



# एचपीसीएल बायोफ्यूल्स लिमिटेड

(हिन्दुस्तान पेट्रोलियम कॉर्पोरेशन लिमिटेड के पूर्ण स्वामित्व वाली सहायक कम्पनी)

## HPCL BIOFUELS LIMITED

(A wholly owned subsidiary company of Hindustan Petroleum Corporation Ltd.)

पंजीकृत कार्यालय : प्रथम मंजिल, श्री सदन, प्लॉट न. 09, पाटलीपुत्र कॉलोनी, पटना-800013, बिहार

Regd. Office : 1st Floor, Shree Sadan, Plot No.09, Patliputra Colony, Patna-800013, Bihar

दुरभाष / Telephone : 0612 - 2260185 / 2270483, Website : www.hpclbiofuels.co.in, CIN - U24290BR2009GOI014927

### TENDER ENQUIRY (Unpriced BID)

### तकनीकी बीड

(This is only a Price Enquiry not a Purchase Order)

**From: (Name & Address to be written below by the tenderer)**

To,

M/s _____ _____ _____ _____ _____ _____
--

**Tender No: HBL/TEN/PUB/20-21/227**

**Tender Date: 06.02.2021**

**Direct Queries Related to Sugauli**

**To: ABHISHEK KUMAR SINGH**

**Designation: PROJECT- ENGINEER**

**Mobile No:- +917277705022**

**Title : Bid for the supply, delivery, installation and commissioning of the goods, materials and equipment for EPC of modernization of existing evaporation suitable for raw spent wash treatment to achieve 60% w/w solids, UF followed by UV for existing CPU and add on equipment in fermentation section & balance of plant for their proposed Incineration Boiler with STG project at village Lauriya West Champaran, Bihar on Engineering, Procurement and Commissioning basis.**

**Tender (Technical & unpriced commercial bid and priced bid) to be received on or before 05/03/2021 by 1430 Hrs at the address mentioned below.**

Tenders are to be dropped in the designated tender box at the address mentioned below. In situation where the tenders are big which cannot be dropped in the box or where the specific tender boxes are not available, tenders are to be submitted with the concerned purchasing authority at the following address.

**HPCL Biofuels Limited.  
1St Floor, Shree Sadan,  
Plot No. 09, Patliputra Colony,  
Patna, Bihar - 800013.**

**Tender received after due date and time due to whatever reasons will be rejected.**

Signature and Seal of the Bidder

HBL/TEN/PUB/20-21/227 dated 06.02.2021

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(COMMERCIAL & TECHNICAL UNPRICE BID)

1. For any grievance related issue, queries to be sent to Grievance Redressal cell of HPCL Biofuels Limited (HBL) at above address.
2. All unit rates in **Indian Rupees** ( Specify currency)

**Prebid meeting for above EPC Package will be held on February 17, 2021, 03:00 pm at MITCON Pune Office, following address:**

**MITCON Consultancy & Engineering Services Limited  
Kubera Chambers, Shivajinagar, Pune 411005**

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**SECTION I- COMMERCIAL EPC BID FOR MODERNIZATION OF EXISTING  
EVAPORATION WITH BOP**

## I. INSTRUCTION TO BIDDERS

### 1. Scope

- 1.1 M/s HPCL Biofuels Ltd, Sugauli (hereinafter referred to as the PURCHASER) wishes to receive the Bid for the supply, delivery, installation and commissioning of the goods, materials and equipment (such goods, materials and equipment hereinafter referred to as the goods) for EPC of modernization of existing evaporation suitable for raw spent wash treatment to achieve 60% w/w solids, UF followed by UV for existing CPU and add on equipment in fermentation section & balance of plant for their proposed Incineration Boiler with STG project at village Lauriya West Champaran, Bihar on Engineering, Procurement and Commissioning basis.
- 1.2 All bids are to be completed and returned to the **PURCHASER** in accordance with these instructions to **BIDDERS**.
- 1.3 Before submitting the offer, the **BIDDERS** are advised to inspect the site and the environment and be well acquainted with the actual working and other prevalent conditions, facilities available, position of material and labour. No claim will be entertained later on the ground of lack of knowledge.

### 2. Cost of bidding

- 2.1 The **BIDDER** shall bear all costs associated with the preparation of the bid. **PURCHASER / CONSULTANT** will, in no case, be responsible or liable for such costs, regardless of the conduct or outcome of the bidding process.

### 3. Joint Ventures

- 3.1 In the event that the successful **BIDDER** is a joint venture formed of two or more companies, the **PURCHASER** requires that the parties to the joint venture accept liability jointly and severally for all obligations under the contract.

### 4. Assurance

The successful **BIDDER** will be required to give satisfactory assurance of its ability and intention to supply the goods and services pursuant to the contract, within the time set forth therein.

### 5. Bidding Documents

- 5.1 The required goods and services, bidding procedures and contract terms are prescribed in this volume I of the bidding documents. The volume II of the bidding documents gives the technical specification, data sheets and the drawings according to which the equipment is to be designed, manufactured and erected. The Appendix I in volume - I of the bidding documents gives bid form and price schedule to be filled up and submitted along with the offer by the Supplier.
- 5.2 **BIDDERS** shall carefully study all sections of these bidding documents and shall clearly indicate in the schedule of deviations, all deviations from technical specification as well as those from general terms and conditions. If no deviation is indicated in the schedule of deviations or except

for the deviations indicated, it will be understood that in all other aspects, the offer conforms to the specification and the PURCHASER reserves the right to evaluate the bid as such without any further reference to the BIDDER.

- 5.3 If the **BIDDER** indicates any comment on this specification in their bid, the same will not be accepted. No extra claims on account of the lack of understanding of the clauses/articles on the part of the **BIDDER** will be entertained by the **PURCHASER** after the award of contract.
- 5.4 **BIDDERS** shall furnish all the data/information called for in the various schedules in Volume II, more specifically the provided data sheets in soft and hard versions failing which the bid will be considered as incomplete and non-responsive and the **PURCHASER** reserves the right to reject the bid.

## **6 Clarification on bidding documents**

- 6.1 In case, any clarification is required, the **BIDDER** shall obtain the same from the **PURCHASER/CONSULTANT** in writing by E-mail so as to ensure submission of bid on or before the bid closing date. All such clarifications shall be binding both on the **PURCHASER** and the **BIDDERS**.
- 6.2 All communications seeking clarification shall be sent to the **CONSULTANTS with copy to PURCHASER**.
- 6.3 Written copies of the **PURCHASER's/ CONSULTANT's** response (including an explanation of the query, but without identifying the source of the enquiry) will be sent to all prospective **BIDDERS** who have been issued the bid documents.

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

- 7.1 At any time prior to the deadline for submission of bid, the **PURCHASER** may, for any reason, whether at their own initiative or in response to a clarification requested by a prospective **BIDDER**, modify the bidding documents by amendment through corrigendum which will be hosted on the HBL Website
- 7.2 The amendment shall be part of the bidding documents and will be notified in writing or by E-Mail to all prospective **BIDDERS** who have received the bidding documents, and will be binding on them. **BIDDERS** will be required to acknowledge receipt of any such amendment to the bidding documents.
- 7.3 In order to afford prospective **BIDDERS** reasonable time in which to take the amendment into account in preparing their bid, the **PURCHASER** may, at their discretion, extend the deadline for the submission of bid.

## **8. Language of the bid**

The bid prepared by the **BIDDER** and all correspondence and documents relating to the bid exchanged by the **BIDDER** and **PURCHASER/CONSULTANT**, shall be written in the English language, provided that any printed literature furnished by the **BIDDER** though written in another language, shall be accompanied by an English translation in which case, for purpose of interpretation of the bid, the Signature and Seal of the Bidder



English translation shall govern.

## 9 Qualification of BIDDERS

- 9.1 Only **BIDDERS** who have previous experience in the work of this nature and description detailed in this tender specification are expected to quote for this work, duly detailing their experience along with the offer. Offers from **BIDDERS** who do not have proven and established experience in the field are not likely to be considered.
- 9.2 The documentary evidence of the **BIDDER's** qualifications to perform the contract if the bid is accepted shall be established to the **PURCHASER's** satisfaction.
- 9.3 In the case of a **BIDDER** offering to supply goods under the contract which the **BIDDER** does not manufacture, the **BIDDER** shall have been duly authorized by the good's manufacturer, to supply and service the goods in India.
- 9.4 In the case of a **BIDDER** where a collaborator is associated with this bid, the bid shall be accompanied by a document addressed to the **PURCHASER** and signed by the collaborator declaring the collaboration agreement.
- 9.5 In addition to the above, to be eligible for the award of the contract, all of the following basic criteria shall be fulfilled. Performance of such installations shall be satisfactory and necessary documentary evidence to prove this shall be submitted along with the bid.
  - 9.5.1 The **BIDDERS** should have designed, engineered, supplied, erected and commissioned minimum of two (2) complete modernization of Evaporation unit suitable for raw spent wash treatment to achieve 60% W/W solids along with UF followed by UV for existing CPU & add on equipment in Fermentation section & BoP for 60KLPD or above capacity distillery/ ethanol project and the same projects should be in satisfactory operation for a minimum period of two (2) years.

## 10. Previous Experience

- 10.1 A statement giving particulars, duly supported by documentary evidence of the various services rendered for similar work by the **BIDDER** indicating the particulars and value of each work, the site location and the duration and date of completion and also such work that are under progress shall be submitted by the **BIDDERS** along with their offers.
- 10.2 Bidder to submit duly signed original completion certificate from principal client for similar job, work order contract copy and payment proof from the Principal client for establishing credentials of the party.

## 11 Documents Comprising the Bid

- 11.1 The bid prepared by the **BIDDER** shall comprise of the following:
  - a) Completed bid form and with complete technical details including the data sheets and all schedules completed in accordance with the requirement of volumes - I and II.
  - b) Documentary evidence established to the requirement of the relevant clause that the **BIDDER** is qualified to perform the contract if the bid is accepted.

11.2 The bid prepared by the **BIDDER** shall be in two (2) parts.

Part - I -Technical & Unpriced Commercial Bid

Part - II -Price Bid

Part III- EMD

### 11.3 PART - I -TECHNICAL & UNPRICED COMMERCIAL BID

Technical bid shall indicate the following to the extent applicable:

- a) **BIDDER's** confirmation that the goods and ancillary services to be supplied by the **BIDDER** conform to the bidding documents.
- b) Complete scope of supply supported by documents, brochures, standards, catalogue etc. as applicable.
- c) List of spare parts for the erection and commissioning of all systems and equipment.
- d) List of spare parts for operation and maintenance,
- e) List of maintenance tools and tackles.
- f) Layout drawings and sketches with dimensions of equipment and indicating limits of supply.
- g) Nature of maintenance assistance available / offered by **BIDDER**.
- h) Delivery schedule and place of manufacture.
- i) Reference list of customers using similar equipment and materials.
- j) Complete filled up data sheets (to be submitted in given format in word / excel soft copy on provided email id's),
- k) Training facilities offered.

Unpriced Commercial Bid shall indicate the following:

- a) Terms of Payment as per tender.
- b) Confirmation that firm prices have been quoted.
- c) Port/place of shipment.
- d) Statement that all taxes and duties levied by the exporting country, if any are included.
- e) Acceptance of general terms and conditions of the purchase.
- f) Confirmation that validity of bid for 90-days and 120-days for spares from the price bid opening date.
- g) Information requested under Clause - 9.
- h) No deviation letter.

### 11.4 PART - II -PRICE BID

Signature and Seal of the Bidder **HBL/TEN/PUB/20-21/227 dated 06.02.2021**

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(COMMERCIAL & TECHNICAL UNPRICE BID)

Should cover the bid price and other related costs, in the provided format.

#### 11.5 PART – III- EMD

EARNEST MONEY DEPOSIT (EMD) of **Rs 4, 00,000** in form of account payee crossed Demand Draft, drawn in favor of HPCL Biofuels Ltd. payable at Patna of any schedule bank (Co-operative not acceptable). Tender without the valid EMD, will not be considered for evaluation. SSI/NSIC/MSME registered vendor shall be exempted from EMD. However, vendor has to submit/enclosed the supporting documents

### 12 Price and Rates

- 12.1 The price to be quoted by the **BIDDERS** shall be in Indian rupees and the quotation shall be in accordance with the requirement of the relevant schedules in the bid specification. The price shall be separately for basic price, taxes and duties as called for elsewhere in this specification.
- 12.2 The prices quoted shall be for complete supply, inspection, packing and forwarding, freight and transit insurance, port clearances, statutory fees payable, unloading at site, erection, commissioning and testing of equipment which will include all the required procurement and allied activities for completion of the job in all aspect and handing over the same to the **PURCHASER**.
- 12.3 Indigenous **BIDDERS** shall arrange for their own required licenses and foreign exchange, if imported components are considered in the equipment supply.

### 13 Validity and Firm Price

- 13.1 The prices quoted by the **BIDDERS** shall be kept open and valid for acceptance for a minimum period of ninety (90) days from the date of opening of the offers. The quotation shall be for the entire scope of work on the '**FIRM PRICE**' basis. No escalation whatsoever is acceptable. The quotations not on the basis of '**FIRM PRICE**' will be treated as non-responsive and they run the risk of rejection.
- 13.2 Prices shall be written in both words and figures. In the event of difference, the prices in words shall be valid and binding. Unit prices shall be considered correct in the event of any discrepancy with regard to the total price.

### 14. Format and Signing of Bid

- 14.1 The original bid form and accompanying documents clearly marked “Original”, must be received by the **PURCHASER / CONSULTANT** at the date, time and place specified, pursuant to clauses-15 and 16. In the event of any discrepancy between the original and the copies, the original shall govern.
- 14.2 The original and all copies of the bid shall be typed or written in indelible ink and shall be signed by the **BIDDER** or a person or persons duly authorized to sign on behalf of the **BIDDER**. Such authorization shall be indicated by written power-of-attorney accompanying the bid.

All pages of the bid, except for un amended printed literature, shall be initialed by the person or persons signing the bid. The name and position held by each person signing must be typed or printed below the signature.

The bid shall contain no interlineations, erasures or overwriting except as necessary to correct errors and such corrections shall be initialed by the person or persons signing the bid.

## 15 Sealing and Marking of Bid

15.1 The **BIDDERS** are requested to prepare their offers in one (1) original and one (1) copy and shall submit in 2 sealed envelopes to the Purchaser's address.

**One additional copy of the technical & unpriced commercial bid shall be addressed to the Consultant and submit at the Consultant's email address (in soft copy format only) as given in project information.**

15.1.1 **The first envelope** should contain three (3) sets (One original and two copies) of technical bid and two (2) sets (One original and one copy) of unpriced commercial bid, no deviation letter, and documents for eligibility. This envelope should be clearly marked **"Technical & Unpriced Commercial Bid"** and shall be addressed to the **PURCHASER at the address given in project information (both soft & hard copy)**

15.1.2 **The second envelope** should contain one original copy of price bid and should be clearly marked as **"PRICE BID"** and shall be addressed to the registered / site office of **PURCHASER only (hard copy only)**

15.1.3 **The third envelope** should contain **Original EMD of Rs 4 Lakhs** in form of account payee crossed Demand Draft, drawn in favor of HPCL Biofuels Ltd. payable at Patna of any schedule bank (Co-operative not acceptable). It should be clearly marked as **"EMD"** and shall be addressed to the registered / site office of **PURCHASER only (Hard copy only)**

15.1.4 All the envelopes shall bear the title, "Modernization of existing Evaporation system with BoP, Project enquiry number, bid closing date and brief description of the contents".

15.1.5 The name and address of the **BIDDER** shall be clearly marked on the envelope to enable the bid to be returned unopened in case it is declared "late".

15.2 If the envelopes are not sealed and marked as required in this clause, as the case may be, the **PURCHASER** will assume no responsibility for the bid's misplacement or premature opening.

## 16 Deadline for Submission of Bid

16.1 **The original TECHNICAL & UNPRICED COMMERCIAL BID and PRICE BID with EMD** together with the required copies, must be received by the **PURCHASER, not later than March 5, 2021, 14:30 Hrs** Also, soft copy (word or excel file) of duly filled technical data sheets to be submitted on the given email id of Consultant / Purchaser within informed time limit.

16.2 The **PURCHASER** may, at their discretion, extend the deadline for the submission of bid by amending the bidding documents, in which case all rights and obligations of the **PURCHASER** and **BIDDERS** previously subject to the deadline will thereafter be subject to the deadline as extended.

## 17. Late Bid

Any bid received by the **PURCHASER** after the deadline for submission of bid so prescribed by the **PURCHASER**, shall be declared “late”.

## 18 Modification and Withdrawal of Bid

- 18.1 The **BIDDER** may modify or withdraw the bid after submission of bid, provided that written notice of the modification or withdrawal is received by the **PURCHASER** prior to the deadline prescribed for submission of bid.
- 18.2 The **BIDDER's** modification or withdrawal notice shall be prepared, sealed, marked and dispatched in accordance with the provisions of clause-15. A withdrawal notice may also be sent by E-mail but must be followed by a signed confirmation copy.
- 18.3 No bid shall be modified subsequent to the deadline for submission of bid.
- 18.4 No bid shall be withdrawn in the interval between the deadline for submission of bid and the expiration of the period of bid validity specified by the **BIDDER** on the bid form.

