completed weld shall be examined after the heat treatment. All defects shall be repaired and re-tested. Magnetic particle test shall be carried out using alternating current. Direct current may be used with the permission of Engineer.

#### 1.2.5.3.2 Liquid Penetrant Inspection :

In the case of welds examined by Liquid Penetrant Inspection, such tests shall be carried out in accordance with ASTM E-165 or IS : 3658. All defects shown shall be repaired and rechecked.

#### 1.2.5.3.3 Radiographic Inspection :

All full strength butt welds shall be fully radiographed in accordance with the recommended practice for radiographic testing as per ASTM E-93 and Part U.W. 51 of ASME Code Section - VIII.

#### 1.2.5.4 Dimensions, Workmanship and Cleanliness :

The structural steel members shall be inspected at all stages of fabrication and assembly to verify that dimensions, tolerances, alignment and surface finish, painting where specified are in accordance with the requirements shown on Contractor's approved shop drawings.

#### 1.2.5.5 Inspection of Test Failure :

In the event of any failure of structural steel members to meet an inspection or test requirement, Contractor shall notify the Engineer or his authorized representative. Contractor must obtain permission from the Engineer before repair is undertaken. The quality control procedures to be allowed to ensure satisfactory repair shall be subject to approval by Engineer. 1.2.5.6 Engineer has a right to specify additional inspection or testing as he deems necessary and the additional cost of such testing will be borne by Owner. Contractor shall maintain records of all inspection and testing which shall be made available to Engineer or his authorised representative.

#### 1.2.6 **SHOP MATCHING :**

Some steelworks particularly columns along with the tie beams/bracings may have to be shop assembled to ensure satisfactory fabrication, obtaining of adequate bearing areas etc. if so desired by Engineer at no extra cost to Owner.

**1.2.7 DRILLING HOLES FOR OTHER WORKS :**

Holes in members required for installing equipment or steel furnished by other manufacturers or other Contractors shall be drilled in Contractor's shop as part of this Contract, the information for which will be supplied by Owner/Engineer before fabrication of the steel.

**1.2.8 STAIRWAYS AND INTERMEDIATE LANDINGS & GRATINGS :**

All stairways and intermediate landings shown on the drawings shall be fabricated as a complete unit and shall include grating treads, landings, hangers, brackets, struts, clips, bracing etc. as detailed or as necessary for connections to structural steel framing in places. Treads and landings shall be suitable for the prescribed loading and be furnished complete with one piece standard non-slip abrasive nosing of approved type. The maximum width of openings in gratings shall not exceed 40 mm. The minimum thickness of main bars shall be 5 mm. The usual span of gratings will not generally exceed 1.5 metres.

**1.2.9 HANDRAILS :**

Handrails shall be provided on open sides of platform stairways and around all opening as shown on drawing. Handrails shall be of standard weight galvanised steel pipe of flush welded construction, ground smooth using 32 mm nominal bore medium class pipe provided with double rail, top rail about 1 metre above platform level and pipe posts spaced not more than two metres apart. Angle handrail posts may be provided if specifically called for in design drawings. Handrails around openings should have toe plates.

Smooth uniform curves and bends shall be provided at stair returns and also wheresoever required. Posts connected to curb plates shall have a net closure at the bottom and a 6 mm thick plate neatly welded to posts for attachments to curb plates. All necessary fittings including inner dowels at splices, brackets, belts, bends, flanges and chains, where required shall be plugged and welded. A minimum radius of three times the pipe diameter shall be provided at all points of direction changes in the handrail.

**1.2.10 CHEQUERED PLATE :**

Chequered plates used shall be 6 mm thick over plates or as indicated on drawings. The chequered plate pattern shall be approved by Owner/Engineer. Mild steel flats of suitable size shall be welded to the bottom portion of chequered plates at a designed spacing to stiffen chequered plates suitably. Chequered plates shall be fixed by tack welding of suitable size.

**1.2.11 MARKING OF MEMBERS :**

After checking and inspection, all members shall be marked for identification during erection. This work shall correspond to distinguishing marks on approved erection drawings and shall be legibly painted and stamped on. The erection mark shall be stamped with a metal dye with figures at least 20 mm high and to such optimum depth as to be clearly visible, even after a member is galvanised.

All erection marks shall be on outer surface of all sections and near one end, but clear of bolt holes. Marking shall be so stamped that they are easily discernible when sorting out members. The stamped marking shall be enriched boldly by a distinguishable paint to facilitate easy location.

Erection marks on like pieces shall be in identical locations. Members having lengths of three metres or more shall have the erection mark at both ends.

**1.2.12 ERRORS :**

Any error in shop work prevents proper assembling and fitting-up of parts in the field by moderate use of drift pins or moderate amount of reaming will be classified by Engineer as defective workmanship. All charges incurred by Owner/Engineer either directly or indirectly because of workmanship will be deducted from the amount due to Contractor before payment is made. The amount of such deduction will consist of the sum total of the costs of labour direct or indirect, material, plant, transportation, equipment, rental and overhead expenses.

In case Engineer chooses to reject the material because of poor workmanship the cost of all handling for returning the material to Contractor, if he so desires, shall entirely be to Contractors' account and in all such cases, the cost of handling, transport and delivery to site shall be borne by Contractor.

**1.2.13 PAINTING :****1.2.13.1 Painting after erection :**

Field painting shall only be done after the structure is erected, levelled, plumbed and grouted in its final position and accepted by the Engineer. Painting shall not be done in frosty or foggy weather or when humidity is such as to cause condensation on the surface to be painted. The air temperature should not be less than 4.4°C and relative humidity greater than 80%.

Before painting, steel, which is delivered only with shop primer, shall be dried and thoroughly cleaned from all loose scale and rust. Paints shall be

done by brushing or spraying. Steel work that has received a shop coat primer shall be cleaned with emery paper followed by application of a second coat of primer. Damaged areas shall be carefully cleaned and re-primed.

Painting shall proceed as soon as possible after cleaning and before further deterioration of the surface occurs. Two coats of approved paint shall be applied after approval of the Engineer and allowing a drying time according to the manufacturers instructions. In the case of red lead, after the second coat of primer, sufficient time shall be allowed for the red lead to dry thoroughly.

All field rivets, bolts, field welds and serious abrasions to the shop coat shall be spot painted with the same paint used for the shop coat. Where specified, surfaces which will be in contact after site assembly shall receive a coat of paint ( in addition to any shop priming) and shall be brought together while the paint is still wet.

Where the steel has received a metal coating in the shop, this coating shall be completed on the site so as to be continuous over any field welds, field rivets or bolts. Each coat of paint shall have an optimum thickness. The overall paint thickness should not be less than 100 microns.

#### **1.2.13.2 Shop Paint :**

1.2.13.2.1 After inspection and issue of test and acceptance certificate, all steel surfaces are to be painted or otherwise treated shall be dried and thoroughly cleaned by effective means of all loose millscale, rust and foreign matter as per IS : 1477 Part-I. The following methods like wire brushing, scrapping and chipping, sand papering or cleaning, flame cleaning, sand blasting or shop blasting, chemical rust removal may be adopted for preparing the steel surface to be painted. Except where encased in concrete, all steel work shall be given one coat of approved metal protection as may be specified, applied thoroughly and evenly and well worked into the joints and other open spaces. Materials shall be of best quality available and procured directly from approved manufacturers. Samples shall be submitted to the Engineer for approval before procurement.

1.2.13.2.2 Surfaces not in contact, but inaccessible after shop assembly, shall receive two coats of shop paint, positively of different colours or such materials to prove use of two coats before assembly. This does not apply to the interior of sealed hollow sections.

1.2.13.2.3 Shop contact surfaces shall be cleaned by effective means before assembly, but not painted.

1.2.13.2.4 In the case of surface to be welded, the steel shall not be painted or metal-coated within minimum 50 mm distance of any edges to be welded, if the paint specified or the metal coating would be harmful to welders or impair the quality of the welds. Welds and adjacent parent metal shall not be painted prior to de-slagging, inspection and acceptance.

1.2.13.2.5 Machine finished surfaces shall be protected against corrosion by a suitable coating.

1.2.13.2.6 Primers should be applied by brushing, Red oxide shall be used as shop painting. Where two coats are specified to be applied at shop to inaccessible parts, the second coat shall be red oxide zinc chromate paint (primer) conforming to IS : 2075.

1.2.13.2.7 In areas which are difficult to reach either by brushing or spraying, daubers, mops or both may be used by dipping the same in paints and pulling or pushing them through narrow spaces. Regarding the methods of application of paint, whether by spraying or brushing, the instructions of the manufacturers shall be followed.

## **1.2.14 GALVANISING :**

### **1.2.14.1 General :**

Structural steel work for switchyard or other structures as may be specified in the Contract shall be hot dip galvanised in accordance with the American Society for Testing and Materials Specification ASTM - A123 or equivalent Indian Standard Specifications. Where the steel structures are required to be galvanised, the field connection materials like bolts, nuts and washers shall also be galvanised.

### **2.2.14.2 Surface Preparation :**

All members to be galvanised shall be cleaned, by the process of pickling, of rust, loose scale, dirt, oil grease, slag and spatter of welded areas and other foreign substances prior to galvanising. Pickling shall be carried out by immersing the steel in an acid bath containing either sulphuric or hydrochloric acid at a suitable concentration and temperature. The concentration of the acids and the temperature of the bath can be varied, provided that the pickling time is adjusted accordingly.

The pickling process shall be completed by thoroughly rinsing with water, which should preferably be warm, so as to remove the residual acid.

### **1.2.14.3 Procedure :**

Galvanising shall be carried out by hot dip process in a proper and uniformly heated bath. It shall meet all the requirements when tested in accordance with IS : 2633 - Methods of testing weight, thickness and uniformity of coating on hot dipped galvanised articles. The zinc coating shall be uniform, clean and of a standard



thickness on the entire surface of the materials galvanised.

After finishing the threads of bolts, galvanising shall be applied over the entire surface uniformly. The threads of bolts shall not be machined after galvanising and shall not be with zinc.

The threads of nuts may be tapped after galvanising but care shall be taken to use oil in the threads of nuts during erection.

The surface preparation for galvanising and the process of galvanising itself, shall not adversely affect the mechanical properties of the materials to be galvanised. Where members are of such lengths as to prevent complete dipping in one operation, great care shall be taken to prevent warping. Materials on which galvanising has been damaged shall be acid stripped and re-galvanised unless otherwise directed, but if any member becomes damaged after having been dipped twice, shall be rejected. Special care shall be taken not to injure the skin on galvanised surfaces during transport, handling and erection. Damages, if occur, shall be made good in accordance with the provisions of this Specification or as directed by the Engineer.

#### **1.2.15 APPLICABLE CODES AND SPECIFICATIONS :**

Unless otherwise specified therein, materials and workmanship shall conform to the latest editions of the one or as many as applicable of the standards or their approved equivalents.

All relevant IS codes/CPWD & NBO Specifications/International Standards shall be followed. A few of them are mentioned below :

##### **1.2.15.1 Materials :**

1	IS :226	-	Structural Steel (Standard Quality).
2	IS :808	-	Rolled steel beam, channel and angle Sections.
3	IS :961	-	Structural steel (Fusion welding quality).
4	IS :2062	-	Structural steel (Fusion welding quality).
5	IS :1977	-	Structural steel (Ordinary quality).
6	IS :1148	-	Rivet bars for structural purposes.
7	IS :1149	-	High tensile rivet bars for structural purposes.
8	IS :1363	-	Black hexagon bolts, nuts and lock nuts and black hexagon screws.
9	IS :1364	-	Precision and semi-precision hexagon bolts, screws, nuts and lock nuts.
10	IS :1367	-	Technical conditions for threaded fasteners.
11	IS :1083	-	Precision hexagonal bolts, screws and nuts (BSE & BSF threads).
12	IS :2016	-	Plain washers.
13	IS :814	-	Specification for covered electrodes for metal arc welding for mild steel.
14	IS :3613	-	Acceptance tests for wire flux combinations for submerged arc welding.

15	IS :1852	- Specification for rolling and cutting tolerances for
		hot rolled steel products.
16	IS :2074	- Ready mixed paint, red oxide zinc chrome, priming.

#### 1.2.15.2 Codes of Practice :

1	IS :800	-	Codes of practice for use of structural steel in general building construction.
2	IS :816	-	Code of practice for use of metal arc welding for general construction.
3	IS : 4353	-	Recommendations for submerged arc welding of mild steel and low alloy steels.
4	IS :823	-	Code of procedure for manual metal arc welding of mild steel.
5	IS :817	-	Code of practice for training and testing of metal arc welders.
6	IS :1181	-	Qualifying tests for metal arc welders (engaged in welding structures other than pipes).
7	IS :1182	-	Recommended practice for radiographic examination of fusion-welded butt joints in steel plates.
8	IS :3658	-	Code of practice for liquid penetrant flow detection.
9	IS :5334	-	Code of practice for magnetic particle flaw detection of welds.
10	IS :147	-	Code of practice for painting of ferrous metals in buildings and allied finishes.
11	IS :7215	-	Tolerance for fabrication of steel structures.
12	IS :2633	-	Methods of testing weight, thickness and uniformity of coating on hot dipped galvanised articles.

### 1.3 TECHNICAL SPECIFICATION FOR ERECTION OF STRUCTURAL STEEL WORK :

#### 1.3.1 SCOPE :

This specification covers general requirements for erection of structural and miscellaneous steel. In general all relevant IS codes/CPWD/NBO/International Standards shall be followed.

#### 1.3.2 ERECTION SCHEME :

Each bid shall be accompanied by a broad erection scheme prepared by the bidder after a thorough study of the bid drawings and the site conditions. The erection scheme shall describe the methods proposed to be employed by the

Contractor for unloading, transporting within the site, handling, assembling, hoisting and erection of the structural and miscellaneous steel components and the type, capacity and quantity of equipment that the Contractor proposes to bring to site for all these operations. The scheme shall also indicate the strength and trade-wise compositions of the work force and supervisory personnel that will be deployed by the Contractor for the various operations.

### **1.3.3 SITE OPERATIONS :**

1.3.3.1 An experienced and qualified superintendent shall be in full time charge of the job.

1.3.3.2 Contractor shall complete all preliminary works at site well before the arrival of structural steel, such as establishment of office, stores, unloading gantry, labour quarters if any, electrical and water connections, electrical winches, derricks, cranes, compressors, all tools and tackle, rivet guns, welding sets, torque wrenches, spud wrenches, staging etc. as part of his contract and any other work that may be necessary so as to start erection immediately after the arrival of first batch of steel at site.

1.3.3.3 Contractor shall furnish at his own expense, the necessary non-inflammable staging for hoisting materials or equipment required for the erection work and shall remove and take them away after completion of the job. Contractor shall also provide necessary passageways, fences, safety belts, helmets, lights and other fittings to the satisfaction of Owner/Engineer and to meet the rules of local authorities and for protection to his men and materials. A licensed electrician shall be kept on the job for full period to maintain Contractor's electrical equipment and connection.

1.3.3.4 Contractor shall protect all existing plant structures, piping, conduits, equipment and facilities against damage during erection. Any damage caused by Contractor shall be rectified entirely at Contractor's cost to the satisfaction of Owner/Engineer. If work has to be carried out adjacent to existing switchyards or electrical installations which are live, Contractor must ensure suitable safety precaution in consultation with Engineer.

### **1.3.4 HANDLING & STORAGE :**

No dragging of steel shall be permitted. All steel shall be stored 300 mm above ground on suitable packing to avoid damage, in the order required for erection and with erection marks visible. All storage areas shall be prepared and maintained by Contractor. Steel shall not be stored in the vicinity of areas

where excavation or grading will be done and if stored temporarily, this shall be removed by Contractor well before such excavation and/or grading commences to a safe distance to avoid burial under debris.

### **1.3.5 ANCHOR BOLTS AND FOUNDATIONS :**

1.3.5.1 Contractor shall carefully check the location and layout of anchor bolts before the foundations are constructed to ensure that the structures can be properly erected as shown in the drawings.

Anchor bolts may be provided with three nuts on upper threads portion, one of which may be used for levelling the column base to the required elevation and one will be a lock nut. All shim stock required for erection shall be of good m.s. plates and shall be supplied by Contractor at his cost.

1.3.5.2 A certain amount of cleaning of foundations and preparing the area is considered normal and shall be carried out by Contractor at no extra cost.

1.3.5.3 Where beams bear in pockets or on walls, bearing plates shall be set and levelled as part of the work. All grouting under column base plates or beam bearing plates will be carried out by the Contractor only after getting prior approval of the Engineer.

### **1.3.6 ASSEMBLY AND CONNECTIONS :**

1.3.6.1 Field connections may be effected either by riveting, bolting, welding or by use of high strength bolts as shown on the design and erection drawings.

All welding shall be in accordance with IS : 816 - Code of practice for use of Metal arc welding for General Construction in mild steel and IS : 823 - Code of procedure for manual arc welding of mild steel.

All assembling shall be carried on a level platform.

1.3.6.2 Drifts shall be used only for drawing the work to proper position and must not be used to such an extent as to damage the holes. Size of drifts, larger than the nominal diameter of hole shall not be used. Any damaged holes or burrs must be rectified to the satisfaction of the Engineer.

1.3.6.3 Corrections of minor misfits and reasonable amount of reaming and cutting of excess stock from rivet shall be considered as a part of erection. Any error in shop which prevents proper fit on a moderate amount of reaming and slight hiping or cu/c cutting shall be immediately reported to Engineer.