## 19. Acceptance / rejection of quotation

- 19.1 The acceptance / rejection of the bid will rest with the **PURCHASER** who do not bind themselves to accept the lowest bid or any bid and reserve to themselves the full rights for the following without assigning any reason whatsoever.
  - To reject any or all of the bids.
  - To split up the work amongst two or more **BIDDERS**.
  - To award the work in part.
- 19.2 Conditional and unsigned bids, bids containing absurd or unworkable prices bids which are incomplete and otherwise considered defective and bids not in accordance with the tender conditions and specification, etc., are all liable to be rejected.
- 19.3 If a bidder quits business after the submission of the bid or after the acceptance of their bid, the **PURCHASER** may at their discretion reject such bid. If a partner of a firm exists from business after the submission of the bid or after acceptance of the bid, the **PURCHASER** may cancel such a bid at their discretion unless the firm retains its character.
- 19.4 The successful **BIDDER** should not sub-contract a part of the complete work undertaken by them without written permission from **PURCHASER**. The **BIDDER** on whom the contract is awarded is solely responsible to the **PURCHASER** for the completion of the awarded work.

## 20. Opening of the price Bids by Purchaser

- 20.1 The technical bids will be evaluated with regard to the PQC, scope, terminal points, exclusions and the general technical specifications of all the equipment to be supplied by the **BIDDER** and the qualification of the **BIDDER** to execute the job.
- 20.2 Subsequent to the technical evaluation, the **PURCHASER** will inform the qualified **BIDDERS**

to attend the opening of **Price Bids in the presence of BIDDER's representatives who choose to attend. The venue will be informed at later stage.**

**21. Process to be confidential**

21.1 Information relating to the examination, clarification, evaluation and comparison of bids and recommendations for award of contract shall not be disclosed to the **BIDDERS** or any other persons not officially concerned with such process. Any effort by a **BIDDER** to influence a **PURCHASER's** processing of bids or award decisions may result in the rejection of the **BIDDER's** bid.

**22. Clarification of Bid**

22.1 To assist in the examination, evaluation and comparison of bid, the **PURCHASER/CONSULTANT** may at their discretion, ask the **BIDDER** for a clarification of their bid. All responses to request for clarification shall be in writing and no change in the price or substance of the bid shall be sought, offered or permitted.

**23. Preliminary Examination**

23.1 The **PURCHASER** will examine the bid to determine whether they are complete, whether any computational errors have been made, whether required sureties have been furnished, whether the documents have been properly signed, and whether the bids are generally in order.

23.2 Arithmetical errors will be rectified on the following basis. If there is a discrepancy between the unit price and the total price that is obtained by multiplying the unit price and quantity, the unit price shall prevail and the total cost will be corrected. If there is a discrepancy between the total bid amount and the sum of total costs, the total cost shall prevail and the total bid amount will be corrected.

23.3 Prior to the detailed evaluation, pursuant to clause-23, the **PURCHASER** will determine the substantial responsiveness of each bid to the bidding documents. A substantially responsive bid is one which conforms to all the terms and conditions of the bidding documents without deviation.

23.4 A bid determined as not substantially responsive will be rejected by the **PURCHASER** and may not subsequently be made responsive by the **BIDDER** by correction of the non-conformity.

**24 Conversion to Single Currency**

24.1 To facilitate evaluation and comparison, all the bid prices in the various currencies, shall be converted to Indian rupees, at the selling exchange rate established by the Reserve Bank of India for similar transactions, on the date of opening of the price bid to be decided by the **PURCHASER/CONSULTANT**.

**25 Evaluation and Comparison of Bid**

25.1 The **PURCHASER** will evaluate and compare the bid previously determined to be substantially responsive.

25.2 The **PURCHASER's** evaluation of a bid will take into account, in addition to the bid price, the following factors, in the manner and extent indicated below:

(a) Work schedule offered in the bid;

The **PURCHASER** requires that the goods under the contract shall be delivered, erected and commissioned within Eight (08) months from the date of notification of award. No credit will be given to earlier deliveries.

Bid offering delivery, erection and commissioning more than Eight (08) months will be rejected.

- (b). Deviations in payment schedule from those specified in the conditions of the contract.

25.3 The **PURCHASER / CONSULTANT's** evaluation shall also take into account the following:

- a) **BIDDER's** experience in manufacturing and supply of similar plants for the intended service on the basis of information provided by **BIDDER**. Modernization of Evaporation unit suitable for raw spent wash treatment to achieve 60% W/W solids along with UF followed by UV for existing CPU & add on equipment in Fermentation section & BoP project of similar or larger scope to that required by technical specification should have been in operation satisfactorily for a minimum period of two years in Distillery / ethanol plant installation for project completed within the previous five years. Bid not fulfilling this requirement will not be considered technically acceptable.
- b) Availability in India of spare parts and "after-sale service" for the equipment offered in the bid, for minimum 3 sugar seasons.
- c) The quality and adaptability of equipment offered.
- d) **BIDDER's** guarantees nature of warranties and warranty period.
- e) Willingness to give shop drawings of spare parts and main equipment. –
- f) Confirmation from the sub-vendors that for future supply of spare parts for bought out items, the sub-vendors shall supply such spares directly to the **PURCHASER** as and when **PURCHASER** so requests.

## 26. Notification of Award

- 26.1 Prior to the expiration of the period of bid validity, the **PURCHASER** will notify the successful **BIDDER** by E-mail to be confirmed by letter that their bid has been accepted and this "notification of award" as above will constitute formation of contract".
- 26.2 The successful **BIDDER** on receipt of "notification of award" shall convey his acceptance by return E-mail and to be confirmed by letter within 7-days.
- 26.3 Delivery shall be counted from the date of receipt of this "notification of award".

## 27. Award of contract and purchaser's right to vary quantities at the time of award.

- 27.1 The **PURCHASER** will award the contract to the successful **BIDDER** whose bid has been determined to be substantially most responsive after the final negotiations held with the most competitive **BIDDERS**.
- 27.2 Wherever applicable, the **PURCHASER** reserves the right at the time of award of the contract to

increase or decrease by upto 40% the quantity of goods and services without any change in unit price or other terms and conditions.

- 27.3 Under possible circumstances, the **PURCHASER** reserves the right to split the contract which may result from this enquiry, between two or more **BIDDERS** at the prices accepted.

## **28. Signing of contract**

- 28.1 **PURCHASER** will send the contract to the successful **BIDDER** who, within seven (7) days of its receipt, shall countersign and return it to the **PURCHASER** as a token of unconditional acceptance failing which, the **PURCHASER** has the right to cancel / withdraw the contract.

## **29 Exceptions**

- 29.1 As far as possible, no exception is to be taken by the **BIDDER** to the bid documents including technical specification and terms and conditions of contract. However, unavoidable exceptions, if any, both technical and commercial, are required to be listed and submitted separately, including the applicable cost and time implications. Such exceptions giving the cost implications should be separately enclosed in the priced commercial bid and exceptions should be clearly stated in the unpriced commercial bid with a statement that cost implications have been given in the priced commercial bid. Time schedule implications of exceptions should be given in the unpriced commercial bid. Unless the exceptions are listed separately as explained above, it will be assumed by the **PURCHASER** that **BIDDER** is complying with the bid documents, and no cognizance shall be taken of any exception stated anywhere else in the bid.

## **30 Verification by purchaser**

- 30.1 All statements submitted by **BIDDER** regarding experience, manpower availability, equipment and machinery availability etc., are subject to verification by the **PURCHASER** either before placement of order or after placement of order. If any data submitted by the contractor at the bid stage is found to be incorrect, the offer is liable to be rejected or the contract is liable to be terminated.



**IMPORTANT**

THE OFFER SHALL BE BASED ONLY ON THE TERMS AND CONDITIONS GIVEN IN THESE BID DOCUMENTS. THE BIDDERS ARE ADVISED TO PREPARE THE BIDS COMPLETELY IN LINE WITH THE TENDER REQUIREMENT WITHOUT ANY DEVIATIONS. IN CASE THE BIDDERS NEED ANY CLARIFICATIONS ON THE TENDER DOCUMENTS, THEY ARE ADVISED TO CONTACT THE PURCHASER & CONSULTANT OR GET THEIR POINTS CLARIFIED BEFORE THE SUBMISSION OF THE BIDS. THE OFFER OF ANY BIDDER GIVING THEIR OWN SEPARATE SET OF TECHNICAL AND COMMERCIAL TERMS AND CONDITIONS WILL BE CONSIDERED AS NONRESPONSIVE AND REJECTED.

BIDDERS SHOULD ENCLOSE THE PROFORMA FOR PERFORMANCE STATEMENT AS PER THE FORMAT GIVEN IN IN THIS DOCUMENT, TO GET QUALIFIED

## II. TERMS & CONDITIONS FOR THE SUPPLY CONTRACT

### 1. GENERAL CONDITIONS OF CONTRACT FOR SUPPLY

#### 1.1 Use of Contract documents and information

- 1.1.1 The **SUPPLIER** shall not, without the **PURCHASER**'s prior written consent, disclose the contract, or any provision thereof, or any specification, drawing, pattern, sample or information furnished by or on behalf of the **PURCHASER** in connection therewith, to any person other than a person employed by the **SUPPLIER** in the performance of the contract. Disclosure to any such employed person shall be made in confidence and shall extend only so far as may be necessary for purposes of such performance.
- 1.1.2 The **SUPPLIER** shall not, without the **PURCHASER**'s prior written consent, make use of any document or information specified in clause-1.1.1 above, except for purposes of performing the contract.
- 1.1.3 Any document other than the contract itself, specified in clause-1.1.1 above, shall remain to be the property of the **PURCHASER** and shall be returned (in all copies) to the **PURCHASER**, on completion of the **SUPPLIER**'s performance under the contract, if so required by the **PURCHASER**.

#### 1.2 Change orders

- 1.2.1 The **PURCHASER** may at any time, by written notice to the **SUPPLIER**, make changes within the general scope of the contract.
- 1.2.2 Upon notification by the **PURCHASER** of such change, the **SUPPLIER** shall submit to the **PURCHASER** an estimate of costs for the proposed change (hereinafter referred to as the change or changes), including any change in the schedule of payments, within ten (10) calendar days of receipt of notice of the change, and shall include an estimate of the impact (if any) on the delivery dates under the contract, as well as a detailed schedule for the execution of the change, if applicable.
- 1.2.3 The **SUPPLIER** shall not effect changes in accordance with clause-1.2.1 above until the **PURCHASER** has authorized a change order in writing on the basis of the estimate provided by the **SUPPLIER** as described in clause-1.2.2 above.
- 1.2.4 Adjustments in the work schedule or the contract price authorized by a change pursuant to clause-1.2.3 are not subject to renegotiation, and such adjustments shall be deemed to include any cumulative effect of this and previously authorized changes.
- 1.2.5 Changes mutually agreed upon shall constitute a part of the work under this contract, and the provisions and conditions of the contract shall apply to the said changes.
- 1.2.6 In the event, the **PURCHASER** shall cause the **SUPPLIER** to expend labour or materials, or both, of any nature in order to provide the **PURCHASER** with information upon which to base a decision as to whether a change should be ordered, the **PURCHASER** shall reimburse the **SUPPLIER** for the total costs related to supplying such information. However in cases, where such costs are involved, prior approval of **PURCHASER/PURCHASE COMMITTEE** shall be

obtained.

1.2.7 Except with the express permission of the **PURCHASER**, the supply of goods shall not be delayed pending agreement of costs or schedules affected by minor changes.

### **1.3 Contract amendments**

1.3.1 Subject to clause-1.2, no variation in or modification of the conditions and terms of the contract shall be made except by written amendment signed by the parties.

### **1.4 Sub-contracts & make of plant and machinery**

1.4.1 The **SUPPLIER** shall not sub-contract all or any part of the contract without notifying the **PURCHASER** in writing, of the details of the sub-contractor and the item sub-contracted. Only approved sub-contractors of the **SUPPLIER** shall be employed.

1.4.2 The **SUPPLIER** guarantees that any and all sub-contractors of the **SUPPLIER**, for performance of any part of the work under the contract, will comply fully with the terms of the contract applicable to such part of the work under the contract.

1.4.3 The make of the main components to be supplied by the **SUPPLIER** shall be one of the makes specified in the **LIST OF APPROVED MAKES OF VENDORS** mentioned in Section II for Technical specifications, mutually agreed and specified in final technical offer. If the make of the component is not one of the vendors given in the approved list, the approval from the **PURCHASER & CONSULTANT** has to be obtained.

### **1.5 Country of origin**

All major equipment shall be manufactured in India at the **SUPPLIER's** works.

### **1.6 Inspection and tests**

1.6.1 The **SUPPLIER** shall submit the quality plan within six (6) weeks of entering into an agreement with the **PURCHASER**. The quality plan shall indicate the quality control procedure adopted by the **SUPPLIER** for inspection and in-process quality control procedures for the various items to be manufactured / procured / fabricated from their sub-vendors works. Based on the list, the **PURCHASER** or their inspecting agency shall send the **SUPPLIER** within two (2) weeks of receipt of the quality plan, the list of items of machinery and equipment requiring **PURCHASER's** inspection before dispatch.

1.6.2 The **PURCHASER / CONSULTANT / PURCHASER INSPECTION AGENCY**, shall have the right to inspect the work being carried out under this contract and to test the goods to confirm their conformity to the specification. The Special Conditions of Contract or the specification or both shall specify what inspections and tests the **PURCHASER** requires and where they are to be conducted. The **PURCHASER** shall notify the **SUPPLIER** in writing of the identity of **PURCHASER's/CONSULTANT's** technical staff retained for this purpose. Notwithstanding the inspection mentioned above, the **PURCHASER** has the right to reject the goods even after the supply, if they do not conform to the specification, and any defect found at the time of installation and commissioning shall be rectified at **SUPPLIER's** cost and / or replaced if the

defect cannot be rectified.

- 1.6.3 The inspections and tests may be conducted at the premises of the **SUPPLIER** or their sub-contractor(s), at point of delivery and at the final destination of goods. Where conducted at the premises of the **SUPPLIER** or their sub-contractor(s), all reasonable facilities and assistance, including access to drawings and production data, shall be furnished to the inspectors at no charge to the **PURCHASER**.
- 1.6.4 Should any inspected or tested goods fail to conform to the specification, the **PURCHASER** may reject them, and the **SUPPLIER** shall either replace the rejected goods or make all alterations necessary to meet the requirement of the specification, free of cost to the **PURCHASER**.
- 1.6.5 The **PURCHASER**'s right to inspect, test and, where necessary, reject the goods after its arrival at the site of installation (the rejection shall be with proper justification and reasonably adequate time will be given to the **SUPPLIER** to remedy the default) shall in no way be limited or waived by reason of the goods' having already been inspected, tested and passed by the **PURCHASER** or their representatives prior to dispatch of the goods.
- 1.6.6 Nothing in the clause-1.6 shall in any way release the **SUPPLIER** from any warranty or other obligations under the contract.
- 1.6.7 Bidders to note that inspection report wherever applicable, MTC and Guarantee certificates will be required for all the supply items which will be cross checked with the OEMs and in case of fake supply of any item, action deemed fit will be taken by the Purchaser which will be binding on the Bidder.

## **1.7 Patent and copy rights**

The **SUPPLIER** shall hold and have the **PURCHASER**, its Officers, Agents, Servants and Employees harmless from liability of any nature or kind including costs and expenses for over an account of any copy-right or un copy right, composition, secret process, patented or appliance un-patented invention, articles or manufactured or used in the performance of this contract including their use by the **PURCHASER** unless otherwise specifically stipulated in this contract. In the event of any claim or demand being made or action being brought against the **PURCHASER** for infringement or patent in respect of any machine, plant used or supplied by the **SUPPLIER** under this agreement or in respect of any method of using or working by the **PURCHASER** or such machine, Plant or thing, the **SUPPLIER** will indemnify the **PURCHASER** against such claims or demand and all cost and expenses arising from or incurred by reason of such claims or demands.

PROVIDED THAT the **PURCHASER** shall notify in writing the **SUPPLIER** immediately if the claim is made and that they shall be at liberty, if they so desire, with the assistance of the **PURCHASER**, if required, but at the **SUPPLIER**'s own expenses to conduct all negotiations for the settlement of the same or any litigation that may arise there from and

PROVIDED THAT no such machines, plant or thing shall be used by the **PURCHASER** for any purpose or in any manner other than that for which they have been supplied by the **SUPPLIER** as specified in this tender.

## 1.8 Bank Guarantees

- 1.8.1 The formats for Bidders Bank Guarantees (BGs) will be as per standard formats. All nationalized banks and private banks viz ICICI, HDFC, Axis Bank, Standard & Chartered, Citi Bank are eligible for issuing of BGs.
- 1.8.2 The Bank guarantee in respect of guaranteed performance of the plant and machinery supplied by the SUPPLIER in the form of the PURCHASER, after mutual discussions between PURCHASER and SUPPLIER, before eight (8) months of scheduled commissioning of the plant. This guarantee shall be valid for two years from the date of commissioning. In the event of non-submission of performance guarantee, in the form of the PURCHASER after mutual discussions between the PURCHASER and SUPPLIER, the SUPPLIER shall deduct from their all bills, equivalent amount of bank guarantee till such time the bank guarantee is furnished, before drawing their bill
- 1.8.3 If the SUPPLIER shall abandon this contractor otherwise fail to supply and deliver the plant within the scheduled period or any extension thereof granted by the PURCHASER or if the work or any part thereof is taken out of the SUPPLIER hands, then and in any such case the SUPPLIER shall refund to the PURCHASER within thirty (30) days of demand such part of the advance payments hereunder made as the PURCHASER may deem fit to protect their interest.
- 1.8.4 The bank guarantee or guarantees required to be furnished by the SUPPLIER under the provisions thereof to secure the timely delivery or performance of the plant and machinery supplied by the SUPPLIER or for any other purpose under the provisions thereof shall be in the form of the PURCHASER and the SUPPLIER, which forms shall invariably include the provision that the decision of the PURCHASER as to whether there has been any loss or damage or default and or negligence on the part of the SUPPLIER will be final and binding of the guarantor, that the right of the PURCHASER shall not be affected or suspended by the reason of the fact that any dispute or disputes have been raised by the SUPPLIER with regard to their liability of that proceedings are pending before any tribunal / arbitrators or court with regard thereto or in connection therewith, that the guarantor shall pay to the PURCHASER the sum under the guarantee(s) without demur or first demand and without requiring the PURCHASER to invoke any legal remedy that may be available to them, that it shall not be open to the guarantor to know the reason of or to investigate or to go into the merit of the demand or to question or to challenge the demand or to know any facts affecting the demand or to required proof of the liability of the SUPPLIER before paying the amount demanded by the PURCHASER, under the guarantee(s).

The Bank Guarantee or guarantees required to be furnished by the SUPPLIER under the provisions thereof to secure the timely delivery or performance of the plant and machinery supplied by the SUPPLIER or for any other purpose under the provision hereof shall be for such period as may cover the period of complete supply and performance respectively, as the case may be as stipulated under the tender, if, however, the period of agreement is extended due to force majeure. The SUPPLIER shall have such guarantee extended upto the corresponding extended period, and failure of the SUPPLIER to do so will amount to a breach of the contract, and in no case the extension of the period of the contract shall be construed as waiver of right of the PURCHASER to enforce the guarantee.

## 1.9 Indemnity

- 1.9.1 The SUPPLIER and the PURCHASER shall indemnify and hold harmless each other from and against such claims and liabilities as provided in the Special Condition of Contract.
- 1.9.2 Notwithstanding anything in this contract to the contrary, it is agreed that neither the

**SUPPLIER** nor the **PURCHASER** shall be held liable to the other party for loss of production, loss of profit, loss of use or any other indirect or consequential damage.

#### **1.10 Insurance**

- 1.10.1 All goods supplied under this contract shall be fully insured against loss or damage incidental to manufacture or acquisition in the manner specified in the Special conditions of contract.
- 1.10.2 Without limiting the **SUPPLIER's** liability (limited only to the contract price) as provided under this contract, the **SUPPLIER** shall procure or ensure that their **SUB-CONTRACTORS** also procure such additional insurance cover as specified in the Special Conditions of Contract.
- 1.10.3 All insurances to be provided by successful bidders, including transit insurance will be as per standard rules.

#### **1.11 Transfer of title**

- 1.11.1 The goods, shall immediately, in consideration of payment of the first installment of the contract price to the **SUPPLIER** by the **PURCHASER**, become and remain the property of the **PURCHASER**; provided always that the **SUPPLIER** shall have a particular possessory lien on the goods to the extent the value thereof exceeds the total value of the installment payments made by the **PURCHASER** to the **SUPPLIER**. Transfer of title of goods shall be ex-works.

#### **1.12 Acceptance**

- 1.12.1 Upon completion of the supply under the contract and erection and commissioning by the **PURCHASER's** contractor, a meeting shall be held for the purpose of accepting the goods (hereinafter called the final acceptance). Such meeting shall constitute the final acceptance of the goods and services under the contract, unless the **PURCHASER** during the meeting shows defects or shortcomings or both. In case of defects or shortcomings or both which in the **PURCHASER's** opinion are considered essential, another meeting shall be convened when the **SUPPLIER/CONTRACTOR** has given notice of completion of the corrective work carried out with regard hereto. Otherwise the **PURCHASER** may accept the goods if the defects or shortcomings or both are not considered serious, and the **SUPPLIER** has agreed to carry out the repairs in conformity with this contract.

#### **1.13 Maintenance Warranty**

- 1.13.1 For a period of two years from the date of commissioning of plant and machinery including the year in which the plant is commissioned (called the maintenance warranty period), the **SUPPLIER** shall remain liable to rectify / replace any machinery and equipment or part thereof, such as may be found to be defective or below the rated capacity under proper use and arising due to faulty design, material, workmanship. The **PURCHASER** shall give the **SUPPLIER** notice in writing setting out the particulars of the defects or failure and the **SUPPLIER** shall thereupon rectify and make good the defective or under rated equipment or replace the same free of cost to make it comply with the requirements of the Agreement. If the **SUPPLIER** fail to do so within reasonable time so as to reduce the production loss to the minimum as required by the **PURCHASER**, the **PURCHASER** may rectify and replace at the cost of the **SUPPLIER** the whole or any portion of the equipment, as the case may be, which is defective or under rated or fail to fulfill the requirements of the Agreement and may recover the actual cost thereof from the

SUPPLIER or adjust the same from any balance payment to be made to the SUPPLIER, or recover by raising debit note. Such rectification / replacement shall be carried out by the PURCHASER within short a time as possible and at a reasonable price under advice to the SUPPLIER.

In case of such rectification / replacement by the PURCHASER the SUPPLIER shall be liable to pay the PURCHASER the whole cost of such rectification / replacement done and the defective equipment on being replaced shall be taken away by the SUPPLIER at their own cost. The PURCHASER shall have the right to operate any and all equipments after the commissioning date of the plant except that this shall not be considered to permit operation of any equipment which may be materially damaged by such operation before any required rectification or alternation have been carried out.

- 1.13.2 If it becomes necessary for the SUPPLIER to replace or renew any defective part of the machinery under this clause the provisions of the first paragraph of this clause shall apply to the parts of the plant and machinery so replaced or renewed until the expiration of six months from the date of such replacement or renewal or until the end of the aforesaid maintenance period of two (2) years, whichever is later.
- 1.13.3 The rectification or new parts will be delivered F.O.R. PURCHASER's factory site. The SUPPLIER shall also bear the cost of rectification / replacement carried out on their behalf by the PURCHASER as mentioned above at the site. At the end of the maintenance period, SUPPLIER liability shall cease. In respect of plant and machinery not covered by the first paragraph of this clause, the PURCHASER shall be entitled to the benefit of any guarantee given to the SUPPLIER's by the original supplier or the manufacturer of each plant and machinery.
- 1.13.4 The responsibility of the SUPPLIER for rectification / replacement under this clause shall extend to the actual cost of rectification / replacement of the defective items of plant and machinery and shall not, in any way, be deemed to be limited to the amount of the performance guarantee.
- 1.13.5 The SUPPLIER shall provide one supervisor at their own expenses for first one month of the first crushing season in order to assist the PURCHASER in the working and maintenance of said machinery and equipment.

## 1.14 Payment

- 1.14.1 The PURCHASER shall pay the contract price in the following manner free of interest:
- 1.14.2 The payment terms will be as per *Appendix – II*.
- 1.14.3 All Payments shall be made in Indian rupee only. In case of imports, the terms of payments will be as per standard International practice
- 1.14.4 Subject to clause-1.2 of the General Conditions of Contract and as provided for in the price schedule, prices charged by the SUPPLIER for goods under the contract shall not vary from the prices agreed by the SUPPLIER and given in the price schedule. **This is the firm price contract for SUPPLY.**
- 1.14.5 Taxes and duties shall be reimbursable at actual, based on the production of documents by the SUPPLIER.

1.14.6 The **PURCHASER** shall not make any deductions against any claims he may have on the **SUPPLIER** as per the contract terms, unless the details of claim have been communicated to the **SUPPLIER** in advance.

## 1.15 Extension in the **SUPPLIER**'s performance

1.15.1 Delivery of the goods shall be made by the **SUPPLIER** strictly in accordance with the delivery schedule, pursuant to the Special Conditions of Contract.

1.15.2 The **SUPPLIER** may claim extension of the time limits as set forth in the delivery schedule in case of:

- a. Changes ordered by the **PURCHASER** pursuant to clause-1.2;
- b. Delay in the receipt of any material, drawings or service which are to be provided by the **PURCHASER** (services provided by the **PURCHASER** shall be interpreted to include all approvals by the **PURCHASER** under the contract as well as access to the site);
- c. Force majeure pursuant to clause-1.21; and
- d. Delay in performance of work caused by instructions issued by the **PURCHASER**.

The **SUPPLIER** shall demonstrate to the **PURCHASER**'s satisfaction that they have used their best endeavour to avoid or overcome such causes of delay, and the parties will mutually agree upon remedies to mitigate or overcome such causes of delay. The extension of time limit shall be mutually discussed and agreed.

1.15.3 Notwithstanding clause-1.15.2 above, the **SUPPLIER** shall not be entitled to an extension of time for completion, unless the **SUPPLIER**, at the time such circumstances arise, has immediately notified the **PURCHASER** in writing of any delay that it may claim as caused by circumstances pursuant to clause-1.15.2 above; and, upon request of the **PURCHASER**, the **SUPPLIER** shall substantiate that the delay is due to the circumstances referred to by the **SUPPLIER**.

## 1.16 Termination for default

1.16.1 The **PURCHASER** may, without prejudice to any other remedy for breach of contract, by written notice of default sent to the **SUPPLIER**, terminate the contract in whole or in part:

- a. If the **SUPPLIER** fails to deliver any or all of the goods within the time period(s) specified in the contract, or any extension thereof granted by the **PURCHASER**, pursuant to clause-1.15; or
- b. If the **SUPPLIER** fails to perform any other obligation(s) under the contract; and if the **SUPPLIER**, in either of the above circumstances, does not cure their failure within a period of ten (10) calendar days (or such reasonably longer period as the **PURCHASER** may authorize in writing) after receipt of a notice of default from the **PURCHASER** specifying the nature of the default(s).

1.16.2 In the event the **PURCHASER** terminates the contract in whole or in part, pursuant to clause-1.16.1 above, the **PURCHASER** may procure, upon such terms and in such manner as it deems



appropriate, goods similar to those undelivered, and the **SUPPLIER** shall be liable to the **PURCHASER** for any incidental excess costs for procurement of such similar goods. Notwithstanding the above, the **SUPPLIER** shall continue performance of the contract to the extent not terminated.

### **1.17 Termination for insolvency**

1.17.1 The **PURCHASER** may at any time terminate the contract by giving written notice to the **SUPPLIER**, without compensation to the **SUPPLIER**, if the **SUPPLIER** becomes bankrupt or otherwise insolvent. Notwithstanding the above, such termination will not prejudice or affect any right of action or remedy which has accrued or will accrue thereafter to the **PURCHASER**.

Provisions for termination for insolvency shall apply viz-a-viz to both the parties. In the event of termination for insolvency by the Supplier, provisions for termination for convenience by the Purchaser shall apply.

### **1.18 Termination for convenience**

1.18.1 The **PURCHASER** may, by written notice to the **SUPPLIER**, terminate the contract, in whole or in part, at any time for their convenience. The notice of termination shall specify that termination is for the **PURCHASER**'s convenience, the extent to which performance of work under the contract is terminated, and the date upon which such termination becomes effective.

1.18.2 The goods that are complete and ready for dispatch within thirty (30) days after the **SUPPLIER**'s receipt of notice of termination shall be purchased by the **PURCHASER** at the contract prices and on the other contract terms. For the remaining goods, the **PURCHASER** may elect:

- (a) to have any portion thereof completed and delivered at the contract prices and on the contract terms; and/or
- (b) to cancel the remainder and pay to the **SUPPLIER** an agreed amount for partially completed goods and for materials and parts previously procured by the **SUPPLIER** for the purpose of the contract, together with a reasonable allowance for overhead and profit and a reasonable compensation, based on mutual discussions, for the financial commitments made by the **SUPPLIER** for fulfilling their obligations under this contract.

### **1.19 Resolution of disputes**

1.19.1 The **PURCHASER** and the **SUPPLIER** shall make every effort to resolve amicably by direct informal negotiation any disagreement or dispute arising between them under or in connection with the contract.

1.19.2 If, after thirty (30) days from the commencement of such informal negotiations, the **PURCHASER** and the **SUPPLIER** have been unable to resolve amicably a contract dispute, either party may require that the dispute be referred for resolution by arbitration by the mechanism described in the Special Conditions of Contract. The award shall be final and binding on the parties.

## 1.20 Jurisdiction for legal proceedings

1.20.1 The contract shall be governed by and interpreted in accordance with the Indian laws. No suit or any proceedings in regard to any matter arising in any respect under this contract shall be instituted in any court other than the court at Patna. No other court shall have jurisdiction to entertain any suit or proceedings even though part of the cause of action might arise within their jurisdiction.

## 1.21 Force majeure

1.21.1 In the event that the **SUPPLIER** or any of their subcontractors, or the **PURCHASER** delays performing any of their respective obligations under the contract, and such delay is caused by force majeure, by acts of God / Government in its sovereign capacity, including but not limited to war, civil insurrection, riots, strikes, fires, floods, epidemics, earthquakes, quarantine restrictions and freight embargoes, such delay may be excused as provided in clause-1.15, and the period of such delays, or a period mutually discussed and agreed, may be added to the time of performance of the obligation delayed.

1.21.2 If a force majeure situation arises, the **SUPPLIER** shall promptly notify the **PURCHASER** in writing of such condition and the cause thereof along with documentary evidence. Unless otherwise directed by the **PURCHASER** in writing, the **SUPPLIER** shall continue to perform their obligations under the contract as far as is reasonably practical, and shall seek all reasonable alternative means for performance not prevented by the force majeure event.

1.21.3 In no event shall, a force majeure event excuse the obligations of a party, if those obligations are required to have been completely performed, prior to the occurrence of that force majeure event.

1.21.4 If performance of the Contractor's obligations or obligations of its vendors and subcontractors are delayed under the contract and such delay is caused by force Majeure conditions which prevents or impedes due performance of the contract despite due diligence by the contractor, the contractor shall get corresponding extension plus an additional period, if any, in time for completion without any claim of the Purchaser for damages for delayed performance.

If, Force Majeure affects the performance of the Purchaser for the reasons including land acquisition, environmental clearances or otherwise in such event the supplier shall be entitled to receive enhanced cost on a mutual agreed basis in addition to extension in time for corresponding period.

If Force Majeure prevails for more than three months, both the parties shall discuss and agree to further course of action including cost implications. Force Majeure shall not apply on payment obligations of the parties.

If, parties agrees to terminate the contract due to prolonged Force Majeure conditions affecting the performance of the purchaser. In such event of termination, provision for 'Termination for Convenience' shall apply.

## 1.22 Modification, Assignment and Subletting

1.22.1 The **PURCHASER's** contract may be amended, modified or rescinded only in writing signed by both the parties or their authorized agents or representatives by a change order issued by the **PURCHASER** and accepted by the **SUPPLIER** pursuant to the terms stated therein.

1.22.2 The **SUPPLIER** shall not assign, sublet in whole or in part, their obligation to perform under the contract, except with the **PURCHASER's** prior written consent. Such written permission if given shall not relieve the **SUPPLIER** from their obligations under the contract and they shall take full responsibility for all the work done by their **SUB-SUPPLIER**.

### 1.23 Contract language

1.23.1 The **SUPPLIER** and **PURCHASER** hereby represent that they have sufficient knowledge of the English language to understand fully the contract. The contract shall be in the English language, and all documentation related hereto will also be in the English language, except if otherwise specifically agreed in writing between the parties.

1.23.2 The **SUPPLIER** shall bear all costs of translation of documents to English and all risks of the accuracy of such translation.

### 1.24 Taxes and duties

1.24.1 **The SUPPLIER shall be responsible** for Central / State Sales Tax, Excise Duties, Special Excise Duties, Local Taxes and Other Taxes or duties at the destination point, on finished bought-out items supplied directly to site from sub-contractors works. The proof for the taxes duties and special excise duties, actually paid by the **SUPPLIER**, shall be submitted to the **PURCHASER** separately for own manufactured items and for bought-out items and claimed by the **SUPPLIER** from the **PURCHASER** as a reimbursement of the same in each Invoice / Bills to be submitted by **SUPPLIER**. The amount included in **SUPPLIER's** bill for payment of all such taxes, surcharges and duties will be computed on the basis of relevant statutory provision in force on the date of dispatch and shall be actual amount as paid by the **SUPPLIER**.