**1.3.7 ERECTION :**

- 1.3.7.1 All structural steel shall be erected as shown on the drawings, proper size steel cable slings etc. shall be used for hoisting, guys shall not be anchored to existing structures, foundations etc. unless permitted by Engineer in writing.
- 1.3.7.2 Steel columns in the basement, if any, are to be lowered and erected carefully with the help of a crane and/or derrick without damaging the basement walls or floor.
- 1.3.7.3 Structural steel frames shall be erected plumb and true. All steel columns and beams shall be checked for plumb and level individually before and after connections are made. Temporary bracings shall be introduced wherever necessary to take care of all loads to which the structure may be subjected including erection equipment and the operation thereof. Such bracings shall be left in place as long as may be required for safety and stability.
- 1.3.7.4 As erection progresses, the work shall be securely bolted to take care of all dead load, wind, seismic and erection stresses.
- 1.3.7.5 No riveting or welding or final bolting shall be done until the structure has been properly aligned and approved by Engineer. No cutting, heating or enlarging of the holes shall be carried out without the prior approval of Engineer.

**1.3.8 INSPECTION :**

Engineer/Owner or their authorised representatives shall have free access to all parts of the job during erection and all erection shall be subject to their approval. In case of faulty erection all such dismantling and re-erection required will be at Contractor's cost. No paint shall be applied to rivet heads or field welds or bolts until these have been approved by Engineer.

**1.3.9 TOLERANCE :**

The shift of column axis at column base from the marked axis shall not exceed 5 mm. All column tiers shall be plumb within a tolerance of 1 in 500 and the structure as a whole plumb within a tolerance of 1 in 1000. In no case, however, shall the displacement from plumb of column tiers exceed 10 mm and the total displacement of the structure as a whole exceed 25 mm, for struc-

tures taller than 50 metres an additional displacement of 1 mm & for every 2.5 metres additional height to a maximum displacement of 50 mm. The actual levels of supports of trusses, collar beams, roofing beams, purling, etc. shall not vary by more than 20 mm from their marked levels. The sweep of trusses, beams etc. in the horizontal plane shall not exceed 1/1500 of their span subject to a maximum of 10 mm. Further, the deviation of the upper chords of trusses from vertical plane through centres of supports shall be within 1/250th of the truss height. Deviation in spacing of purling shall be within 5 mm.

#### **1.4 TECHNICAL SPECIFICAION FOR EXCAVATION OF HARD ROCK :**

##### **1.4.1 SCOPE :**

The work covers all operations connected with excavation of Hard Rock including all labour and material. The definition of Hard Rock should be as specified in specification for Preparation of Site and Earthwork in foundation and trenches.

##### **1.4.1.1 GENERAL :**

Excavation in hard rock shall generally be done by blasting. A valid blasting licence shall be obtained by the Tenderer from authorities concerned. If the permission for blasting is refused by the Engineer for safety considerations the rock shall be removed by wedging, picking, barring, burning and sudden quenching or other approved means. All the excavation beyond the minimum excavation limits shall be filled back with the same class and type of material as proposed and approved by the Engineer. While blasting the Tenderer shall take all possible care to preserve rock below and beyond the lines of excavation in the soundest condition possible.

#### **1.5 TECHNICAL SPECIFICATION FOR CEMENT CONCRETE (*PLAIN & REINFORCED*) : 1.5.1**

##### **SCOPE :**

1.5.1.1 This specification deals with Cement Concrete, Plain or Reinforced, for general use, and covers the requirements for concrete materials, their storage, grading, mix design, strength and quality requirements, pouring at all levels, reinforcements, protection, curing, formwork, finishing, painting, admixtures, inserts and other

miscellaneous works.

1.5.1.2 The provision of the latest revision of IS : 456 shall be complied with unless permitted otherwise and any other Indian Standard Code (latest revision) shall form a part of this Specification to the extent it has been referred to or applicable within this specification.

## **1.5.2 MATERIALS :**

### **1.5.2.1 Cement :**

Cement shall be ordinary portland cement conforming to IS : 269 latest revision or portland slag cement conforming to IS : 455 latest revision OR

PORTLAND POZZOLONA CEMENT CONFIRMING TO IS 1498 PART-1. Rapid hardening portland cement may be used under special circumstances if permitted by the Engineer.

### **1.5.2.2 Aggregates :**

All aggregates shall conform to all provisions and test methods of IS : 383 latest revision and/or IS : 515 latest revision.

Samples of aggregates, proposed to be used shall be submitted free of charge in sufficient quantities to the Engineer with sieve analysis data for his approval. Approved samples will be preserved by him for future reference. This approval will not in any way relieve the Contractor of his responsibility of producing concrete of specified qualities.

#### **1.5.2.2.1 Coarse Aggregates :**

Coarse aggregates shall consist of uncoated, hard, strong, dense and durable pieces of crushed stone and shall be free from undesirable matters viz. disintegrated stones, soft, flaky or elongated particles, salt, alkali, vegetable matter or other deleterious substances. The amount of different undesirable substances in coarse aggregates shall not exceed the percentage limits by weight as specified in relevant IS Codes, but in no case, the total amount of all the undesirable substances shall exceed 5%. Aggregates other than crushed stone conforming to the provisions of this Specification may be used under special conditions, if permitted by the Engineer.

Washing of aggregates by approved means shall be carried out, if desired by the Engineer. The Maximum size of coarse aggregates shall be as follows :

For :

Reinforced concrete including foundations	-	20 mm
Ordinary Plain concrete	-	20 mm
Heavy	-	40 mm

Grading of coarse, aggregate for a particular size shall generally conform to relevant IS Codes and shall also be such as to produce a dense concrete of the specified proportions and/or strength and consistency that will work readily into position without segregation. mass concrete

#### **1.5.2.2.2 Fine Aggregates - Sand :**

Sand shall consist of siliceous material having hard, strong, durable, uncoated particles, free from undesirable amounts of dust, lumps, soft or flaky particles or other deleterious substances. The amount of different undesirable substances shall not exceed the percentage limits by weight as specified in relevant IS Codes; but in no case, the total amount of all undesirable substances shall exceed 5% by weight.

Manufactured sand, other than natural sand, conforming to the provision of this Specification may be used under special conditions, if permitted by the Engineer.

Washing of aggregates by approved means shall be carried out, if desired by the Engineer at no extra cost to the Owner.

Coarse and fine sand shall be well graded within the limits by weights as specified in relevant IS Codes. Fineness modulus shall not vary by more than plus or minus 20 percent from that of the approved sample.

#### **1.5.2.3 Water :**

Water shall be clean, fresh and free from organic or other deleterious matters in solution or in suspension in such amounts that may impair the strength or durability of the concrete. Potable water is generally satisfactory.

#### **1.5.2.4 Admixtures :**

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

#### **1.5.2.5 Reinforcement :**

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

- i) Mild steel and medium tensile steel bars and hard drawn steel wire conforming to IS : 432 ; ii)  
Deformed bars conforming to IS : 1139 ;
- ii) Cold twisted steel bars conforming to IS : 1786 and
- iv) Structural steel sections conforming to IS : 226 or IS : 2062.



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

#### **1.5.2.6 Form work :**

Form work shall be composed of steel and/or best quality shuttering wood of non-absorbent type. Timber shall be free from knots and shall be of medium grain as far as possible. Hard wood shall be used as caps and wedges under or over posts. Ply-wood or equivalent shall be used where specified to obtain smooth surfaces for exposed concrete work. Struts shall generally be mild steel tubes, and strong sal ballahs 150 mm in diameter or above. Bamboos, small diameter ballahs etc. shall not be used unless approved by the Engineer in specific cases.

#### **1.5.3 STORAGE OF MATERIALS :**

All materials shall be so stored as to prevent deterioration or 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 the Engineer, shall not be used for concrete and shall be removed from site immediately, failing which, the Engineer shall be at liberty to get the materials removed and the cost thereof shall be realised from the Contractor's dues.

#### **1.5.4 GRADES OF CONCRETE :**

General :

Concrete shall be either ordinary or controlled and in grades designated as M-15, M-20 etc., as specified in IS : 456. Lean concrete shall be 1:4:8 mix with aggregate of nominal size 40 mm maximum or as indicated in drawings or other contract documents.

##### **1.5.4.1 Ordinary Concrete :**

Ordinary concrete is recommended only when accurate control is impracticable and not necessary. However, if ordinary concrete is allowed by the Engineer, it shall be used only in the concrete of grades M-15 and M-20. Ordinary concrete does not require preparation of trial mixes.

1.5.4.1.1 Concrete mix proportions for ordinary concrete shall be as per IS : 456 and as follows :

**TABLE – I**  
( *CONCRETE MIX PROPORTIONS AND STRENGTH REQUIREMENTS* )  
**ORDINARY CONCRETE**

<i>Grade of Concrete</i>	<i>Total quantity of dry aggregates by volume per 50 Kg. of cement to be taken as the sum of individual volumes of fine &amp; coarse aggregates (Max.)</i>	<i>Proportion of fine Aggregates to Coarse Aggregates</i>	<i>Quantity of water per 50 Kg. of cement (max.)</i>
M-15	220 Litres	Generally 1:2 for fine aggregates to coarse aggregates by volume but subject to an upper limit of 1 : 1.5 and a lower limit of 1:3	32 Litres
M-20	160 Litres		30 Litres
M-25	100 Litres		27 litres

(NOTE : Regarding explanation to the above mix proportions, refer to Table - III of IS : 456).

1.5.4.1.2 In proportioning concrete the quantity of cement shall be determined by actual weight. The quantities of fine and coarse aggregates may be determined by volume, but preferably by weight. If the aggregates are moist, allowance shall be made for bulking in case of volume batching and in accordance with IS : 2386 (Part-III). Allowance shall also be made for surface water present in the aggregates when computing the water content. The amount of surface water shall be determined by one of the field methods described in IS : 2386 (Part-III). All the above data shall be maintained properly to satisfaction of the Engineer.

1.5.4.1.3 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 Contractor for use of the extra cement.

1.5.4.1.4 If ordinary 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 to obtain a specified strength at no extra cost to the owner. This richer mix shall continue until the Engineer instructs otherwise.

1.5.4.1.5 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.

**1.5.4.2 Controlled concrete :**

Controlled concrete shall be used on all concrete works, except where specified otherwise. Controlled concrete for use in plain and reinforced concrete structures shall be in grades M-15, M-20, M-25 etc.

1.5.4.2.1 The mix proportions for all grades of concrete shall be designed to obtain strengths corresponding to the values specified hereinafter for respective grades of concrete. Preliminary tests, as specified in the I.S. code and required by the Engineer, shall be carried out sufficiently ahead of the actual commencement of the work with different grades of concrete made from representative samples of aggregates and the water-cement ratio required to produce a concrete of specified strength and desired workability.

1.5.4.2.2 As a guide to perform the mix design properly, the relationship between water-cement ratio, aggregate to cement ratio, workability and strength of concrete are furnished in Table-II below :

**TABLE - II***(FOR GUIDANCE ONLY) MIX*

PROPORTIONS (BY WEIGHT) EXPECTED TO GIVE DIFFERENT  
DEGREES OF WORKABILITY WITH DIFFERENT WATER-  
CEMENT RATIOS AND A SPECIFIED STRENGTH

Workability	Water/ Cement Ratio	Compressive Strength in Cylinder 28 days Kg/cm <sup>2</sup>	Ratio by weight of cement to crushed stone aggregate		Ratio by weight of cement to gravel aggregate	
			20mm	40mm	20mm	40mm
Very slump 0-25 mm	0:04	360	01:04.5	01:05.0	01:04.5	01:05.0
	0:05	290	01:06.5	01:07.4	01:06.5	01:07.4
	0:06	220	01:07.8	01:08.4	01:07.8	01:08.4
	0:07	160	01:08.7	01:08.9	01:08.7	01:08.9
Low slump 25-50 mm	0:04	360	01:03.5	01:04.0	01:03.5	01:04.0
	0:05	290	01:05.0	01:05.5	01:05.0	01:05.5
	0:06	220	01:06.3	01:07.0	01:06.3	01:07.0
	0:07	160	01:07.4	01:08.0	01:07.4	01:08.0
Medium Slump 50- 100 mm	0:04	360	01:03.1	01:05.6	01:03.1	01:05.6
	0:05	290	01:04.2	01:05.0	01:04.2	01:05.0
	0:06	220	01:05.2	01:06.2	01:05.2	01:06.2
	0:07	160	01:06.2	01:07.0	01:06.2	01:07.0
High slump 100-175 mm	0:04	360	01:02.5	01:03.3	01:02.5	01:03.3
	0:05	290	01:03.9	01:04.6	01:03.9	01:04.6
	0:06	220	01:04.7	01:05.7	01:04.7	01:05.7
	0:07	160	01:05.5	01:06.5	01:05.5	01:06.5

Notwithstanding anything mentioned hereinbefore, the maximum total quantity of aggregates by weight per 50 Kg of cement shall not exceed 450 Kg except where otherwise specifically permitted by the Engineer. 1.5.4.2.3 low The minimum cement content for each grade of concrete shall be as per latest BIS/ IS /CPWD/ NBO code of practice :

1.5.4.2.4 At least 4 trial batches are to be made and 7 test cylinders taken for each batch noting the slump on each mix. These cylinders shall then be properly cured and two cylinders for each mix shall be tested in a testing laboratory approved by the Engineer at 7 days and others at 28 days for

obtaining the ultimate compressive strength. The test reports shall be submitted to the Engineer. The cost of the mix design and testing shall be borne by the Contractor. On the basis of the preliminary test reports for trial mix, a proportion of mix by weight and water-cement ratio will be approved by the Engineer, which will be expected to give the required strength, consistency and workability and the proportions so decided for different grades of concrete shall be adhered to during all concreting operations. If, however, at any time, the Engineer feels that the quality of materials, being used has changed from those used for preliminary mix design, the Contractor shall have to run similar trial mixes to ascertain the mix proportions and consistency. It will be within the competency of the Engineer to reduce the number of trial batches and then number of test specimens mentioned above. Further, the Engineer can also allow adoption of the mixes already tried and found satisfactory, with similar materials, for other jobs at the same site, without any fresh design of the mix.

The mixes once approved must not be varied without prior approval of the Engineer. Should however, the Contractor anticipate any change in the quality of future supply of materials than that has been used for preliminary mix design, he shall inform the same to the Engineer and bring fresh samples sufficiently ahead to carry out fresh trial mixes.

If permitted by the Engineer, Contractor may test concrete cube specimens in place of cylinder specimens.

1.5.4.2.5 In designing the mix proportions of concrete, the quantity of both cement and aggregate shall be determined by weight. The Engineer may allow the quantity of aggregates to be determined by equivalent volume basis after the relationship between the weight and volume is well established by trial and the same shall be in calibrated tanks or weighed. All measuring equipment shall be maintained in a clean and serviceable condition, and their accuracy periodically checked.

1.5.4.2.6 To keep the water-cement ratio to the designed value, allowance shall be made for the moisture contents in both fine and coarse aggregates and determination of the same shall be made as frequently as directed by the Engineer. The determination of moisture contents shall be according to IS:2386 (Part-III).

#### **1.5.5 STRENGTH REQUIREMENTS :**

1.5.5.1 Where ordinary portland cement conforming to IS : 269 or Portland blast furnace slag cement conforming to IS : 455 is used, the compressive strength requirements for various grades of concrete shall be as shown in Table - IV

hereinafter. Where rapid hardening Portland cement is used, the 28 day compressive strength requirements specified in Table-IV shall be met in 7 days. The strength requirements specified in Table-IV shall apply to both controlled concrete and ordinary concrete.

- 1.5.5.2 The acceptance of strength of concrete shall be as per Clause 5.4 'Sample size and Acceptance Criteria' of IS : 456, subject to stipulations and/or modifications stated elsewhere in this specification.
- 1.5.5.3 Concrete work found unsuitable for acceptance shall have to be dismantled and replacement to be done as per specification by the contractor. No payment for the dismantled concrete, the relevant formwork and reinforcement, embedded fixtures etc. wasted in the dismantled portion shall be made. In the course of dismantling, if any damage is done to the embedded items or adjacent structures, the same shall be made good free of charge by the Contractor to satisfaction of the Engineer.
- 1.5.5.4 Compressive strength requirement for different grades of concrete as specified in Table - IV with reference to 15 cm diameter x 30 cm high cylinder specimen or 15 cm x 15 cm x 15 cm cube specimen, as the case may be, shall have to be satisfied. Requirements for preliminary tests and works tests are specified separately.

**TABLE - IV STRENGTH REQUIREMENTS  
OF CONCRETE**

Min. compressive strength at 28-days after mixing conducted in accordance with IS : 456 ( In Kg/cm <sup>2</sup> )				
Grade of Concrete	For 15cm diameter x 30cm high cylinder specimen		For 15cm x 15cm x 15 cm cube specimen	
	Preliminary Test	Works Test	Preliminary Test	Works Test
M - 15	160	120	200	150
M - 20	208	160	260	200
M - 25	256	200	320	250

Other requirements of concrete strength as may be desired by the Engineer shall be in accordance with Indian Standard IS : 456.

- 1.5.5.5 In exceptional circumstances, the Engineer may accept a concrete of lower strength than specified and which is otherwise unacceptable according to the 'Acceptance Criteria' of IS : 456, provided the strength is never less than 80% of the specified strength. All concrete having a strength less than 80% of that specified shall always be rejected.

With permission of the Engineer, for any of the above mentioned grades of concrete, if the water has to be increased in special cases, cement shall also be increased proportionately to keep the ratio of water to cement same as

adopted in trial mix design for each grade of concrete. No extra payment for the additional cement will be made.

#### 1.5.6 WORKABILITY :

1.5.6.1 The workability of the concrete shall be checked at frequent intervals by slump test. Where facilities exist and if required by the Engineer, alternatively, the compacting factor test in accordance with IS : 1199 shall be carried out.