Price excludes all kinds of taxes, duties and levies including GST Central Sales Tax, Excise Duty (if levied) including Central Sales Tax, Works Contract Tax, BOWC cess etc. and fresh impositions and variations in rates of taxes, duties and levies, which shall be reimbursed by the Purchaser to the Supplier at actual on the basis of documentary proofs.

Entry tax, special entry tax and octroi duty, if applicable, will be settled and paid directly by the Purchaser.

GST, duties and levies shall also be remitted by the Purchaser to the Supplier.

If Purchaser wishes to avail benefit of concessional Central Sales Tax (as applicable) for interstate sales, Purchaser shall provide to the Supplier Central Sales Tax Declaration Forms C'/E-1 within 30 days of the end of each quarter.

In the event of Purchaser's inability to provide Central Sales Tax Declaration Form C'/E-1 and / or any other form/document as may be applicable and consequent to imposition of final demand upon the Supplier by the authorities, the Purchaser shall pay the differential sales tax, penalty and interest to the Supplier as per the demand notice so issued.

1.24.2 The **SUPPLIER** shall furnish to the **PURCHASER** with their bill excise duty gate passes in support of excise duty and special excise duty paid for the base price.

1.24.3 The **SUPPLIER** shall indicate in the contract price, (Refer price schedule), the estimated amount of GST, Central / State Sales Tax, Excise Duty, Special excise duties, Customs duty, local taxes and any other taxes or duties and octroy, if any payable by the **PURCHASER** for own manufactured items and bought-out items under the contract based on the rates prevailing at the time of submission of offer. The actual taxes and duties payable by the **PURCHASER** shall not exceed more than two (2) percent of the indicated values by the **SUPPLIER** in the price schedule, unless there is a change in rate of the taxes and duties imposed by State / Central Authorities. The **SUPPLIER** shall indicate clearly the rate at which the taxes and duties, octroi, etc. have been estimated by the **SUPPLIER** at the time of giving this offer.

1.24.4 The **PURCHASER** or their authorized representative shall be shown all original documents and accounting records in support of excise duties, customs duties on imported components charged and the original bill of the sub-contractors for satisfying that the single point sales tax, excise duty and special duties as aforesaid have actually been paid to the sub-contractors.

## **1.25 Headings**

1.25.1 Headings, whether of clauses or of other parts of the contract, are for reference only and are not to be construed as part of the contract.

## **1.26 Waiver**

1.26.1 Failure of either party to insist upon strict performance by the other party of any provision of the contract shall in no way be deemed or construed to affect in any way the right of that party to require such performance.

## **1.27 Foreign Exchange**

Any foreign exchange required for import of the raw materials of equipment shall be arranged by the **SUPPLIER**, non-availability of foreign exchange shall not entitle the **SUPPLIER** any extension of time for commissioning of the plant.

## 2. SPECIAL CONDITIONS OF CONTRACT FOR SUPPLY

### 2.1 Definitions

In this document, the words and phrases listed shall have the meaning specified against each word or phrase. Words imparting singular shall include plural and vice versa and words imparting the masculine gender shall include feminine gender and words imparting persons shall include bodies corporate.

- a) "The **PURCHASER**" means M/s **HPCL Biofuels Ltd (HBL), Village Lauriya, West Champaran, Bihar**
- b) "The **CONSULTANT**" means **M/s. MITCON Consultancy & Engineering Services Ltd.**, having their Registered Office at First Floor, Kubera Chambers, Shivajinagar, Pune – 411 005.
- c) "The **SUPPLIER**" means the individual or firm supplying the goods and providing the services under this contract.
- d) "The **GOODS/EQUIPMENT/PLANT**" means all of the equipment, machinery and/or other materials which the **SUPPLIER** is required to supply to the **PURCHASER** under the contract.
- e) "The **CONTRACT / AGREEMENT**" means the agreement entered into between the **PURCHASER**, and the **SUPPLIER**, as recorded in the contract signed by both the parties, including all attachments and appendices thereto and all documents incorporated by reference therein.
- f) "**FOB**", "**C&F**" and "**CIF**" have the meanings assigned to them by the current edition of the international rules for the interpretation of the trade terms published by the International Chamber of Commerce.
- g) "The **SUB-SUPPLIER**" means any individual or firm or company, to whom part of the contract has been sublet by the **SUPPLIER** with the consent of the **PURCHASER**.
- h) "The **INSPECTOR**" means any person or agency nominated by the **PURCHASER**, from time to time, to inspect equipment stage-wise including final stage, before dispatch at **SUPPLIER's / SUB-SUPPLIER's** works as per the terms of the contract.
- i) "**SUB CONTRACT**" shall mean order placed by the **SUPPLIER** for any portion of the Contract or work, with the necessary consent of **PURCHASER**.
- j) "**CONTRACT PRICE**" means the `consideration' payable by the **PURCHASER** directly to the **SUPPLIER** as per the agreement and desire of **SUPPLIER** for the full and proper performance of contractual obligations under the contract between the **PURCHASER** and the **SUPPLIER**.
- k) "**DELIVERY**" shall mean the completion of delivery of all such goods within the delivery date specified in the contract, vide clause No.2.8.2 of the Special Conditions of Contract.

- l) **"SITE"** shall mean and include the land and other places on, into or through which the works and the related facilities are to be erected or installed, at the **PURCHASER's** site at **Village Lauriya West Champaran, Bihar**
- m) **"DRAWINGS"** shall mean the technical specification which shall include engineering drawings, sketches showing plans, sections and elevations related to the contract together with modifications and/or revision thereto.
- n) **"SPECIFICATION"** shall mean and include schedules, detailed description, statements of technical data, performance characteristics, standards (Indian as well as International) as applicable and specified in the contract.
- o) **"ENGINEER/ENGINEER-IN-CHARGE"** shall mean the person so nominated by the **PURCHASER** for the time being or such other person as may be duly authorized and appointed in writing by the **PURCHASER** to act as site engineer for the purpose of the contract. In cases where no such engineer is so appointed, the word 'engineer' shall mean the **PURCHASER** or their duly authorized representatives.
- p) **"TESTS"** shall mean such process or processes to be carried out by the **SUPPLIER** as are prescribed in the contract or considered necessary by **CONSULTANT / PURCHASER** and **SUPPLIER** together after mutual discussions, in order to ascertain quality, workmanship, performance and efficiency of equipment or part thereof.
- q) **"APPROVAL"** shall mean and include the written consent, either manuscript, type written or printed statement, under signature or seal, as the case may be, of the **PURCHASER/CONSULTANT** or their authorized representative on documents, drawings or other particulars in relation to the contract.
- r) **"DATE OF CONTRACT"** shall mean the date on which the parties have signed the Contract Agreement.
- s) **"THE ZERO DATE OF THE CONTRACT"** shall be the date on which the Letter of Intent (LOI) is given or Contract Agreement is signed.
- t) **"MONTH"** shall mean the calendar month.
- u) **"DAY AND DAYS"** shall mean the calendar day or days of twenty four (24) hours each.
- v) **"WEEK"** shall mean a continuous period of seven (7) days.
- w) When the words 'Approved', 'Subject to Approval', 'Satisfactory', 'Required', 'As Directed', 'Where Directed', 'Determined By', 'Accepted', 'Permitted', or words or phrases of like importance are used, the approval, judgment, direction etc., are understood to be a function of **PURCHASER / CONSULTANT**.
- x) **"SCOPE OF WORK"** shall mean all the work to be performed by the **SUPPLIER** under this contract.
- y) **"OPERATING MONTHS"** shall mean the period of actual operation of the equipment without taking into account the intervening off-season shutdown or shutdown due to major plant breakdown.

- z) “**COMMISSIONING**” shall mean the first operation of the equipment (after all initial adjustments, trials, cleaning and reassembly required at site if any, have been completed) and the equipment is ready for commercial use.
- aa) “**SATISFACTORY COMMISSIONING**”, means the continuous operation of the equipment to the full capacity and establishment of its strict performance of the contractual requirement.

## 2.2 Scope of the contract

- 2.2.1 The **SUPPLIER's** scope of work comprises of the detailed design, procurement, fabrication / manufacture, inspection and testing at the works and supply of plant and machinery on F.O.R. site basis, as defined in the technical specification, with all their accessories, fittings, supports and all the auxiliary equipment and material as detailed in the specification.
- 2.2.2 Wherever it is stated in this contract that such and such a supply is to be effected or such and such a work is to be carried out, or provided, it shall be understood that the same shall be effected/carried out by the **SUPPLIER** within the contract price, unless a different intention is specifically and expressly stated herein or otherwise explicit from the context.
- 2.2.3 Completeness of the equipment, within the battery limits, shall be the responsibility of the **SUPPLIER**. Any equipment, fittings and accessories which may not be specifically mentioned in the specification or drawings, but which are usual or necessary for the satisfactory functioning of equipment (successful operation and functioning of the equipment being **SUPPLIER's** responsibility) shall be provided, by the **SUPPLIER** without any extra cost to the **PURCHASER**.
- 2.2.4 Furnishing to the **PURCHASER**, foundation drawings and loading details relating to plant and machinery within the **SUPPLIER's** scope progressively at an agreed time schedule.
- 2.2.5 The **SUPPLIER** shall ensure that the work shall be of the first class quality and shall be performed:
  - a. with due diligence and efficiency.
  - b. in accordance with the provisions of the Contract and the time schedule indicated in this Contract.
- 2.2.6 The **SUPPLIER** shall at all times ensure that the work is carried out by fully qualified and experienced personnel to warrant the performance of the work in accordance with this agreement.
- 2.2.7 The **SUPPLIER's obligations** towards this contract include participation in the performance testing, trial operation and reliability run of the plant and equipment.
- 2.2.8 The training of the **PURCHASER's** personnel at the **SUPPLIER's** works and / or at the site.
- 2.2.9 The **SUPPLIER** is responsible for packing (sea worthy wherever necessary) protecting and marking as per instructions to be given by the **PURCHASER**.

2.2.10 Providing all the necessary drawings / documents / manuals. Instructions for all the equipment /  
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components / materials required for the proper understanding, erection and commissioning of the equipment by the **PURCHASER's** erection and commissioning contractor.

2.2.11 Bidders to note that inspection report wherever applicable, MTC and Guarantee certificates will be required for all the supply items which will be cross checked with the OEMs and in case of fake supply of any item, action deemed fit will be taken by the Purchaser which will be binding on the Bidder.

### **2.3 Limit of contract**

Equipment supplied shall be complete in every respect with all mounting, fittings, fixtures and standard accessories, tools etc., normally provided with such equipment and / or needed for maintenance, completion of installation and commissioning and safe operation of the equipment as required and within the battery limits, though they may not have been specifically detailed in the respective specification. All similar standard component / part of similar standard equipment provided shall be interchangeable with one another.

Any additional equipment or material which are not specifically mentioned but are required to complete the equipment and system offered, in every respect in accordance with the technical specification and required for safe and reliable operation and guaranteed performance, shall also be deemed as included in the scope of work of this contract. The **SUPPLIER** shall not be eligible for any extra payment in respect of such mountings, fittings, fixtures, accessories, etc., which are needed for the safe operation of the equipment as required by applicable codes, though they may not have been explicitly spelt out in the contract. However if new equipment are to be added due to change of government rules, then such new equipment will come under additional scope of work.

### **2.4 Codes and Standards**

The goods supplied under this contract shall conform to the codes and standards mentioned in the technical specification, and, when no applicable standard is mentioned, to the authoritative codes and standards and such standards shall be the latest issued by the concerned institution. In the event that the language of such codes and standards happens to be anything other than English, the **SUPPLIER** shall furnish the English translation of all such codes and standards proposed to be used in the contract. Such English translations shall be provided to the **PURCHASER / CONSULTANT** within the first four (4) weeks from the date of the contract and the **SUPPLIER** shall undertake the full responsibility for the accuracy of such translations.

### **2.5 Materials and workmanship**

The materials and workmanship shall meet the requirement of relevant standards and good engineering practices. In any case, the material shall be the best grade obtainable and the most suitable and proven for the purposes intended in accordance with the modern engineering practices. **All materials shall be new.** Substitutions for specified materials or variations from designed methods of fabrication will be permitted only if approved in writing by the **PURCHASER/CONSULTANT**. Such approvals may be granted only if a compelling reason exists for making a substitution.

Before any defect in material or workmanship is repaired, the **SUPPLIER** shall outline the procedure proposed for rectification of the defect and obtain approval in writing, of the **PURCHASER/CONSULTANT**. Such repairs shall be done free of cost to the **PURCHASER**, if the defects are established to have occurred during the warranty period.



## 2.6 Statutory approval for works

- 2.6.1 The application for submission to inspector, or any other authority required as per statutory rules and regulations of State / Central governments along with copies of required certificates complete in all respects shall be prepared by the **SUPPLIER**. The primary responsibilities for statutory approvals and liaison with government authorities for approvals, during the manufacturing and till such time the equipment and material are shipped from the **SUPPLIER's / SUB-SUPPLIER's** premises, shall be with the **SUPPLIER**.
- 2.6.2 Any change / addition required to be made to meet the requirement of the statutory authorities, if such change / addition of the statutory requirement come into force before the date of signing of the contract, shall be carried out by the **SUPPLIER** free of charge. The changes / additions required and additional charges thereon, consequent to the statutory regulations coming into force after the date of signing of the contract, shall be paid by the **PURCHASER** after mutual agreement. The inspection and acceptance of the work by statutory authorities shall, however, not absolve the **SUPPLIER** from any of their responsibilities under the contract.

## 2.7 Testing and inspection

- 2.7.1 The equipment will be inspected and where practicable, submitted to such tests at the works as deemed necessary by the **SUPPLIER** before dispatch.
- 2.7.2 The **SUPPLIER** shall give the **PURCHASER** a minimum of seven (7) days' written notice whenever any equipment / component / material is ready for testing. The **PURCHASER** shall, unless they waive witnessing of the tests, attend such tests on the notified scheduled date of testing. In case the Inspection Agency feels that inspection will be delayed before despatch, they will accordingly send a clearance to the **SUPPLIER** with an instruction to despatch the material. Such materials will be inspected at site. The **SUPPLIER** shall show necessary test certificates and documents for the verification of the same as per the specification of contract.
- 2.7.3 Where the **PURCHASER's** representative is present to witness the tests, the test certificate shall be signed by him on successful completion of tests at **SUPPLIER's / SUB-SUPPLIER's** works. In case the **PURCHASER** is not satisfied with the tests, they shall within seven (7) days of witnessing the tests, inform the **SUPPLIER**, in writing, of any objection they have with regard to any equipment and workmanship with reference to the contractual provisions. The **SUPPLIER** shall give due consideration to such objections and shall either make the modification that may be necessary to meet the said objections or shall confirm in writing to the **PURCHASER** giving necessary reasons, that no modification is necessary to comply with the contract. Notwithstanding the test certificates, any defect found at the time of installation or after installation and commissioning shall be rectified at the **SUPPLIER's** cost.
- 2.7.4 Bidders to note that inspection report wherever applicable, MTC and Guarantee certificates will be required for all the supply items which will be cross checked with the OEMs and in case of fake supply of any item, action deemed fit will be taken by the Purchaser which will be binding on the Bidder.

## 2.8 Work schedule

- 2.8.1 Timely delivery of the plant and equipment shall be the essence of the contract. The **SUPPLIER** shall so organize their resources and perform this work as to complete it on or before the date given in the following clause.
- 2.8.2 The following shall be the schedule for the completion of various milestone activities for this package. The **SUPPLIER**'s time schedule shall strictly conform to this schedule.

Milestone activity	Completion date
1. Engineering Activities 2. Completion of Supply 3. Commencement of erection 4. Completion of commissioning	To suit commissioning within 8-months for Modernization of existing Evaporation system with BoP from zero date of the contract i.e. date of issue of LOI/PO, whichever is earlier

- 2.8.3 If the situation warrants, consequent to a delay in the manufacturing process, the **SUPPLIER** shall arrange to air lift the equipment to meet with the delivery commitment. All expenditure towards such air lifting, including tax implication if any, shall be to the **SUPPLIER**'s account, in case the delay in supply is directly attributable to the **SUPPLIER**.
- 2.8.4 The **SUPPLIER** within fifteen (15) days of the signing of agreement shall furnish dispatch wise break-up prices. The **SUPPLIER** within fifteen (15) days of signing of contract agreement shall furnish a time schedule of deliveries relating to major equipments and erection work, which shall be adhered to, for enabling completion of erection and commissioning. The delivery schedule shall be finalized with the approval of **PURCHASER/CONSULTANTS**.
- 2.8.5 Time schedule network / bar chart.
- 2.8.5.1 The **SUPPLIER** shall submit to **PURCHASER / CONSULTANT**, their time schedule regarding the documentation, manufacture and supply of the equipment and materials as well as information on their sub-contracts to be placed with third parties, including the dates on which the **SUPPLIER** intends to issue such sub-contracts.
- 2.8.5.2 The time schedule will be in the form of a network or a bar chart clearly indicating all main or key events regarding documentation, supply of raw materials, manufacturing, testing and delivery.
- 2.8.6 Progress trend chart / monthly report.
- 2.8.6.1 **SUPPLIER** shall report monthly on the progress of the execution of contract and achievement of targets set out in time bar chart.
- 2.8.6.2 The progress will be expressed in percentages as shown in the form of progress trend chart.
- 2.8.6.3 The monthly reporting will be the updating of the progress trend chart.
- 2.8.6.4 The progress reports shall be submitted once in every month for the first three months

and subsequently once in every fortnight till the completion of the contract.