1.5.6.2 The degree of workability necessary to allow the concrete to be well consolidated and to be worked into the corners or formwork and round the reinforcement to give the required surface finish shall depend on the type and nature of structure and shall be based on experience and tests. The preferred limits of consistency for various type of structures, are as specified in the following Table - V :

**TABLE - V : LIMITS OF CONSISTENCY**

Degree of workability	Slump in mm with standard cone as per IS : 1199		Use for which concrete is suitable
	Min.	Max.	
Very low	0	25	Vibrated concrete in roads or other large sections.
Low	25	50	Mass concrete foundations without vibration, simple reinforced sections with vibration.
Medium	50	100	Normal reinforced wall without vibration and heavily reinforced section with vibration.
High	100	150	Sections with congested reinforcement not normally suitable for vibration.

(Note : Notwithstanding the above, the slump to be obtained for work in progress shall be as per direction of the Engineer).

#### 1.5.8 WORKMANSHIP :

General :

All workmanship shall be according to the latest and best possible standards.

Before starting a pour the contractor shall obtain the approval of the Engineer in a 'Pour card' maintained for this purpose. He shall obtain complete instructions about the material and proportion to be used, slump workability, quantity of water per unit of cement, number of test cylinders to be taken, type of finishing to be done, any admixture to be added etc.

##### 1.5.8.1 Concrete :

###### 1.5.8.1.1 Mixing of Concrete :

The proportions of fine and coarse aggregate, cement and water shall be as determined by the preliminary tests or according to fixed proportions in case of ordinary concrete and shall always be approved by the Engineer. The quantities of

fine and coarse aggregates shall be determined as specified hereinbefore. The quantity of cement shall always be determined by weight. The water shall be measured accurately after giving proper allowance for surface water present in the aggregate for which regular check shall be made by the Contractor. Due allowance shall be made for bulking in case of volume hatching in accordance with IS : 2386 (Part - III).

Concrete shall always be mixed in a mechanical mixer unless specifically approved by the Engineer for concrete to be used in unimportant structures. The water shall not be poured into the drum of the mixer until all the cement and aggregates constituting the batch are already in the drum and mixed for at least one minute. Mixing of each batch shall be continued until the mix is uniform in colour and consistency, but in no case shall mixing be done for less than two (2) minutes and at least forty (40) revolutions after all the materials and water are in the drum. When absorbent aggregates are used or when the mix is very dry, the mixing time shall be extended as may be directed by the Engineer. Mixers shall not be loaded above their rated capacity as this prevents thorough mixing.

The entire contents of the drum shall be discharged before the ingredients for the next batch are fed into the drum. No partly set remixed or excessively wet concrete shall be used and it shall be immediately removed from site. Each time the work stops, the mixer shall be thoroughly cleaned and when the next mixing commences, the first batch shall have 10% additional cement at no extra cost to the Owner to allow for loss in the drum.

When hand mixing is permitted by the Engineer for concrete to be used in unimportant structures it shall be carried out on a water tight platform and care shall be taken to ensure that mixing is continued until the mass is uniform in colour and consistency. In case of hand mixing, extra cement @ 10% shall be added to each batch at no extra cost to the Owner.

#### **1.5.8.1.2 Conveying Concrete :**

Concrete shall be handled and conveyed from the place of mixing to the place of final laying as rapidly as practicable, by approved means, before the initial setting of the cement starts. Concrete should be conveyed in such a way as will prevent segregation or loss of any of the ingredients. If segregation does

occur during transport, the concrete shall be remixed. During very hot or cold weather, if directed by the Engineer, concrete shall be transported in deep containers which will reduce the rate of evaporation and loss of heat. Conveying equipments for concrete shall be well maintained and thoroughly cleaned before commencement of concrete mixing. Such equipment shall be kept free from set concrete.



#### 1..5.8.1.3 Placing Concrete :

Formwork and reinforcement shall be approved in writing by the Engineer before concrete is placed. The forms shall be well wetted and all shavings, dirt and water that may have collected at the bottom shall be removed before concrete is placed. Concrete shall be deposited in its final position without segregation, re-handling or flowing. The interval between adding the water to the dry materials in the mixer and the completion of the final placing inclusive of compaction of the concrete shall be well within the initial setting time for the particular cement in use or as directed by the Engineer. As far as possible, concreting shall be placed in the formwork by means approved by the Engineer and shall not be dropped from a height or handled in a manner which may cause segregation. Any drop over 180 cm shall have to be approved by the Engineer. Once the concrete is deposited in its final position, it shall not be disturbed.

After the concrete has been placed, it shall be spaded and thoroughly compacted by approved mechanical vibration to a maximum subsidence without segregation and thoroughly worked around reinforcement or other embedded fixtures into the correct form and shape. Vibrators shall not be used for pushing and shovelling concrete into adjoining areas. Vibrators must be operated by experienced men and over-vibration shall not be permitted. Hand tamping in some cases may be allowed subject to the approval of the Engineer. Care must be taken to ensure that the inserts, fixtures, reinforcement and formwork are not displaced or distorted during placing of concrete. No concrete shall be placed in open, while it rains. If there has been any sign of washing of cement and sand, the concrete shall be removed immediately. Suitable precautions shall be taken in advance to guard against rains leaving the fresh concrete unattended. No accumulation of water shall be permitted on or around freshly laid concrete. Slabs, beams and similar members shall be poured in one operation normally. In special circumstances, with the approval of the Engineer, these can be poured in horizontal layers not exceeding fifty (50) cm. in depth. When poured in layers, it must be ensured that the under layer is not already hardened.

Blending of under layer, if any, shall be effectively removed. Moulding, throating, drip course etc. shall be poured as shown on the drawing or as desired by the Engineer. Holes shall be provided and bolts, sleeves, anchors, fastenings or other fixtures shall be embedded in concrete as shown on the approved drawings or as directed by the Engineer. Any deviation therefrom shall be set right by the Contractor at his own expenses as instructed by the Engineer.

#### **1.5.8.1.4 Construction Joints :**

When the work is to be interrupted, the concrete shall be rebated at the joint to such shape and size as may be required by the Engineer or as shown on the drawing. All vertical construction joints shall be made with stop boards, which are rigidly fixed and slotted to allow for the passage of the reinforcing steel. If desired by the Engineer, keys and/or dowel bars shall be provided at the construction joints. In the case of water retaining structures, water stop of approved material shall be provided if so specified on the drawing or desired by the Engineer. Construction joints shall be provided in positions as shown or described on the drawings. Where it is not described, the joints shall be in accordance with the following :

In a column, the joint shall be formed about 75 mm below the lowest soffit of the beams framing into it.

Concrete in a beam shall be placed throughout without a joint, but if the provision of a joint is unavoidable, the joint shall be vertical and at the middle of the span. A joint in a suspended floor slab shall be vertical at the middle of the span and at right angle to the principal reinforcement.

In forming a joint, concrete shall not be allowed to slope away to a thin edge. The locations of construction joints shall be planned by the Contractor well in advance of pouring and have to be approved by the Engineer.

Before fresh concrete is placed, the cement skin of the partially hardened concrete shall be thoroughly removed and surface made rough by hacking, sand blasting, water jetting, air jetting or any other method as directed by the Engineer. The rough surface shall be thoroughly wetted for about two hours and shall be dried and coated with 1:1 freshly mixed cement sand slurry immediately before placing the new concrete. The new concrete shall be worked against the prepared surface before the slurry sets. Special care shall be taken to see that the first layer of concrete placed after a construction joint is thoroughly rammed against the existing layer. Cold joints during pour shall be treated with 1:1 freshly made cement sand slurry only after removing all loose materials.

#### **1.5.8.1.5 Protection and Curing of Concrete :**

Newly placed concrete shall be protected by approved means from rain, sun and wind. Concrete placed below the ground level shall be protected from falling earth during and after the placing. Concrete placed in ground containing deleterious substances shall be kept free from contact with such ground or with water draining from such ground during placing of concrete and for a period of at least three days or as otherwise instructed by the Engineer. The ground water around newly poured concrete shall be kept to an approved level

by pumping or other approved means of drainage. Adequate steps shall be taken to prevent floatation or flooding. Steps, as approved by the Engineer, shall be taken to protect immature concrete from damage by debris, excessive loading, vibration, abrasion, mixing with earth or other deleterious materials etc. that may impair the strength and durability of the concrete.

As soon as the concrete has hardened sufficiently for the surface to be marked, it shall be covered either with sand, hessian, canvas or similar materials and kept continuously wet for at least seven (7) days after final setting. This period may be extended, at the discretion of the Engineer, upto fourteen (14) days.

#### **1.5.8.1.6 Control Tests On Concrete :**

For the concrete of a particular specified strength, at least six (6) test cubes/ cylinders for each type of mix. shall be taken by the Contractor for each 8 hours or less work for each medium sized mixing plant. If the volume of concrete poured is less than  $20 \text{ M}^3$  on any day per mixing plant, the Engineer may exempt or reduce the number of test specimens at his discretion based on the test report. The sampling of concrete, making the test specimens, curing and testing procedure shall be as specified in IS : 456. The test specimens shall be 15 cm dia and 30 cm high. The Contractor shall get the specimens tested in a laboratory approved by the Engineer and submit to the Engineer the test results in triplicate within three (3) days of the test. The contractor shall carryout the sampling and testing according to the provisions of this specification at his own cost. No payment shall also be made for the concrete used in specimen.

To control the consistency of concrete from mixing plant, slump tests shall be carried out by the Contractor free of charge every two hours or as directed by the Engineer. The amount of mixing water shall not be changed without approval of the Engineer. Slumps corresponding to the test cylinders shall be recorded for reference.

Before commencing the work or during the progress of the work, the Engineer, if so desires, may order tests to be carried out on cement, sand or coarse aggregates, water, reinforcing steel or transverse tests in accordance with ISI recommendations. The Engineer can suspend the work during the testing of any doubtful material. No claim for any consequent loss arising out of such suspension shall be entertained.

For testing concrete, if permitted by the Engineer, cube specimens may be tested in place of cylinder specimens.

### **1.5.8.2 Reinforcement :**

#### **1.5.8.2.1 Shop Drawings - Bar Bending Schedules :**

The Contractor shall prepare and furnish to the Owner bar bending schedules with working drawings for all R.C.C. work for review by the Engineer.

#### **1.5.8.2.2 Cleaning :**

All steel for reinforcement shall be free from loose scale, oil, grease, paint or other harmful matters immediately before placing the concrete.

#### **1.5.8.2.3 Bending :**

Unless otherwise specified, reinforcing steel shall be bent in accordance with procedure specified in IS : 2502 or as approved by the Engineer. Bends and shapes shall comply strictly with the dimensions in the approved Bar Bending Schedule. Bending schedule shall be re-checked by the Contractor before bending and he shall be entirely responsible for its correctness. Bar Correctly bent shall only be used.

No reinforcement shall be bent, when a position in the work without approval of the Engineer, whether or not it is partially embedded in concrete. Bars shall not be straightened in a manner that will injure the material. Rebending can be done only if approved by the Engineer. Reinforcement bars shall be bent by machine or other approved means producing a gradual and even motion. All the bars shall be cold bent unless otherwise approved. Bending hot at a cherry-red heat (not exceeding 845<sup>0</sup>C) may be allowed in very exceptional cases except for bars whose strength depends on cold working. Bars bent hot shall not be cooled by quenching.

#### **1.5.8.2.4 Placing in Position :**

All reinforcements shall be accurately fixed and maintained in position as shown on the drawings by such approved means as mild steel chairs and/or concrete spacer block. Bars intended to be in contact, at crossing points, shall be securely bound together at all such points by No. 20 G annealed soft iron wire or by tack welding as may be directed by the Engineer. Binders and the like shall tightly embrace the bars with which they are intended to be in contact and shall be securely held. The vertical distance between successive layers of bars shall be maintained by provision of mild steel spacer bars. They should be so spaced that the main bars do not sag perceptibly between adjacent spacers.

Welding by gas or electricity may be permitted by the Engineer under suitable conditions and with suitable safeguards in accordance with relevant Indian

Standards for welding of mild steel bars used in reinforced concrete construction, Butt welding between ends of a bar in a line, whereby stress is transferred across the section may be allowed for mild steel bars only. In the case of bars of mild steel, which have their strength increased by cold twisting (like cold twisted bars), the stress at the weld shall be limited to the strength of mild steel before cold twisting and the additional strength obtained by cold twisting shall be ignored at and near the weld. As a consequence, if any additional steel is required to be provided in the member, it shall be to the Contractor's account.

The placing of reinforcements shall be completed well in advance of concrete pouring. Immediately before pouring, the reinforcement shall be examined by the Engineer for accuracy of placement and cleanliness and necessary corrections as directed by him shall be carried out. The cover for concrete over the reinforcements shall be as shown on the approved drawings unless otherwise directed by the Engineer. Where concrete blocks are used for ensuring the cover and positioning reinforcement, they shall be made of mortar not leaner than one (1) part cement to two (2) parts sand by volume and cured for at least seven (7) days. The sizes and locations of the concrete blocks shall be approved by the Engineer. Laps and anchorage lengths of reinforcing bars shall be in accordance with IS : 456, unless otherwise specified. If the bars in a lap are not of the same diameter, the smaller will guide the lap length. The laps shall be staggered as far as practicable and as directed by the Engineer.

#### **1.5.8.3 FORMWORK :**

##### **1.5.8.3.1 General :**

If it is so desired, the Contractor shall prepare, before commencement of actual work, design and drawings for formwork and centering and get them approved by the Engineer. The formwork shall conform to the shape, lines and dimensions as shown on the drawings.

The centering shall be true and rigid and thoroughly braced both horizontally and diagonally. The forms shall be sufficiently strong to carry without undue deformation, the dead weight of the concrete as a liquid as well as working load. Where the concrete is vibrated, the formwork shall be strong enough to withstand the effects of vibration without appreciable deflection, bulging, distortion or loosening of its components. The joints in the formwork shall be sufficiently tight to prevent any leakage of mortar. The formwork shall be such as to ensure a smooth uniform surface free from honeycombs, air bubbles, bulges, fins and other blemishes,. Any blemish or defect found on the surface of the concrete must be brought to the notice of the Engineer immediately and rectified free of charge as directed by him. To achieve the desired rigidity, tie bolts, spacer blocks, tie wires and clamps as approved by the Engineer shall

be used but they must in no way impair the strength of concrete or leave stains or marks on the finished surface. Where there are chances of these fixtures being embedded, only mild steel or concrete of adequate strength shall be used. Bolts passing completely through liquid retaining walls/slabs for the purpose of acquiring and aligning the formwork should not be used unless effective precautions are taken to ensure water tightness after removal.

For exposed interior and exterior concrete surfaces of beams, columns, and walls, plywood or other approved forms, thoroughly cleaned and tied together with approved corrosion-resistant devices shall be used. Rigid care shall be exercised in ensuring that all columns are plumb and true and thoroughly cross braced to keep them so. All floor and beam centering shall be crowned not less than 8 mm in all directions for every 5 meters span. Unless described on the drawing or elsewhere to the contrary, beveled strips 25 mm by 25 mm shall be provided, without any extra charge, to form angles and in corners of column and beam boxes for chamfering of corners. Temporary openings for cleaning, inspection and for pouring concrete shall be provided at the base of vertical forms and at other places, where they are necessary and as may be directed by the Engineer. The temporary openings shall be so formed that they can be conveniently closed when required and must not leave any mark on the concrete.

#### 1.5.8.3.2 Cleaning and Treatment of Forms :

All forms shall be thoroughly cleaned of old concrete, wood shavings, saw dust, dirt and dust sticking to them before they are fixed in position. All rubbish, loose concrete, Chippings, shavings, saw dust, etc., shall be scrupulously removed from the interior of the forms before the concrete is poured. Along with wire brushes, brooms etc., compressed air jet and/or water jet shall be kept handy for the cleaning, if directed by the Engineer. Before shutter is placed in position, the form surface in contact with concrete shall be treated with approved non-staining oil composition. Care shall be taken that the oil or composition does not come in contact with reinforcing steel or existing concrete surfaces. They shall not be allowed to accumulate at the bottom of the shuttering.

The formwork shall be so designed and erected that the forms for slabs and the sides of beams, columns and walls may be removed first, leaving the shut

tering to the soffits of beams and their supports in position. Re-propping of beams shall not be done except with the approval of the Engineer, and props can be reinstated in anticipation of abnormal conditions. If formwork for col-

umn is erected for the full height of the columns, one side shall be left open and built up in sections as placing of concrete proceeds. Wedges, spacer bolts, clamps or other suitable means shall be provided to allow accurate adjustment of the formwork and to allow it to be removed gradually without jarring the concrete.

#### 1.5.8.3.3 Removal of Forms :

The Contractor shall record on the drawing or in other approved manner, the date on which the concrete is placed in each part of the work and the date on which the formwork is removed there from and have this record checked and countersigned by the Engineer. The Contractor shall be responsible for the safe removal of the formwork, but the Engineer may delay the time of removal if he considers it necessary. Any work showing signs of damage through premature removal of formwork or loading shall be entirely re-constructed without any extra cost to the Owner.