2.8.6.5 The monthly progress report shall be in the form to be given by the **PURCHASER** showing the progress in connection with the all the items like the progress of the submission of drawings, placing of order for bought outs, delivery of plant and machinery and compliance of contractual obligations, before the Tenth day of month, with a copy thereof endorsed to CONSULTANT

2.8.6.6 Photographs wherever necessary shall be submitted. The progress report shall further compare actual versus projected completion dates as well as describe current and anticipated problems and delaying factors, if any, and corrective action taken or proposed to be taken without in any way relieving or affecting the **SUPPLIER's** responsibility to deliver the equipment within the stipulated delivery date(s) / period(s).

## 2.9 Invoices and payments

Upon delivery of the goods, the supplier shall notify the purchaser and the insurance company by E-mail the full details of the shipment including contract number, transport carrier receipt number and date, description of goods, quantity, name of the consignee etc. The **SUPPLIER** shall mail the following documents to the purchaser with a copy to the insurance company:

- (i) Three (3) copies of the **SUPPLIER's** invoice showing description of goods, quantity, unit price and total amount.
- (ii) Transport receipt / acknowledgement of receipt of goods from the consignee(s);
- (iii) Certificate of origin for imported direct despatchable finished goods.
- (iv) Packing list as required as per clause-2.10. The above documents shall be received by the **PURCHASER** before receipt of the goods (except where the goods have been delivered directly to the consignee with all documents) and, if not received, the **SUPPLIER** will be responsible for any consequent expenses/losses.
- (v) The **SUPPLIER** shall send all duplicate for Transporter copies of cenvat invoices along with original for Buyer copies directly to the **PURCHASER** to their registered office address to avoid loss of such documents in transit. The **SUPPLIER** shall send only Xerox of the duplicate for Transporter copies of the cenvat invoices through the vehicles carrying the consignments.
- (vi) If the **SUPPLIER** fails to send such documents directly and in the event of such documents getting lost in transit, the **SUPPLIER** shall be fully responsible to compensate the **PURCHASER** from loss of cenvat credit and the **PURCHASER** shall be at liberty to deduct from the dues of the **SUPPLIER**, amounts equivalent to such losses towards compensation.
- (vii) All Payments will be released by the **PURCHASER** only after 30 days from the date of certification of the **SUPPLIER's** bill by **EIC & Consultant**

## 2.10 Packing

2.10.1 The **SUPPLIER** shall provide such packing of goods as is required to prevent their damage or deterioration during transit to their final destination as indicated in the contract. The packing shall be sufficient to withstand, without limitation, rough handling during transit and exposure to

extreme temperatures, salt and precipitation during transit and open storage. Packing case size and weights shall take into consideration, where appropriate, the remoteness of the goods' final destination and the absence of heavy handling facilities at all points in transit.

2.10.2 The packing, marking and documentation within and outside the packages shall comply strictly with such special requirement as shall be provided for in the contract and in subsequent instructions by the **PURCHASER**.

2.10.3 **SUPPLIER** shall furnish one (1) original and five (5) copies of a packing list for each shipment. This packing list shall be prepared on **SUPPLIER's** standard formats. Packing list must include the following:

- Date
- Supplier's reference number
- Full name and address of the supplier or manufacturer
- Full name of consignee (**PURCHASER**)
- Import license number, where applicable
- Itemized list of contents of each package, case, crate etc. identified by the contract number, item number and equipment or tag number, where applicable.
- Quantity of each item actually being shipped
- Copy of all marking as shown in each package or piece
- Number and type of package and/or pieces in each shipment. Each package and / or piece shall be numbered consecutively to indicate individual and total packages: i.e., 1 of 5, 2 of 5 etc. (succeeding shipments against same order number will carry progressive package numbers: i.e., 3 of 5, 4 of 5, 5 of 5 etc.)
- Shipment number - packing list must indicate if shipment is partial or final shipment of order. Each partial shipment will be consecutively indicated as "partial shipment" No.1 or 2 or 3 etc. as applicable. Final shipment shall be indicated as "final shipment". A shipment of an entire order in one shipment shall be indicated as "complete shipment".
- Net and gross weight of each package and / or piece, and the total weight of the shipment.
- Dimensions and volume of each package and / or piece and the total volume of the shipment.

## 2.11 Documents, drawings & instruction manuals

2.11.1 All drawings, specification, design calculations and bill of material prepared by the **SUPPLIER**, shall comply with the following instructions unless otherwise directed in writing by **PURCHASER/CONSULTANT**. The term "drawing" as used in this specification shall mean and include sketches, design drawings, design calculations, specification and bill of materials unless otherwise defined. Design calculations to be submitted by the **SUPPLIER** shall include the working stress, the safety factor used, codes and standards used, etc., excepting those proprietary in nature. Drawings and data, furnished by the **SUPPLIER** for construction use, shall be certified as such and shall bear the signature of one of the authorized persons, whose names shall previously be given in writing to the **PURCHASER/CONSULTANT**.

2.11.2 The **PURCHASER/CONSULTANT** will after mutual discussions with the **SUPPLIER**, select the drawings / documents for approval by **PURCHASER/ CONSULTANT** or for their information.

- 2.11.3 It is understood that the approval or release by **PURCHASER/CONSULTANT** does not include the checking of drawings and other errors, but only review of basic concepts and general principles involved. Approval does not relieve the **SUPPLIER** of responsibility for correctness of design, details, dimensions and guarantee obligations.
- 2.11.4 All design drawings shall be oriented to match the plant arrangement drawings and shall have a key plan identifying the plant area to which they apply. All layout drawings shall be made with the north arrow pointing to the top of the sheet or to the left. There shall be sufficient reference notes on the drawings to permit identification of all the drawings which are required for a proper understanding.
- 2.11.5 All drawings shall be dimensioned in the metric system. Where drawings are usually made in the British (or other) system, they shall also have metric system dimensions in parentheses or below dimension line. Titles and written notations shall be in English.
- 2.11.6 The scale of the drawing shall be shown clearly in the title block of the drawing. Wherever possible scales of drawings shall correspond to the recommendation of the Bureau of Indian Standards.
- 2.11.7 All reproducible must be made from original drawings.
- 2.11.8 All revised drawings shall clearly indicate the number, date and subject of each revision.
- 2.11.9 The **SUPPLIER** shall submit to **PURCHASER/CONSULTANT**, in the first contract meeting, a list of all drawings and data, by title, which the **SUPPLIER** expects to supply against the contract. On receipt of the list **PURCHASER/ CONSULTANT** and **SUPPLIER** shall jointly finalize a schedule for the submission of drawings.
- The **SUPPLIER** shall maintain the pace of work as required by the schedule. Drawing list shall be kept upto-date, incorporating all new additions, cancellations and changes and will be reissued periodically with the periodical progress reports.
- 2.11.10 The **SUPPLIER** will be required to furnish all the necessary drawings, data, etc. of the plant/equipment with appropriate "status" stamp in adequate number of copies as indicated below.

S.No	Status of the drawing/ document etc.	No. of copies for Purchaser	No. of copies for Consultant
1.	Reference/information	4 prints	2 prints
2.	For approval	2 prints	3 prints
3.	Final & certified duly signed	6 Prints & 1 CD	1 Print & 1 CD
4	Operation and maintenance manual	4 copies	1 copy

5	Performance and acceptance test procedure	2 copies	1 copy
6	All other documents including erection drawings	2 copies	1 copy

2.11.11 Within a period of ten (10) days after the receipt of those drawings/documents, the **PURCHASER / CONSULTANT** shall signify their approval or otherwise. Corrected drawings / documents shall be submitted to the **PURCHASER / CONSULTANT** within ten days after the receipt of the commented drawings/documents by the **SUPPLIER**. The **SUPPLIER** shall submit copies of all drawings which are required to be approved by the **PURCHASER / CONSULTANT**. The drawings which are approved by the **PURCHASER / CONSULTANT** shall not be deviated from, without the further approval of the **PURCHASER / CONSULTANT**.

2.11.12 All drawings submitted for approval shall contain the name of the **PURCHASER**, name of the **CONSULTANT**, project title, drawing title, scale, **SUPPLIER**'s drawing number, date of drawing etc. in the lower right hand corner.

2.11.13 The **SUPPLIER** shall have the right to improve with the **PURCHASER**'s approval, the design of equipment without affecting the basic requirement of the **PURCHASER**, and without affecting the agreed contract price.

## 2.12 Liquidated damages for delay in delivery

The **SUPPLIER** shall endeavor to complete their scope of work within the time specified in the contract. It may be noted that "time is the essence of this contract", subject to clauses-1.15 and 1.21 of the General Conditions of Contract. If the **SUPPLIER** fails to supply any or all of the goods within contract stipulated time in the contract to suit commissioning within 12-months from the zero date of the contract, the **PURCHASER** shall, without prejudice to their other remedies under the contract, deduct from the contract price, as liquidated damages, a sum equivalent to 0.5% of the total contract price for each week of delay until actual performance, up to a maximum deduction of 5% of the total contract price, the total contract price being inclusive of subsequent modifications and price escalation, if contractual. Once the maximum is reached, the **PURCHASER** may consider termination of the contract.

## 2.13 Indemnity

2.13.1 The **SUPPLIER** shall indemnify and hold harmless the **PURCHASER / CONSULTANT** from all claims, losses, demands, causes of action or suits arising out of the equipment and material furnished by them. The **SUPPLIER** shall also indemnify the **PURCHASER** against all third party claims, any infringement of trade mark or patent or industrial design rights arising from use of the goods or any part thereof. Indemnity Clause shall apply to both the parties equally.

2.13.2 **SUPPLIER** shall conform to the provisions of Indian Boiler Regulations (as applicable), Indian Factories Act, Indian Electricity Rules etc. relating to the work and to the regulations and by laws of any authority, if required.

## 2.14 Insurance

- 2.14.1 The **SUPPLIER** is responsible for comprehensive risk, insurance including transit charges of all machinery and equipments, other consumables, directly dispatched to the **PURCHASER** Sugars plant site from the **SUPPLIER** / Sub-contractors or sub-**SUPPLIER** respective place of manufacture and despatch and the insurance policies in respect thereof shall be arranged by the **SUPPLIER** at such premium rates with such insurance companies as may be approved by the **PURCHASER** and kept in full force and effect until commissioning of the said plant.
- 2.14.2 Any consignment received at the place of destination in damaged conditions or is lost in transit, the representative of the **SUPPLIER** / **SUPPLIER'S** erection contractor will take an open delivery from the carriers and will give suitable remarks in the delivery book maintained by the Station Master or other carriers about the loss or breakage in transit. The representatives of the **SUPPLIER** shall lodge claims with the Railway or other carriers on behalf of the **PURCHASER** in time with a copy to the **PURCHASER** for information. All realization of claims from the carrier / railway and insurance company, whether in the name of the **SUPPLIER** shall be to the account of the **SUPPLIER**. The **SUPPLIER** shall supply the replacement of machinery and equipments, goods free of cost delivered at the site to the **PURCHASER** within the time as far as possible so as to adhere to the date of commissioning.
- 2.14.3 All goods supplied under this contract shall be fully insured by the **PURCHASER** on all risks basis against loss/damage during transit from the place of manufacture of the **SUPPLIER** and from the places of manufacture of their Sub-**SUPPLIER** to the site of installation.
- 2.14.4 If there is any loss or damage to goods, within 15 days of such occurrence the **SUPPLIER** will take action to make good the loss so that it will not affect the overall time schedule of the project.

## 2.15 Performance guarantee

- 2.15.1 The **SUPPLIER** shall guarantee that the performance of the equipment supplied under the contract shall be strictly in conformity with the requirement given in the specification and shall perform the duties specified under the contract. The performance trials will be conducted in the presence of authorized representatives of:
- a. Purchaser
  - b. Supplier
  - c. Consultant
  - d. Representative of Erector
- 2.15.2 If the performance of the equipment fails to prove the guarantee set forth in the specification, **SUPPLIER** shall investigate the causes and provide, free of cost to **PURCHASER**, materials, and equipment within one (1) month or such reasonable period, to be mutually discussed and agreed, to prove the guarantees.
- 2.15.3 If the **SUPPLIER** fails to prove the guarantee within the reasonable period, as mutually agreed upon, **PURCHASER** shall have the option to take over the equipment and rectify, if possible, the equipment to fulfill the guarantees and or to make necessary additions to make up the deficiency at
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**SUPPLIER's** risk and cost. All expenditure incurred by the **PURCHASER** in this regard shall be to **SUPPLIER's** account.

- 2.15.4 The manufacturers' guarantees for all bought out items/equipment/instruments etc., shall be made available to the **PURCHASER** and shall be valid for the entire maintenance warranty period. If such guarantees are not issued by the manufacturer, the **SUPPLIER** shall guarantee the bought out items for the entire maintenance warranty period along with their guarantee for the plant as a whole.
- 2.15.5 In the event of failure of any particular part of any equipment more than three times during the maintenance warranty period, it shall not be repaired but the complete part shall be replaced by the **SUPPLIER** and the warranty for this particular part shall be extended by one year from the date of last replacement or the maintenance period of two crushing season, whichever is later.
- 2.15.6 In case it is found that the above mentioned failure is due to some connected part of the equipment, that part shall also be rectified or replaced by the **SUPPLIER** to avoid such failure in the future. The warranty for such replaced parts shall be extended by one year, for parts replaced within six (6) months of commissioning of the equipment, and six months for parts replaced after six months of commissioning of the equipment, from the date of last replacement. or the maintenance period of two crushing season, whichever is later.
- 2.15.7 For electrical motors, during the warranty period, in case some important part of the motor like stators, winding, shaft, squirrel cage rotor etc., become defective, the warranty shall cover its replacement, and no repairs shall be allowed.

## **2.16 Spare parts, lubricants**

- 2.16.1 All the spare parts for the equipment under the contract will strictly conform to the specification and other relevant documents and will be identical to the corresponding main equipment / components supplied under the contract and shall be fully interchangeable.
- 2.16.2 Commissioning spares are not envisaged separately. However, any and all requirement of commissioning spares until commissioning of plant shall be **SUPPLIER's** responsibility.
- 2.16.3 The quality plan and the inspection requirement finalized for the main equipment will also be applicable to the corresponding spares.
- 2.16.4 The **SUPPLIER** will provide the **PURCHASER** with the addresses and particulars of all their **SUB-SUPPLIER** while placing the order on vendors for items / components / equipment covered under the contract and will further ensure with their vendors that the **PURCHASER**, if so desires, will have the right to place order for spares directly on them on mutually agreed terms based on offers of such vendors.
- 2.16.5 Apart from the requirement of this clause, the **SUPPLIER** shall maintain all critical spares, and shall undertake to supply them as and when required during the life time of the unit, at the prevailing prices and with in a reasonable time required for supply, such that the **PURCHASER** does not face any hardship due to the machine break down and the consequent loss of production.
- 2.16.6 Details of all the spare parts are required to be provided in the item master format (format will be shared by Purchaser to L1 bidder after award of PO) which will include all the technical details regarding the spare parts along with indicative price, approved suppliers with their details for ease in procurement after installation



2.16.7 In the event of termination of production of the spare parts by the **SUPPLIER** or their **SUB-SUPPLIER**:

2.16.7.1 The **SUPPLIER** shall give advance notification to the **PURCHASER** of the impending termination of production, in sufficient time to permit the **PURCHASER** to procure their requirement.

2.16.7.2 Following such termination, the **SUPPLIER** shall furnish to the **PURCHASER**, at no extra cost to the **PURCHASER**, blue prints, drawings and specification of the spare parts, if and when required.

## 2.17 Licenses and permits

The **SUPPLIER** shall procure necessary permits, certificates and licenses such as from the Chief Inspector of Boilers (as applicable), Electrical Inspectorate, Inspector of Factories, and such statutory bodies required by virtue of all applicable law, regulations, ordinances and other rules in effect at the place where any of the work is to be performed and the **SUPPLIER** shall further agree to hold the **PURCHASER** harmless from liability or penalty which may be imposed by reason of asserted or established violation of such laws, regulations, ordinances or other rules.

## 2.18 Arbitration

If at any time there should be any question, dispute, difference between the parties in respect of any matter arising out of or in relation to the contract, either party may give to the other party notice in writing of the existence of such question, dispute or difference, and the same shall be referred to the arbitration of panel of Engineers appointed by each party as per prevailing arbitration act.

The award of the Arbitrator shall be final and binding of the parties and be accepted by them. This reference to the Arbitrator shall be deemed to be reference, under the provisions of the Arbitration Act, 1996 and the rules made there under and any statutory modifications or recent amendment thereof that may be made from time to time and actually in force at the time of the reference. The cost of arbitration shall be borne by the parties as may be decided upon by the Arbitrator.