Forms for various types of structural components shall not be removed before the minimum specified days as shown below (Table-VI) which shall also be subject to the approval of the Engineer :

**TABLE - VI**

Parts of Structure		Ordinary Portland Cement Concrete				Rapid Hardening Portland Cement Concrete			
		Temperature				Temperature			
		Above 40°C	40°C to 20°C	20°C to 5°C	Below 5°C	Above 40°C	40°C to 20°C	20°C to 5°C	Below 5°C
		Days	Days	Days		Days	Days	Days	
a)	Columns & walls	2	1	1	Do not remove forms until site cured test cylinders/ cubes develop	1	1.5	1	Do not remove until site cured test cylinders/ cubes develop 50% of 28 days strength
b)	Beams sides	3	2	3		2	1	1	
c)	Slab, 125mm thick or less	10	7	8		7	4	5	
d)	Slab, 125mm thick or less & soffit of minor beams	18	14	16		12	8	9	
e)	Soffit of main beams	24	21	22		14	10	12	

Where exposed surfaces of a concrete can be effectively sealed to prevent loss of water, the periods specified for temperature above 40°C can be reduced to those for the temperature range of 20°C to 40°C subject to approval of the Engineer. Before removing any formwork, the Contractor must notify the Engineer well in advance to enable him to inspect the concrete, if he so desires.

#### 1.5.8.3.4 Tolerance :

The formwork shall be so made as to produce a finished concrete, true to shape, lines, levels, plumb and dimensions as shown on the drawings subject to the following tolerances unless otherwise specified in this specification or drawings or directed by the Engineer.

For :

- |    |                     |   |   |
|----|---------------------|---|---|
| a) | Sectional dimension | - | 5 mm  |
| b) | Plumb               | - | 1 in 1000 of height                         |
| c) | Levels              | - | 3 mm before any deflection has taken place. |

#### 1.5.8.3.5 Re-use of Forms :

Before re-use, all forms shall be thoroughly scraped, cleaned, joints, etc. examined and when necessary repaired and inside surface treated as specified hereinbefore. Formwork shall not be used/re-used, if declared unfit or unserviceable by the Engineer.



### **1.5.8.6 Joints etc.:**

#### **1.5.8.6.1 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.

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

#### **1.5.8.6.2 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.

#### **1.5.8.6.3 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.

#### **1.5.8.6.4 Separation Joints :**

Strong and tough alkathene sheet or equivalent of about 1 mm thickness as approved by the Engineer 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.

#### **1.5.8.6.5 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. 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.

#### 1.5.9.9 Acceptance of Structures :

##### 1.5.9.9.1 Inspection :

Immediately after stripping the formwork, all concrete shall be carefully inspected and any defective work or small defects either removed or made good before concrete has thoroughly hardened.

1.5.9.9.2 In case of doubt regarding the grade of concrete used either due to poor workmanship or based on results of cube strength tests, compressive strength tests of concrete on the basis of Core Test (2.5.9.9.3) and/or Load Test (2.5.9.9.8) may be carried out.

1.5.3.9.6 if the average equivalent cube strength of the cores is equal at least 85 percent of the cube strength of the grade of concrete specified for the corresponding age and no individual core has a strength less than 75%.

1.5.9.9.6 In case the core test results do not satisfy the requirements of 2.5.9.9.6 or where such tests have not been done, Load Test (2.5. 9.9.8) may be resorted to.

##### 1.5.9.10 Code of Practice :

All the works shall conform to relevant IS codes/CPWD/NBO/International Standards. A few of them are mentioned below :

IS : 383	-	Specification for coarse and fine aggregates from natural source for concrete.
IS : 432	-	(All parts) - Specifications for mild steel and medium tensile steel bars and hard-drawn steel wire for concrete reinforcement.
		<i>Part- I : Mild Steel and medium tensile bars.</i>
		<i>Part-II : Hard drawn steel wire.</i>
IS : 456	-	Code of practice for plain and reinforced concrete for general building construction.
IS : 515	-	Specification for natural and manufactured aggregates for use in mass concrete.
IS : 516	-	Methods of tests for strength of concrete.
IS : 1139	-	Hot rolled mild steel and medium tensile steel deformed bars for concrete reinforcement.
IS : 1199	-	Methods of sampling and analysis of concrete.
IS : 1200	-	Method of measurement of building works (All parts)
IS : 1322	-	Specification for bitumen felts for waterproofing and damp proofing.
IS : 1566	-	Specification for hard--drawn steel wire fabric for concrete

		reinforcement.
IS : 1786	-	Specification for cold twisted steel bars for concrete reinforcement.
IS : 1834	-	Specification for hot-applied sealing compounds for joints in concrete.
IS : 2386	-	Methods of test for aggregates for concrete(8 parts)
IS : 2502	-	Code of practice for bending and fixing of bars for concrete reinforcement.
IS : 2751	-	Code of practice for design & construction of pile foundation.
IS : 3067	-	Code of practice of general design details and preparatory work for damp proofing and water proofing of buildings.
IS : 3370	-	(Part-I & II) - Code of Practice for concrete structure for the storage of liquids.
IS : 8041	-	Rapid hardening Portland cement.

## **1.7 FINISH TO MASONRY AND CONCRETE :**

### **1.7.1 SCOPE :**

This specification covers repairing, finishing, curing, testing, protection, maintenance till handing over of finishing items for masonry and concrete.

Before commencing finishing items the Contractor shall obtain the approval of the Engineer regarding the scheduling of work to minimise damage by other trades. He shall also undertake normal precaution to prevent damage of disfiguration to work of other trades or other installations.

### **1.7.2 WORKMANSHIP :**

#### **1.7.2.1 Preparation of Surface :**

All joints in masonry walls shall be raked out to a depth of at least 10 mm with a hooked tool made for the purposes while the mortar is still green. Walls shall be brushed down with stiff wire brush to remove all loose dust from joints and thoroughly washed with water. All laitance shall be removed from concrete to be plastered.

For all types of flooring, skirting and dado work, the base cement concrete slab or masonry surface shall be roughened by chipping and cleaned of all dirt, grease or loose particles by hard brush and water. The surface shall be thoroughly moist to prevent absorption of water from the base course. Any excess of water shall be mopped up.

At any point, the level of base shall be lower than the theoretical finished floor level by the thickness of floor finish. Any chipping or filling to be done to bring the base to the required level shall be brought to the notice of the Engineer and his approval shall be taken regarding the method and extent of rectification work required .

Prior to commencement of actual finishing work, the approval of the Engineer shall be taken as to the acceptability of the base.

#### **1.7.2.2 Plastering :**

##### **1.7.2.2.1 Mortar :**

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. This 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.

##### **1.7.2.2.2 Application of Plaster :**

Plaster, when more than 12 mm 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, however, shall exceed 12 mm in thickness. The lower coat shall be thicker than the upper coat . The overall thickness of the coats shall not be less than the minimum thickness shown on the drawings. The undercoat shall be allowed to dry and shrink before applying the second coat of plaster. The undercoat shall be scratched or roughened before it is fully hardened to form a mechanical key. The method of application shall be 'thrown on ' rather than 'applied by trowel'.

To ensure even thickness and true surface, patches of plaster about 100 mm to 150 mm square or wooden screed 75 mm wide and of the thickness of the plaster shall be fixed vertically about 2000 mm to 3000 mm apart to act as gauges. The finished wall surface shall be true to plumb and the Contractor shall without any extra cost to the Owner make up any irregularity in the brickwork with plaster. All vertical edges of brick pillars, door jambs etc. shall

be chamfered or rounded off as directed by the Engineer. All drips, grooves, mouldings and cornices as shown on drawing or instructed by the Engineer 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 the areas left clean. Any plastering that is damaged shall be repaired and left in good condition at the completion of the job.

#### 1.7.2.2.4 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 approved means. Moistening shall commence as soon as the plaster has hardened sufficiently and not susceptible to damage. Each individual coat of plaster shall be kept damp continuously for at least two days and then dried thoroughly before applying the next coat.

plastered surface shall be saturated with water before application of the lime punning. The punning shall be applied by skilled workmen and given a smooth and even finish free from undulations, cracks etc. and to the satisfaction of the Engineer.

The surface where white washing is to be applied shall be cleaned of all loose materials and dirt. All holes and irregularities 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 top downwards, another from bottom upwards over the first stroke and another from left to right before the previous one dries up. Second coat shall be applied after the first coat dries up completely and similarly third coat shall be applied and in case the Engineer feels that one or more coats are required the contractor shall do so without any extra cost to the owner. No brush marks shall show on the finished surfaces. The inner plastered surfaces of walls shall be given 3 or more coats of white washing.