## 2.19 Instructions, directions and correspondence

2.19.1 The materials and equipment described in this contract are to be supplied according to the standards, data sheets, tables, specification enclosed with the contract itself and according to all conditions specified in the contract.

2.19.1.1 All instructions and orders to **SUPPLIER** shall, excepting what is herein provided, be given by **PURCHASER** and/or **CONSULTANT**, in writing.

2.19.1.2 All the work shall be carried out under the direction of and to the satisfaction of **PURCHASER/CONSULTANT**.

2.19.1.3 All communications, from **SUPPLIER**, including technical-commercial clarifications and/or comments shall be addressed to **PURCHASER** with a copy to **CONSULTANT** and shall always bear reference to the contract.

2.19.1.4 Suitable **PURCHASER** identification numbers shall be shown on all invoices, communications, packing lists, containers and bills of lading, etc.

2.19.1.5 Correspondence on technical and commercial matters shall be dealt in separate letters and each copy of the letter shall be complete with all annexures.

## **2.20 Excess materials**

2.20.1 This contract is for the supply of the equipment as specified, along with all their accessories and auxiliaries and the **SUPPLIER** shall supply all the equipment and material required for this purpose. Any excess material over and above this requirement supplied by the **SUPPLIER** shall be taken back by the **SUPPLIER** after the satisfactory commissioning of the plant.

2.20.2 The **SUPPLIER** has to take all care for the safety of such excess materials and the **PURCHASER** is not responsible for any loss or damage to such materials

## **2.21 Contract coordination procedure**

2.21.1 The **SUPPLIER** shall identify one of their senior executives as the contract coordinator. The contract coordinator shall liaison closely with **PURCHASER's** executives and **CONSULTANTS** for the effective completion of the project within the stipulated time schedule.

2.21.2 The **SUPPLIER** shall prepare a contract coordination procedure in consultation with the **PURCHASER / CONSULTANT** for the smooth execution of the work. It shall cover, but not limited to, the following:

- a. Contract coordinators
- b. Progress review meeting / Engg. review meeting
- c. Progress reporting
- d. Billing procedure
- e. Inspection co-ordination procedure
- f. Shipping procedure
- g. Expediting procedure

## **2.22 Performance tests and Guarantee**

The **SUPPLIER** shall guarantee the following:

- a. That all the machinery and equipment shall work as specified in Volume II forming part of the tender.
- b. That all the machinery and equipments will be brand new of latest design and first-class material and workmanship. Any part found defective, within two crushing season from the date of commissioning of the plant, shall be replaced or satisfactorily rectified by the **SUPPLIER** free of charge, should such defect be due to either faulty design / workmanship or use of defective material.
- c. Defects liability Period: 12 months from the date of completion of the entire job. (To be read together with General terms & Conditions)
- d. As per GTC, Original PBG for defect liability period (If Bidder chose not to deduct 10% retention) to be submitted at Purchase dept, Patna and copy at site.

The performance tests on the Modernization of existing Evaporation system with BoP shall be conducted within six (6) weeks from the date of commissioning. Upon successful completion of performance tests required by the **PURCHASER** and availability of the documentation including the layout and arrangement as built drawings and maintenance manuals, as well as fulfillment of all other obligations by the **SUPPLIER**, taking over certificate as a proof of final acceptance of the equipment/system under scope of supply will be issued by the **PURCHASER**. The taking over certificate shall not be unduly delayed without assigning any acceptable reason.

If the performance test could not be conducted within the five (5) months' period, owing to an intervening off-season, the test shall be conducted immediately after the starting and stabilization of the next cane crushing season, applying the internationally accepted ageing factors, failing which the conducting of performance test and any extension of performance bank guarantee will be mutually discussed.

## **2.23 Penalty for shortfall in performance (detailed in Appendix IV)**

2.23.1 The **SUPPLIER**'s guaranteed performance included as part of this contract shall be binding on them.

2.23.2 The terms of guarantee fall under two categories:

2.23.2.1 Items for which penalties will be leviable for shortfall in performance.

2.23.2.2 Items for which shortfall in performance is not acceptable beyond a permissible tolerance.

2.23.3 The **Appendix IV** gives the penalties leviable for the shortfall in performance of the plant and equipment supplied.

2.23.4 If the total value of penalties for shortfall in performance exceed ten (10) percent of total contract price, and the **SUPPLIER** has expressed his inability to rectify the defect and bring the equipment performance to the guaranteed level, then the **PURCHASER** retains the option to reject the equipment, and in case of such option the **SUPPLIER** shall, jointly and severally, replace the equipment with the one, which shall meet the guaranteed figures. The replacement shall be done within a reasonable period mutually agreed and at no extra cost to the **PURCHASER**.

2.23.5 For those items for which shortfall in performance is not acceptable beyond a permissible tolerance, vide clause 2.23.4 above, the **SUPPLIER** jointly and severally, shall carry out modifications to obtain the guaranteed performance within the stipulated tolerance. It may be noted that as these are primary parameters, they must be corrected even before the trial run is started, and further, these parameters must remain stable throughout the period of trial run.

2.23.6 If finally, in spite of all practical efforts on the part of the **SUPPLIER**, the stipulated guarantees on these parameters are not established, the **PURCHASER** retains the option to reject the equipment. In case the option to reject is exercised by the **PURCHASER**, the **SUPPLIER** shall jointly and severally be responsible for the replacement of the rejected equipment within a

reasonable period of time as will be indicated by the **PURCHASER** and achieve the performance as guaranteed.

2.23.7 In the event of rejection of equipment for above reasons, it is obvious that the overall project schedule will be affected. To minimize the loss due to such an occurrence, the **PURCHASER** retains the right to use as best as possible, the faulty equipment until new replacement arrives at site. Note should be taken that as the faulty equipment has not been taken over by the **PURCHASER**, the responsibility for it lies entirely with the **SUPPLIER**. During this period, the **SUPPLIER** shall not limit the use of the faulty equipment, except for reasons of safety during operation, both of personnel and the equipment.

## 2.24 **PURCHASER's right to withhold payment**

**PURCHASER** shall have the right to withhold or nullify the whole or a part of any application of **SUPPLIER** for payment to such extent as may be necessary to protect **PURCHASER** from sustaining any loss on account of:

- a. short supply not made good by **SUPPLIER**
- b. defective supply not rectified / made good by **SUPPLIER**
- c. defective work not remedied / replaced by **SUPPLIER** and to release the amount withheld after fulfillment by **SUPPLIER**

## 2.25 **Training of PURCHASER's personnel**

2.25.1 If considered necessary by the **PURCHASER**, the **SUPPLIER** shall undertake to train, the **PURCHASER's** engineering personnel (two persons) at their works / their sub-contractors' works without any additional liability to the **PURCHASER**. These engineering personnel shall be given special training in the shops, where the equipment will be manufactured and where possible, in any other plant where equipment manufactured by the **SUPPLIER** is under installation, operation or testing to enable these personnel to become familiar with the equipment being furnished by the **SUPPLIER**. The period of training shall be a minimum of 15-days.

2.25.2 All traveling expenses for the engineering personnel to be trained will be borne by the **PURCHASER**. Accommodation at the place of training, food and local travel facilities shall be provided by the **SUPPLIER**. These engineering personnel while undergoing training shall be responsible to the **SUPPLIER** for discipline.

## 2.26 **Expediting**

When deemed advisable, this contract shall be subjected to physical expediting by the **PURCHASER / CONSULTANT** who shall be granted access to any and all parts of **SUPPLIER's** or the **SUB-SUPPLIER's** plant and office involved in the manufacture or processing of the contract.

Expediting performance by the **PURCHASER's** representative shall in no way relieve the **SUPPLIER** of delivery obligations under the terms of the contract.

## 2.27 **Suspension of work & extension of time**

The **SUPPLIER** shall, if ordered in writing by the **PURCHASER** or their representative, temporarily suspend the work or any part thereof for such period and such time as so ordered and shall not after

receiving such written orders, proceed therewith. In the event of suspension of work for a prolonged time by the **PURCHASER**, for the consequent idle time for the **SUPPLIER**, the **SUPPLIER** shall be compensated based on mutual agreement. The **SUPPLIER** shall not be responsible for the same, provided that the suspension was not consequent to any default / failure on the part of the **SUPPLIER** and the contractual delivery schedule shall be suitably extended after mutual discussion.

## **2.28 Sequence of delivery**

The **SUPPLIER** shall deliver the goods as per the terms and conditions of the contract. Delivery terms are meant to be binding and essential. All materials shall be dispatched as per the agreed sequential order, suitable for erection progress at site. The delivery schedule shall also, indicate the approximate value of the major equipments. No deviation from the agreed sequence is allowed without **PURCHASER**'s written approval. In case of deviation, the **PURCHASER** shall have the right to accept the supply but withhold the payment till the agreed date for the delivery of such material. If the delivery of any items as per the delivery schedule is delayed, the delivery of the subsequent items shall not be held up on this account.

## **2.29 Load data**

**SUPPLIER** shall be responsible for correctness of the load data furnished by them to the **PURCHASER** for civil foundations.

In the event of notice of defects in the civil work, due to incorrect data furnished by the **SUPPLIER**, the cost incurred for redoing / rectifying, shall be borne by the **SUPPLIER**.

## **2.30 Quality assurance and Quality control**

2.30.1 Quality Assurance (QA) shall mean the organizational set up, procedures as well as test, methods and facilities developed by **SUPPLIER** in order to assure that all goods leaving **SUPPLIER**'s/ their **SUB-SUPPLIER**'s shops are of the highest quality i.e., equal or exceeding the requirement specified by the **PURCHASER**.

2.30.2 Quality Control (QC) shall mean all the tests, measurements, checks and calibrations to be carried out in vendor's shop in order to compare the actual characteristics of the goods with the specified ones, as well as the documentation (certificates, records) containing the data or result of these activities.

2.30.3 The **SUPPLIER** shall submit a detailed procedure for quality control and quality assurance. The **PURCHASER** reserves the right to order for the technical audit of quality control and quality assurance systems followed by the **SUPPLIER** / **SUB-SUPPLIER**.

## **2.31 Dispatch Notice**

**SUPPLIER** shall notify **PURCHASER** by E-mail, 7-days before the expected date of delivery of a consignment, date of readiness of equipment for shipment, total gross weight and total volume

### **III. TERMS & CONDITIONS FOR THE ERECTION & COMMISSIONING SERVICES CONTRACT**

#### **1. GENERAL CONDITIONS OF CONTRACT FOR SERVICES**

##### **1.1 Use of contract documents and information**

- 1.1.1 The CONTRACTOR shall not, without the OWNER's prior written consent, disclose the contract, or any provision thereof, or any specification, drawing, pattern, sample or information furnished by or on behalf of the OWNER in connection therewith, to any person other than a person employed by the CONTRACTOR in the performance of the contract. Disclosure to any such employed person shall be made in confidence and shall extend only so far as may be necessary for purposes of such performance.
- 1.1.2 The CONTRACTOR shall not, without the OWNER's prior written consent, make use of any document or information specified in clause-1.1.1<sup>1</sup> above, except for purposes of performing the contract.
- 1.1.3 Any document other than the contract itself, specified in clause-1.1.1 above, shall remain to be the property of the OWNER and shall be returned (in all copies) to the OWNER, on completion of the CONTRACTOR'S performance under the contract, if so required by the OWNER.

##### **1.2 Change in the contract**

- 1.2.1 The OWNER may at any time, by written notice to the CONTRACTOR make changes within the general scope of the service contract.
- 1.2.2 Upon notification by the OWNER of such change/s, the CONTRACTOR shall submit to the OWNER an estimate of costs for the proposed change/s, including any change in the schedule of payments, within ten (10) calendar days of the receipt of notice, and shall include an estimate of the impact, if any, on the time schedule under the contract, as well as the detailed schedule for the execution of the change, if applicable.
- 1.2.3 The CONTRACTOR shall not perform changes in accordance with clause-1.2.1 above until the OWNER has authorized a change in writing on the basis of the estimate provided by the CONTRACTOR as described in clause-1.2.2 above.
- 1.2.4 Changes mutually agreed upon shall also constitute a part of the work under this contract, and the provisions and conditions of the contract shall apply to said changes.
- 1.2.5 In the event the OWNER shall cause the CONTRACTOR to expend labour or consumables, or both, of any nature in order to provide the OWNER with information upon which to base a decision as to whether a change should be ordered, the OWNER shall reimburse the CONTRACTOR for the total costs related to supplying such information.

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<sup>1</sup> Any reference to the clause numbers made within section III shall be construed to be the reference with in Section III only.

1.2.6 Except with the express permission of the **OWNER**, the installation of goods shall not be delayed pending agreement of costs or schedules affected by minor changes.

### **1.3 Contract Amendments**

1.3.1 Subject to clause-1.2, no variation in or modification of the conditions and terms of the contract shall be made except by written amendment signed by the parties.

### **1.4 Sub-contracts**

1.4.1 The **CONTRACTOR** shall not sub-contract all or any part of the contract without notifying the **OWNER** in writing, of the details of the sub-contractor and the work sub-contracted. Only approved sub-contractors of the **CONTRACTOR** shall be employed.

1.4.2 The **CONTRACTOR** guarantees that any and all sub-contractors of the **CONTRACTOR** for performance of any part of the work under the contract will comply fully with the terms of the contract applicable to such part of the work under the contract.

### **1.5 Country of Origin**

All services provided under this contract shall be within India.

### **1.6 Inspection and tests**

1.6.1 The **OWNER** or their representative or a reputed third party inspection agency nominated by the **OWNER**, shall have the right to inspect the work being carried out under this contract. However, for IBR items, third party inspection is not necessary. The Special Conditions of Contract or the specification or both shall specify what inspections and tests the **OWNER** requires and where they are to be conducted. The **OWNER** shall notify the **CONTRACTOR** in writing of the identity of representatives or third party agency retained for these purposes.

### **1.7 Contract performance security (Retention money)**

1.7.1 The **CONTRACTOR** shall cause contract performance security to be furnished to the **OWNER** for the amount of ten percent (10%) of the contract price by means of a Bank Guarantee. Such performance security shall be provided, in the form satisfactory to the **OWNER**, within fifteen (15) days after the **CONTRACTOR**'s receipt of the notification of award of contract. The period of validity of the contract performance security shall be until the completion of work under the contract plus one year.

1.7.2 The proceeds of the performance security shall be payable to the **OWNER** as compensation for any loss resulting from the **CONTRACTOR**'s failure to complete the work under the contract. The **CONTRACTOR** shall cause the validity period of the performance security to be extended for such period(s) as the work schedule may be extended pursuant to clause-1.11.2.

1.7.3 The performance security shall be in the following form:

A bank guarantee, issued by a bank acceptable to the **OWNER**, in a form acceptable to the **OWNER**.

1.7.4 The performance security will be discharged or returned or both by the **OWNER** not later than thirty

(30) days following the date of satisfactory commissioning and acceptance.

1.7.5 The bank guarantee as per clause-1.7.3 above, shall be enforceable by the OWNER in case the CONTRACTOR does not commence or continue to work as per the schedule / bar chart by giving 30-days' notice.

## **1.8 Indemnity**

1.8.1 The **CONTRACTOR** and the **OWNER** shall indemnify and hold harmless each other from and against such claims and liabilities as provided in the Special Conditions of Contract.

1.8.2 Notwithstanding anything in this contract to the contrary, it is agreed that neither the **CONTRACTOR** nor the **OWNER** shall be held liable to the other party for loss of production, loss of profit, loss of use or any other indirect or consequential damage, except losses due to defects due to improper handling and installation.

## **1.9 Insurance**

1.9.1 Necessary insurance cover shall be taken by the **CONTRACTOR** as mentioned in the Special Conditions of contract.

1.9.2 Without limiting the **CONTRACTOR's** liability (limited only to the contract price) the **CONTRACTOR** shall ensure that their sub-contractors also procure such additional insurance cover as specified above.

1.9.3 The **CONTRACTOR** shall ensure that further insurance covers as specified in the Special Conditions of the contract are also arranged.

## **1.10 Payment**

1.10.1 The PURCHASER will pay the CONTRACTOR directly for the costs of loading, transportation to site, transit insurance, unloading, storage at site, installation and commissioning services as per *Appendix – I*.

1.10.2 The Price shall be firm and no escalation whatsoever is applicable till the completion of the contract.

1.10.3 All Payments shall be made in Indian rupee only.

1.10.4 Subject to clause-1.2 of the General Conditions of Contract and as provided for in the price schedule, price charged by the CONTRACTOR for services under the contract shall not vary from the prices agreed by the CONTRACTOR and given in the price schedule.

1.10.5 Payment for all invoices shall be made within 30-days from the date of submission and acceptance of the invoices by the OWNER.

1.10.6 The **CONTRACTOR's** invoices shall be paid in full inclusive of taxes and duties, after the deduction of advances and the retention money. The **OWNER** shall not make any deductions against any claims he may have on the **CONTRACTOR** as per the contract terms, unless the details of claim have been communicated to the **CONTRACTOR** in advance.

## **1.11 Extension in the CONTRACTOR's performance**

1.11.1 Installation and commissioning of the goods shall be made by the **CONTRACTOR** in accordance with



the time schedule, pursuant to the Special Conditions of Contract.

1.11.2 The **CONTRACTOR** may claim extension of the time limits as set forth in the work schedule in case of:

- a. Changes ordered by the **OWNER** pursuant to clause-1.2;
- b. Delay in any service which is to be provided by the **OWNER** (services provided by the **OWNER** shall be interpreted to include all approvals by the **OWNER** under the contract as well as access to the site);
- c. Delay in timely fulfillment of obligation by the Purchaser.
- d. Delay in timely release of payments by the Purchaser.
- e. Suspension, variations or any other reasons of delay, which is not attributable to the supplier.
- f. Force majeure pursuant to clause-1.17; and
- g. Delay in performance of work caused by orders issued by the **OWNER**.

The Supplier shall be entitled to extension to time for the corresponding period besides escalation/increase in price on account of delays, which shall be mutually discussed and agreed.

The **CONTRACTOR** shall demonstrate to the **OWNER**'s satisfaction that they have used their best endeavors to avoid or overcome such causes of delay, and the parties will mutually agree upon remedies to mitigate or overcome such causes of delay. The extension of time limit shall be mutually discussed and agreed.

## 1.12 Termination for Default

1.12.1 The **OWNER** may, without prejudice to any other remedy for breach of contract, by written notice of default sent to the **CONTRACTOR**, terminate the contract in whole or in part:

- a. If the **CONTRACTOR** fails to deliver any or all of the services within the time period(s) specified in the contract, or any extension thereof granted by the **OWNER**, pursuant to clause-1.11; or
- b. If the **CONTRACTOR** fails to perform any other obligation(s) under the contract; and if the **CONTRACTOR**, in either of the above circumstances, does not cure their failure within a period of ten (10) calendar days (or such reasonable period as the **OWNER** may authorize in writing) after receipt of a notice of default from the **OWNER** specifying the nature of the default(s).

## 1.13 Termination for Insolvency

1.13.1 The **OWNER** may at any time terminate the contract by giving written notice to the **CONTRACTOR**, without compensation to the **CONTRACTOR**, if the **CONTRACTOR** becomes bankrupt or otherwise insolvent. Notwithstanding the above, such termination will not prejudice or affect any right of action or remedy which has accrued or will accrue thereafter to the **OWNER**.

Provisions for termination for insolvency shall apply viz-a-viz to both the parties. In the event of termination for insolvency by the Supplier, provisions for termination for convenience by the Purchaser shall apply.

## 1.14 Termination for Convenience

1.14.1 The **OWNER** may, by written notice to the **CONTRACTOR**, terminate the contract, in whole or in part, at any time for their convenience. The notice of termination shall specify that termination is for the **OWNER**'s convenience, the extent to which performance of work under the contract is terminated, and the date upon which such termination becomes effective.

1.14.2 For the extent of work terminated, the **OWNER** shall pay an agreed amount for partially completed services by the **CONTRACTOR** for the purpose of the contract, together with a reasonable allowance for overhead and profit and a reasonable compensation, based on mutual discussions, for the financial commitments made by the **CONTRACTOR** for fulfilling their obligations under this contract.

### **1.15 Resolution of disputes**

1.15.1 The **OWNER** and the **CONTRACTOR** shall make every effort to resolve amicably by direct informal negotiation any disagreement or dispute arising between them under or in connection with the contract.

1.15.2 If, after thirty (30) days from the commencement of such informal negotiations, the **OWNER** and the **CONTRACTOR** have been unable to resolve amicably a contract dispute, either party may require that the dispute be referred for resolution by arbitration by the mechanism described in the Special Conditions of Contract. The award shall be final and binding on the parties.

### **1.16 Jurisdiction for legal proceedings**

1.16.1 The contract shall be governed by and interpreted in accordance with the Indian laws. No suit or any proceedings in regard to any matter arising in any respect under this contract shall be instituted in any court other than the court Patna. No other court shall have jurisdiction to entertain any suit or proceedings even though part of the cause of action might arise within their jurisdiction.

### **1.17 Force majeure**

1.17.1 In the event that the **CONTRACTOR** or any of their sub-contractors, or the **OWNER** delays performing any of their respective obligations under the contract, and such delay is caused by force majeure, by acts of God / Government in its sovereign capacity, including but not limited to war, civil insurrection, riots, strikes, fires, floods, epidemics, earthquakes, quarantine restrictions and freight embargoes, such delay may be excused as provided in clause-1.11, and the period of such delays, or a period mutually discussed and agreed, may be added to the time of performance of the obligation delayed.

1.17.2 If a force majeure situation arises, the **CONTRACTOR** shall promptly notify the **OWNER** in writing within 15 days of such condition and the cause thereof along with documentary evidence. Unless otherwise directed by the **OWNER** in writing, the **CONTRACTOR** shall continue to perform their obligations under the contract as far as is reasonably practical, and shall seek all reasonable alternative means for performance not prevented by the force majeure event.

1.17.3 In no event shall, a force majeure event excuse the obligations of a party, if those obligations are required to have been completely performed, prior to the occurrence of that force majeure event.

### **1.18 Assignment**

1.18.1 The **CONTRACTOR** shall not assign to any other agency, in whole or in part, their obligations to perform under the contract, except with the **OWNER**'s prior written consent.

### **1.19 Contract language**

1.19.1 The **CONTRACTOR** hereby represents that it has sufficient knowledge of the English language to understand the contract fully. The contract shall be in the English language, and all documentation related hereto will also be in the English language, except if otherwise specifically agreed in writing between the parties.

### **1.20 Taxes and duties**

1.20.1 The **CONTRACTOR** shall be entirely responsible for all taxes, duties and other such levies including entry tax and works contract tax imposed for the performance of the services as per the contract. The **CONTRACTOR** shall indicate the same in the price schedule.

### **1.21 Headings**

1.21.1 Headings, whether of clauses or of other parts of the contract, are for reference only and are not to be construed as part of the contract.

### **1.22 Waiver**

1.22.1 Failure of either party to insist upon strict performance by the other party of any provision of the contract shall in no way be deemed or construed to affect in any way the right of that party to require such performance.

## 2. SPECIAL CONDITIONS OF CONTRACT FOR SERVICES

### 2.1 Definitions

In this document, the words and phrases listed shall have the meaning specified against each word or phrase. Words imparting singular shall include plural and vice versa and words imparting the masculine gender shall include feminine gender and words imparting persons shall include bodies corporate.

- a. "The **OWNER**" means M/s **HPCL Biofuels Ltd (HBL), Village Lauriya West Champaran, Bihar**
- b. "The **CONSULTANT**" means M/S. MITCON Consultancy & Engineering Services Ltd., having their Registered Office at First Floor Kubera Chambers, Shivajinagar Pune 411 005 Maharashtra State.
- c. "The **CONTRACTOR**" shall mean the individual or firm providing the services under this contract.
- d. "The **GOODS/EQUIPMENT/PLANT**" shall mean all of the equipment, machinery and/or other materials which the **OWNER** is required to provide to the **CONTRACTOR** under the contract.
- e. "The **CONTRACT**" shall mean the Contract agreement entered into between the **OWNER**, and the **CONTRACTOR**, as recorded in the contract, signed by both the parties, including all attachments and appendices thereto and all documents incorporated by reference therein.
- f. "The **SUB-CONTRACTOR**" shall mean any individual or firm or company, to whom part of the contract has been sublet by the **CONTRACTOR** with the consent of the **OWNER**.
- g. "The **INSPECTOR**" shall mean any person or agency nominated by the **OWNER**, from time to time, to inspect equipment stage wise including final stage, at job site as per the terms of the contract.
- h. "**SUB-CONTRACT**" shall mean order placed by the **CONTRACTOR** for any portion of the work, with the necessary consent of **OWNER**.
- i. "**CONTRACT PRICE**" shall mean the 'consideration' payable by the **OWNER** directly to the **CONTRACTOR** as per the agreement and desire of **CONTRACTOR** for the full and proper performance of contractual obligations under the contract between the **OWNER** and the **CONTRACTOR**.
- j. "**DELIVERY**" shall mean the completion of all erection work within the completion date specified in the contract, vide clause 2.7.2 of the Special Conditions of Contract.
- k. "**SITE**" shall mean and include the land and other places on, into or through which the works and the related facilities are to be erected or installed, at the **PURCHASER's** site at Village Lauriya West Chaparan, Bihar.
- l. "**DRAWINGS**" shall mean the technical specification which shall include engineering drawings, sketches showing plans, sections and elevations related to the contract together with modifications and/or revision thereto.
- m. "**SPECIFICATION**" shall mean and include schedules, detailed description, statements of technical data, performance characteristics, standards (Indian as well as international) as applicable and specified

in the contract.

- n. “**ENGINEER/ENGINEER-IN-CHARGE**” shall mean the person so nominated by the **OWNER** for the time being or such other person as may be duly authorized and appointed in writing by the **OWNER** to act as site engineer for the purpose of the contract. In cases where no such engineer is so appointed, the word ‘engineer’ shall mean the **OWNER** or their duly authorized representatives.
- o. “**TESTS**” shall mean such process or processes to be carried out by the **CONTRACTOR** as are prescribed in the contract or considered necessary by **CONSULTANT / OWNER** and **CONTRACTOR** together after mutual discussions, in order to ascertain quality, workmanship, performance and efficiency of equipment or part thereof.
- p. “**APPROVAL**” shall mean and include the written consent, either manuscript, type-written or printed statement, under signature or seal, as the case may be, of the **OWNER/CONSULTANT** or their authorized representative on documents, drawings or other particulars in relation to the contract.
- q. “**DATE OF CONTRACT**” shall mean the date on which the parties have signed the contract.
- r. “**MONTH**” shall mean the calendar month.
- s. “**DAY AND DAYS**” shall mean the calendar day or days of twenty four (24) hours each.
- t. “**WEEK**” shall mean a continuous period of seven (7) days.
- u. When the words ‘Approved’, ‘Subject to Approval’, ‘Satisfactory’, ‘Required’, ‘As Directed’, ‘Where Directed’, ‘Determined By’, ‘Accepted’, ‘Permitted’, or words or phrases of like importance are used, the approval, judgement, direction etc., are understood to be a function of **OWNER / CONSULTANT**
- v. “**WORK**” shall mean all the services to be rendered by the **CONTRACTOR** under the contract.
- w. “**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 shall include the preliminary inspection and checkup of equipment and supporting sub-system, initial operation of the complete equipment to obtain necessary pre-trial data, perform calibration and corrective action and adjustment prior to trial operation period.
- x. “**COMMISSIONING**” shall mean the first operation of the equipment (after all initial adjustments, trials, cleaning and re-assembly required at site if any, have been completed) and the equipment is ready for commercial use.
- y. “**SATISFACTORY COMMISSIONING for the purpose of claiming retention money**”, means the continuous operation of the equipment to the full capacity and establishment of its strict performance of the contractual requirement.
- z. “**THE ZERO DATE OF THE CONTRACT**” shall be issue of LOI OR date of Contract Signed

## **2.2 Scope of the contract**

- 2.2.1 The **CONTRACTOR**’s scope of work comprises of the transportation of the goods to site from the

equipment supplier's works, unloading, storage at the site, handling, installation, commissioning and performance testing of plant and machinery as defined in the specification, with all their accessories, fittings, supports and all the auxiliary equipment and material as detailed in the specification.

- 2.2.2 Wherever it is stated in this contract that such and such service is to be provided, it shall be understood that the same shall be effected/carried out by the **CONTRACTOR** within the contract price, unless a different intention is specifically and expressly stated herein or otherwise explicit from the context.
- 2.2.3 The **CONTRACTOR** shall ensure that the work shall be of first-class quality and shall be performed:
- a. with due diligence and efficiency.
  - b. in accordance with the provisions of the Contract agreement and the time schedule indicated in this Contract.
- 2.2.4 The **CONTRACTOR** shall at all times ensure that the work is carried out by fully qualified and experienced personnel to warrant the performance of the work in accordance with this Contract.
- 2.2.5 The **CONTRACTOR's** obligations towards the contract include besides erection and commissioning of Modernization of existing Evaporation system with BoP, performance testing, trial operation, reliability run and handing over of the Modernization of existing Evaporation system with BoP to the **OWNER**.
- 2.2.6 Training of the **OWNER's** personnel at the site.

### 2.3 Codes & Standards

The services performed under this contract shall conform to the codes and standards mentioned in the technical specification, and, when no applicable standard is mentioned, to the authoritative codes and standards and such standards shall be the latest issued by the concerned institution. In the event that the language of such codes and standards happens to be anything other than English, the **CONTRACTOR** shall furnish the English translation of all such codes and standards proposed to be used in the contract. Such English translations shall be provided to the **OWNER / CONSULTANT** within the first four (4) weeks from the date of the contract.

### 2.4 Workmanship

The workmanship shall meet the requirement of relevant standards and good engineering practices.

### 2.5 Statutory approval for work

- 2.5.1 The application for submission to inspector, or any other authority required as per statutory rules and regulations of State / Central governments along with copies of required certificates complete in all respects shall be prepared by the **CONTRACTOR**. At the site the primary responsibilities for statutory approvals and liaison with government authorities for approvals shall be with the **OWNER** and the **CONTRACTOR** shall provide all necessary assistance to the **OWNER** in this regard.

The **PURCHASER** shall pay the statutory inspection and other fees and charges payable under the terms of any act of Regulation in respect of the installation, operation or use of machinery and

equipments. But the follow-up work for get the approval is to be done by the SUPPLIER at their cost. The PURCHASER will extend all co-operation in this respect.

2.5.2 Any change / addition required to be made to meet the requirement of the statutory authorities, if such changes /additions of the statutory requirement come into force before the date of signing of the contract, shall be carried out by the **CONTRACTOR** free of charge.

The changes/additions required, consequent to the statutory regulations coming into force after the date of signing of the contract shall be paid by the **OWNER** after mutual agreement. The inspection and acceptance of the work by statutory authorities shall, however, not absolve the **CONTRACTOR** from any of their responsibilities under the contract.

**2.6 Testing and inspection**

2.6.1 The equipment will be inspected and where practicable, submitted to such tests at site as deemed necessary by the **OWNER / CONSULTANT**.

2.6.2 Where the **OWNER**'s representative is present to witness the tests, the test certificate shall be signed by him on successful completion of tests. In case the **OWNER** is not satisfied with the tests, he shall within seven days of his witnessing the tests, inform the **CONTRACTOR**, in writing, of any objection with regard to any equipment and workmanship with reference to the contractual provisions. The **CONTRACTOR** shall give due consideration to such objections and shall either make the modification that may be necessary to meet the said objections or shall confirm in writing to the **OWNER** giving necessary reasons, that no modifications are necessary to comply with the contract. However, any defect noticed at the time of installation or after installation and commissioning shall be rectified by the **CONTRACTOR** free of cost.

2.6.3 The extent of **OWNER**'s inspection could be mutually discussed and agreed between the **OWNER** and the **CONTRACTOR**.

**2.7 Time schedule**

2.7.1 Timely installation and commissioning of the plant and equipment shall be the essence of the contract. The **CONTRACTOR** shall so organize their resources and perform this work as to complete it not later than the date given in the following clause. The schedule of the equipment delivery by the equipment supplier will be furnished to the **CONTRACTOR** two (2) months before the first consignment is ready for dispatch. The **CONTRACTOR** shall mobilize their resources for the transportation of the deliverables from the **SUPPLIER**'s or their **SUB-SUPPLIER**'s works to the site and carefully store the equipment and materials at the site prior to the starting of the erection work.

2.7.2 The following shall be the schedule for the completion of various milestone activities for this package. The **CONTRACTOR'S** time schedule shall strictly conform to this schedule.

Milestone activity	Completion date
1. Engineering Activities 2. Completion of Supply 3. Commencement of erection 4. Completion of commissioning	To suit commissioning within 08-months from zero date for Modernization of existing Evaporation system with BoP i.e. date of issue of LOI/PO, whichever is earlier

2.7.3 If the situation warrants, on account of any delay in the performance of the services, the **CONTRACTOR** shall air lift the equipment to meet the delivery commitment. All expenditure towards

such air lifting, including tax implication if any, shall be to the **CONTRACTOR's** account, in case the delay in performance of services is directly attributable to the **CONTRACTOR**.

#### 2.7.4 Time schedule network/bar chart

2.7.4.1 The **CONTRACTOR** shall submit to **OWNER / CONSULTANT**, their time schedule regarding the erection and commissioning of the equipment and materials as well as information on their sub-contracts to be placed with third parties, including the dates on which the **CONTRACTOR** intends to issue such sub-contracts.

2.7.4.2 The time schedule will be in the form of a network or a bar chart clearly indicating all main or key events regarding transportation, erection and commissioning.

#### 2.7.5 Progress trend chart / monthly report

2.7.5.1 **CONTRACTOR** shall report monthly on the progress of the execution of contract and achievement of targets set out in time bar chart.