## **1.16 TECHNICAL SPECIFICATION FOR SOIL INVESTIGATION WORK :**

### **1.16.1 SCOPE :**

This specification is intended to cover the complete soil exploration of the plant area, as elaborated hereunder :

- 1.16.1.1 Making test bores on soil including taking out requisite number of undisturbed samples at different depths for laboratory tests, making standard penetration tests at different depths, recording ground water levels, maintaining driving record, preparation of borehole log for each borehole etc.
- 1.16.1.2 Conducting direct load test including cyclic loading and unloading operations wherever required. (plate bearing load tests).
- 1.16.1.3 Laboratory tests on collected samples for determining natural moisture content, particle size analysis, index properties, wet and dry density, unconfined compression test, shear test by triaxial compression, consolidation tests, permeability tests, swelling pressure etc.
- 1.16.1.4 If rock is encountered, drilling through rock upto 3M or 90% core recovery is obtained, including core recovery and determination of crushing strength of rock samples.
- 1.16.1.5 Direct undisturbed soil sample testing by open trial pit.
- 1.16.1.6 Preparation and submission of a comprehensive soil report with recommendations for type of foundation, allowable bearing capacities for shallow foundation considering shear as well as settlement criteria, method of deep excavation, probable settlement for foundations etc.
- 1.16.1.7 Location of boring for direct load test and open trial pit shall be shown tentatively by the Engineer. Before carrying out the tests prior approval should be taken from the Consultants/Owner regarding the location of any test.
- 1.16.1.8 **RECORDS :**

All field records shall be submitted to the Engineer in duplicate as and when they are recorded during the process of soil investigation.

### **1.16.2 TEST BORING :**

Test boring through different layers of soil shall be carried out by the Contractor at the locations as at such places within the plant area as directed by the Engineer in a manner described below. Depth of boring shall

be 20M or refusal strata, whichever is lesser, below the natural ground level. If the present formation level is above the natural ground with filled up soil, the depth of boring mentioned shall exclude such filled up soil. Various methods of boring are described in IS code of practice IS:1892 (*latest revision*), which may be adopted.

Preferably it shall be auger type boring with boring diameter not less than

150M and should be carried out in such type of soil as found in the site. However, the contractor shall describe in detail the equipment and method of boring he proposes to use. Samples of undisturbed soil shall be obtained preferably at every 1.5M or where a change in strata is indicated but in no case, more than 2M and a sample shall be obtained on the average for every 2 M depth of boring, since it is intended to ascertain the characteristics of the soil at various depths. If, however, there is fair uniformity in the characteristics of the soil of samples stipulated above.

Ground water level for each borehole shall be checked during boring operation and shall be recorded in bore log. The contractor shall maintain a bore log for each soil test boring on an approved proforma. Records of driving the sampler, number of blows and penetration shall be maintained for each bore hole depth-wise. IS: 2131(latest edition) should be followed for additional information. The contractor shall furnish the complete bore log and record of penetration duly verified and signed by the Engineer at site and submit them in duplicate to the Engineer.

#### **1.16.6 REPORT ON SOIL INVESTIGATION :**

The contractor shall make analysis of soil data as collected by him in the field and approved by the Engineer as well as field tests and laboratory tests. A comprehensive report shall have to be prepared by him finally incorporating all the data collected in proper tabular forms or otherwise along-with specific recommendations. The report shall be submitted in sextuplicate to the Engineer for his review and approval.

**1.16.7 I.S CODES :**

All latest relevant IS codes/CPWD/NBO/International Standards shall be followed. A few of them are mentioned below :

IS: 1888 ( <i>latest</i> )	- Method of Load Tests on soils.
IS: 2131 ( <i>latest</i> )	- Standard penetration tests for soils.
IS: 1892 ( <i>latest</i> )	- Site investigation.
IS: 1498 ( <i>latest</i> )	- Classification of soils.
IS: 2720 ( <i>latest</i> )	- Method of test of soils.

**SUB-SECTION-6.2.1 (MECHANICAL)  
DETAILS (DATA SHEET) REQUIRED  
WITH THE OFFER**

The offer must be complete with the following details for correct appreciation of the proposal. The offers will be treated as incomplete and may be passed over if the data as asked for, are not submitted along with the offer.

**1.0 General**

- a) Plant description as envisaged.
- b) System drawings of the plant.
- c) Scope of supply.
- d) List of spares forming part of scope of supply.
- e) Equipment specifications.
- f) Deviations from the NIT, if any.
- g) Manufacturer's printed pamphlet
- h) List of spares for next three years operations.
- i) Any additional alternative provisions.

**2.0 Mechanical****2.1 Crushing Plant****2.1.1 Rock Breaker**

- a) Maximum horizontal reach with breaker.
- b) Maximum vertical reach with breaker.



- c) Swing rotation of Boom.
- d) Minimum head room.
- e) Weight of boom and pedestal.
- f) Total weight of the equipment.
- g) Make, HP of motor etc.
- h) Maker's illustrative pamphlets and literature etc.
- i) Past performance of such equipment along with list of users and details of application.
- j) General arrangement drawing along with broad dimensions
- k) Literature /pamphlet of the manufacturer
- l) Type of rock breaker

## **DATA SHEET (CIVIL)**

### **SUB-SECTION-6.3.1 TECHNICAL INFORMATION TO BE SUPPLIED BY BIDDER**

#### **1.0 Design**

No sub soil data are being provided with the tender documents.

Soil investigation will be carried out before design engineering by the successful tenderer. However, for bidding purposes the tenderer should inspect the site before hand and assess the soil characteristics and its bearing capacity before quoting their rates as per standard practice.

- a. Whether loads for design as per IS code be followed
- b. Whether dynamic forces in machine foundation be considered
- c. Whether weep holes at suitable spacing with adequate boulder or gravel packing, moun will be provided for earth retaining structures.
- d. Whether dewatering due to natural cause during construction be carried out at no extra cost.
- e. Whether excavation will be carried out in all kinds of soil and rock including all lift and lead
- f. Whether surplus excavated earth will be disposed off, at a distance of 2000 m from working area.
- g. During excavation, will be the sides be protected by timber shoring, and shuttering wherever required.
- h. Whether all materials used for construction shall conform to IS code
- i. Will earth filling be done with good quality earth in layers not exceeding 150 mm thick and earth layers be compacted properly
- j. Type of reinforcement steel to be used
- k. Whether arrangement for testing of concrete and construction

materials be done

- l. Type and details of weigh batching equipment to be used.
- m. Details of scheme for curing the concrete at high level
- n. Whether fabrication and erection will be done as per relevant IS code.
- o) Compliance with standards

END OF TENDER DOCUMENT

## **SECTION – 7**

### **PART-III**

# **FORM FOR PRICE BID**

## SECTION - 7

**PROFORMA FOR PRICE BID****PRICE BREAK-UP OF DIFFERENT SUB HEADS FOR  
TURN-KEY EXECUTION****A. SURVEY, SOIL TESTING & DESIGN ENGINEERING COST**

<b>Item No</b>	<b>Sub-heads/ Item description</b>	<b>Quantum of works</b>	<b>Unit price</b>	<b>Amount</b>
1	Detailed survey of the area with in the plant limit & submission of reports	Complete works as per tender document for 5 (five) sites		

**B. Breakup for Supply of Equipments**

<b>Item no</b>	<b>Description</b>	<b>Qty Nos</b>	<b>Unit Price Each</b>	<b>Amount (Rs)</b>
1.	Cost of Equipments consisting of Feeder Breaker,Rock Breaker attachment,Hopper,Operators Cabin,Electrical Motors,Gear Boxes,Power Cables,Control gears/Starters,Control cables,all feed arrangements and any other items which will be required for output capacity of 400TPH, (-)100mm,3dimensional	5		

**C) PRICE BREAK UP FOR CIVIL AND STRUCTURAL WORKS**

<b>S N</b>	<b>SUB HEAD/ ITEM DESCRIPTION</b>	<b>Unit</b>	<b>Qty</b>	<b>Unit rate</b>	<b>AMT</b>
1	<b>DEVELOPMENT WORKS &amp; INFRASTRUCTURE</b> Cost of civil works consisting of construction of retaining walls (Minimum 14 mtr. top finished width),foundations,structural works as required for complete installation of the feeder breaker for output capacity of 400 TPH,(-)100mm,3 dimensional				
	a) Site Development including soil testing	Each	5		
	b) Foundation Work	Each	5		
	c) Retaining Wall Work	Each	5		
	d) Steel Structural Work	Each	5		
	<b>SUB-TOTAL OF 'B' = a+b+c+d</b>				

**D) Breakup of Installation & Commissioning**

Item no	Description	Qty Nos	Unit Price Each	Amount (Rs)
1	Cost of installation, commissioning and trial run for required output of 400TPH, (-)100mm, 3 dimensional	5		

**TABLE OF TOTAL PRICE**

Total Price = A + B + C + D = Rs. \_\_\_\_\_

(in words Rs. ....)

**Instructions :**

1. Bidders are required to quote the quantity, unit price, amount and taxes etc. in the respective column. Unit price should be in word as well as in figure.
2. Quantity should be as per scope defined in the tender document and should cover all the requirement of the system
3. **± 10% clause**  
Based on civil and structural quantities of works as given by the bidder in sub head A, B & C of this proforma, the shortfall in total quantity of all civil and structural works shall be allowed up to 10% only to every individual items. For shortfall of quantities exceeding 10%, there shall be proportional reduction in the price of the individual items resulting the reduction in the award value by the same amount. Contractor should absorb upward variation in quantity of individual items for civil and structural works unless specifically stated otherwise in the document.
4. The above items of work are to be executed strictly as per IS provisions