2.7.5.2 The progress will be expressed in percentages as shown in the form of progress trend chart.

2.7.5.3 The monthly reporting will be the updating of the progress trend chart.

2.7.5.4 The progress reports shall be submitted once in every fortnight till the completion of the contract.

2.7.5.5 The progress report shall further compare actual versus projected completion dates as well as describe current and anticipated problems and delaying factors, if any, and corrective action taken or proposed to be taken without in any way relieving or affecting the **CONTRACTOR's** responsibility to complete the services within the stipulated dates.

### 2.8 Liquidated damages for delay in time schedule

The **CONTRACTOR** shall endeavour to complete their scope of work within the time specified in the contract. It may be noted that "time is the essence of this contract", subject to clauses-1.11 and 1.17 of the General Conditions of Contract. If the **CONTRACTOR** fails to install and commission any or all of the goods within the time period(s) specified in the contract for services, the **OWNER** shall, without prejudice to the other remedies under the contract, deduct from the contract price, as liquidated damages, a sum equivalent to 0.5% of the total contract price for weekly of delay until actual performance, up to a maximum deduction of 5% of the total contract price, the total contract price being inclusive of subsequent modifications and price escalation, if contractual. Once the maximum is reached, the **OWNER** may consider termination of the contract.

### 2.9 Indemnity

2.9.1 The **CONTRACTOR** shall indemnify and hold harmless the **OWNER / CONSULTANT** from all claims, losses, demands, causes of action or suits arising out of the services and the labour furnished by them.

2.9.2 The **CONTRACTOR** shall indemnify the **OWNER** in respect of all actions, suits, claims and demands brought or made against **OWNER** by the workmen of the **CONTRACTOR** or any other person or persons or government authorities whomsoever, in connection with the work or in respect of any matter



or thing done or omitted to be done by the **CONTRACTOR** in the execution of or in connection with the work, notwithstanding that all reasonable and proper precautions may have been taken by the **CONTRACTOR**, and against any loss or damage to **OWNER** in consequence of any action or suit being brought against **OWNER** for anything done or committed to be done in connection with the execution of the work.

- 2.9.3 The **CONTRACTOR** shall reinstate all damages of every sort, so as to deliver the whole of the contract work complete and perfect in every respect, within the stipulated time.
- 2.9.4 The **CONTRACTOR** shall ensure compliance with all statutes, laws, rules and regulations of the Central or State governments or any other authority, such as the Workmen Compensation Act, 1923, Payment of Wages Act, Minimum wages Act, 1948, Employees State Insurance Act, Employees Provident Fund Act, etc., and any of the statutory modifications thereof in connection with employees engaged by them or their **SUB-CONTRACTORS** in the work.
- 2.9.5 **CONTRACTOR** shall conform to the provisions of Indian Boiler Regulations (as applicable), Indian Factories Act, Indian Electricity Rules etc. relating to the work and to the regulations and by laws of any authority, if required.

## **2.10 Insurance**

- 2.10.1 The **CONTRACTOR** is responsible for comprehensive risk, insurance including storage-cum erection insurance charges of all machinery and equipments, other consumables, handed over by the owner to the **CONTRACTOR**. The insurance policies in respect thereof shall be arranged by the **CONTRACTOR** at such premium rates with such insurance companies as may be approved by the **OWNER** and kept in full force and effect until commissioning of the said plant.
- 2.10.2 The **CONTRACTOR** shall also lodge claims for damage / loss of material or equipments during storage, erection and commissioning. All realization of claims from the insurance company, whether in the name of the **OWNER** or the **CONTRACTOR**, shall be to the account of the **CONTRACTOR**.
- 2.10.3 The **CONTRACTOR** shall also maintain an insurance policy against all claims which may be made upon the **OWNER** whether under the Workmen's Compensation Act or any other statute in force during the currency of the contract or at common law in respect of any employee of **CONTRACTOR** or their **SUB-CONTRACTORS**.

## **2.11 Licenses and permits**

The **CONTRACTOR** shall procure or render all the assistance to the **OWNER** to procure, as the case may be, necessary permits, certificates and licenses such as from the Chief Inspector of Boilers (as applicable), Electrical Inspectorate, Inspector of Factories, and such other statutory bodies required by virtue of all applicable laws, regulations, ordinances and other rules in effect at the place where any of the work is to be performed and the **CONTRACTOR** shall further agree to hold the **OWNER** harmless from liability or penalty which may be imposed by reason of asserted or established violation of such laws, regulations, ordinances or other rules.

## **2.12 Arbitration**

If at any time there should be any question, dispute, difference between the parties in respect of any matter arising out of or in relation to the contract, either party may give to the other party notice in

writing of the existence of such question, dispute or difference, and the same shall be referred to the arbitration of panel of Engineers appointed by each party as per prevailing arbitration act.

The award of the Arbitrator shall be final and binding of the parties and be accepted by them. This reference to the Arbitrator shall be deemed to be reference, under the provisions of the Arbitration Act, 1996 and the rules made there under and any statutory modifications or recent amendment thereof that may be made from time to time and actually in force at the time of the reference. The cost of arbitration shall be borne by the parties as may be decided upon by the Arbitrator.

## **2.13 Instructions, Directions and Correspondence**

2.13.1 The services described in this contract are to be provided according to the specification and conditions specified in the contract.

2.13.1.1 All instructions and orders to **CONTRACTOR**, excepting what is herein provided shall be given by **OWNER** and/or **CONSULTANT**, in writing.

2.13.1.2 All the services shall be provided under the direction of and to the satisfaction of **OWNER/CONSULTANT**.

2.13.1.3 All communications from **CONTRACTOR**, including technical/commercial clarifications and/or comments shall be addressed to **OWNER** with a copy to **CONSULTANT** and shall always bear reference to the contract.

2.13.2 Correspondence on technical and commercial matters shall be dealt in separate letters and each copy of the letter shall be complete with all annexures.

## **2.14 Excess Materials**

2.14.1 To expedite work, the **CONTRACTOR** may keep extra consumable materials in quantities at their cost more than that required for erection, installation and commissioning of the plant and equipment. Such excess material shall be treated as the property of the **CONTRACTOR**.

2.14.2 The **CONTRACTOR** has to take all care for the safety of such materials and the **OWNER** is not responsible for any loss or damage to such materials.

## **2.15 Contract coordination procedure**

2.15.1 The **CONTRACTOR** shall identify one of their senior executives as the contract coordinator. The contract coordinator shall liaison closely with **OWNER**'s executives and **CONSULTANTS** for the effective completion of the services within the stipulated time schedule.

## **2.16 Trial run and provisional take-over**

2.16.1 After all the systems have been erected and commissioned and completely stabilized and proved safe, the **CONTRACTOR** in consultation with the **OWNER / CONSULTANT** shall offer concern equipment/ plant as a whole for continuous and safe operation as a "trial run" for 7-days. A "reliability run" at rated design load for 24-hours of uninterrupted operation shall also be undertaken

during such “trial run”.

2.16.2 In case the trial operation is interrupted by default of the **CONTRACTOR** at any time then, and excepting any trivial tripping, it will be repeated from the beginning, after modification / adjustments / verifications by the **CONTRACTOR** as required and agreed by the **OWNER / CONSULTANT**.

2.16.3 After such safe, stable and successful trial run, the package shall be considered operationally reliable and commissioned, and be provisionally taken over by the **OWNER**.

## **2.17 Performance tests and final take over**

The performance test on the unit shall be conducted within six (6) weeks from the date of commissioning. Upon successful completion of performance tests required by the **OWNER** as well as fulfillment of all other obligations by the **CONTRACTOR**, taking over certificate as a proof of final acceptance of the equipment/system will be issued by the **OWNER**. The taking over certificate shall not be unduly delayed without assigning any acceptable reason.

If the performance test could not be conducted within the five (5) month’s period owing to an intervening off-season, the test shall be conducted immediately after the starting and stabilization of the next cane crushing season, applying the internationally accepted ageing factors, failing which the conducting of performance test and any extension of performance bank guarantee will be mutually discussed.

## **2.18 Co-ordination with other agencies**

Work shall be carried out in such a manner that the work of other agencies operating at the site is not hampered due to any action of the **CONTRACTOR**. Proper co-ordination with other agencies shall be the **CONTRACTOR**’s responsibility. In case of any dispute, the decision of the Engineer-in-charge shall be final and binding on the **CONTRACTOR**.

## **2.19 Setting out and leveling**

The **CONTRACTOR**, wherever applicable, shall set out and level the works from the general grid of plot and bench marks furnished by the Engineer-in-charge and will be responsible for the accuracy of the same. The **CONTRACTOR** shall provide all instruments and proper qualified staff for checking their work. The **CONTRACTOR** shall protect survey benchmarks, reference lines and control points from damage or movement during work.

## **2.20 Loss due to non-compliance of instructions**

Losses or damages occurring to the **OWNER** owing to **CONTRACTOR**’s failure to adhere to any of the instructions given by the Engineer / **OWNER** in connection with the contract execution shall be recoverable from the **CONTRACTOR**. The decision of the **OWNER** as to the compensation recoverable shall be final and binding on the **CONTRACTOR**.

## **2.21 Suspension of work & idle time extension**

The **CONTRACTOR** shall, if ordered in writing by the **OWNER** or their representative, temporarily suspend the work or any part thereof for such period and such time as so ordered and shall not after

receiving such written orders, proceed therewith. In the event of suspension of work for a prolonged time by the **OWNER** and the consequent idle time for the **CONTRACTOR**, the **CONTRACTOR** shall be compensated based on mutual agreement. The **CONTRACTOR** shall not be responsible for the same, provided that the suspension was not consequent to any default, failure on the part of the **CONTRACTOR** and the contractual time schedule shall be suitably extended after mutual discussions.

## **2.22 CONTRACTOR's site office**

**OWNER** will provide available open space for the construction of their site office to the **CONTRACTOR** and such office shall be kept open by the **CONTRACTOR** at all reasonable hours to receive instructions, notices or other communications.

## **2.23 Site organization**

The **CONTRACTOR** shall deploy adequately qualified and skilled personnel on the work, and the **CONTRACTOR** shall augment the site personnel as decided by the Engineer-in-charge depending on the exigencies of work.

## **2.24 Construction equipment**

The **CONTRACTOR** without prejudice shall bear the overall responsibility to execute and complete the work as per specification and time schedule, progressively deploy adequate equipment and tools and tackles and augment the same as decided by the Engineer-in-charge depending on the exigencies of work so as to suit the construction schedule. No construction equipment shall be supplied by the **OWNER**.

All tools, tackles and consumables besides items like furniture's etc., shall be accounted for at the site's entrance and also at the **OWNER's** stores, by handing over a spare copy of the delivery challan by the **CONTRACTOR**.

## **2.25 CONTRACTOR's work force**

### **2.25.1 Registration of contract and labour license**

2.25.1.1 The **CONTRACTOR** shall have the responsibility to register the contract with local authorities as per the statutory requirement and shall also obtain necessary license from Factory Inspectorate in respect of the labour force employed by them.

- a. No child labour employment is permitted. No female worker will be permitted to work beyond 6.00 P.M. on any day.
- b. Every worker shall be given a weekly day of rest. Any work done on weekly rest days shall be duly compensated, by the **CONTRACTOR**.
- c. The **CONTRACTOR** shall maintain a register of wages-cum-muster roll.

2.25.1.2 The **CONTRACTOR** shall furnish adequate courteous and competent labour, (skilled, semi-skilled and un-skilled), watchmen, supervisors and engineers of all class for the duration of the work, to maintain the progress of erection in accordance with the requirement of the schedule of completion.

2.25.1.3 It is important that the **CONTRACTOR** shall employ men known to be reliable and competent for the work

2.25.1.4 **CONTRACTOR** shall be personally present or employ atleast one competent representative (whose name shall have been previously communicated in writing to the **OWNER**) to supervise the erection of the equipment and carrying out of the work under the contract. This representative shall have full technical capability and complete administrative and financial powers to expeditiously and efficiently execute the work under the contract. The **OWNER** or **CONSULTANT** shall normally communicate directly with the said representative at site.

In case the above representative is found to be incompetent and / or non-coordinating by the **OWNER / CONSULTANT**, the **CONTRACTOR** shall replace him with a more competent person.

2.25.1.5 **CONTRACTOR**'s employees shall be provided with identification badges showing employee's name, **CONTRACTOR**'s name and project identification. All employees will be required to wear the badge during the time they are at project site. All workers, watchmen, supervisors, engineers and other staff at the work site shall be provided with safety helmets by **CONTRACTOR** and they shall wear it all the time they are at the work site.

2.25.1.6 **CONTRACTOR** shall ensure that they pay their men regularly their wages, overtime and other compensations. **CONTRACTOR** shall also furnish the **OWNER** at fortnightly intervals, a certificate that they have paid all the dues to their workmen.

2.25.1.7 In case, such payment is not regularly made by the **CONTRACTOR**, **OWNER** will be in the right to make such payments and deduct it from **CONTRACTOR**'s progress payment.

#### 2.25.2 Registration of contract

If the number of workmen employed by the **CONTRACTOR** is more than nineteen (19), they are required to obtain a license from the competent authority as required under the contractors' and Labour (Regulations and Abolition) Act, after obtaining a certificate from the principal employer, to the effect that they have been awarded the contract. They are also required to give to the principal employer, the number of workmen proposed to be employed and produce the license for verification.

#### 2.25.3 E.S.I

All workmen employed by the **CONTRACTOR** shall be covered under ESI immediately on appointment, by the **CONTRACTOR**.

#### 2.25.4 Requirement under Factories Act

All workmen should be allowed to work not more than 9-hours a day and forty eight (48) hours a week. Weekly off on 1<sup>st</sup> day of the week (Sunday) or a substitute weekly off within 3-days before the 1<sup>st</sup> day of the week or after the 1<sup>st</sup> day of the week should be allowed to all the workmen. Overtime wages for working beyond the normal working hours should be given as per labour laws in force. Also overtime for the work on company's declared holidays should be given at the same rate. All the workmen should be allowed leave as per the Factories Act. In case the workmen have not availed leave during the period of their work, they should be given wages in lieu of leave accrued to their credit at the time of leaving. The **CONTRACTOR** should maintain the Muster Roll, Register of Adult Workers, Overtime Register, Leave Register and submit the Registers to the principal employer for verification, and to the Factories Inspector, if applicable, for inspection, whenever he visits the factory.

2.25.5 Accident register If any accident occurs in the course of and arising out of employment, the  
Signature and Seal of the Bidder **HBL/TEN/PUB/20-21/227 dated 06.02.2021** Page 61 | 179

**CONTRACTOR** should immediately inform **OWNER**'s representative with the details of the workmen. He should maintain the present and permanent addresses of all the workmen and the name of the person to whom information is required to be given in case of emergencies.

## **2.26 Safety code**

### **2.26.1 General**

**CONTRACTOR** shall adhere to safe construction practices and guard against hazardous and unsafe working conditions.

### **2.26.2 First aid and industrial injuries**

2.26.2.1 The **CONTRACTOR** / their **Sub-CONTRACTORS** shall make arrangements for the treatment of their workmen for injuries sustained while on duty.

2.26.2.2 All major accidents shall be reported promptly to **OWNER**, and a copy of **CONTRACTOR**'s report covering each personal accident requiring the attention of a physician, shall be furnished to **OWNER** for their information.

### **2.26.3 CONTRACTOR's barricades**

2.26.3.1 **CONTRACTOR** shall erect and maintain barricades required in connection with their operation to guard or protect especially the following areas, if applicable with the scope of **CONTRACTOR**.

- a. Excavations
- b. Hoisting areas
- c. Areas considered hazardous by **CONTRACTOR** or **OWNER** or Engineer.
- d. **OWNER**'s existing property likely to be damaged by **CONTRACTOR**'s / their **SUB-CONTRACTOR**'s operations.

2.26.3.2 Barricades and hazardous areas with the battery limits, adjacent to normal routes of travel shall be marked by red flasher lanterns at nights.

### **2.26.4 Scaffolding**

2.26.4.1 Suitable scaffolding shall be provided for workmen for all work that cannot safely be done from the ground or from solid construction except for such short period work as can be done safely from ladders. When a ladder is used, a helper shall be engaged for holding the ladder and if the ladder is used for carrying materials as well, suitable footholds and handholds shall be provided on the ladder. The ladder shall be given an inclination not steeper than 1 in 4 (1 horizontal and 4 verticals).

2.26.4.2 Working platform, scaffolding or staging more than 4-metres above the ground level or floor level shall be closely boarded, shall be of adequate width and shall have a guard rail properly attached, at least one metre high above the floor or platform of such scaffolding or staging and extending along the entire length and the sides with only such openings as may be necessary for the entry of workmen and for handling of materials. Such scaffolding or staging shall be so fastened as to prevent it from swaying from the building or structure.

2.26.4.3 Every opening in the floor of a building or in a working platform shall be provided with suitable

fencing whose minimum height shall be one metre to prevent the fall of persons or materials.

2.26.4.4 Safe-means of access shall be provided to all working platforms and other working places. Every ladder shall be securely fixed. No portable single ladder shall be over 9-metres in length while the width between the side rails in rung ladder shall in no case be less than 30-cms for ladder upto and including 3-metres in length. For longer ladder this width should be increased atleast by 5-mm for each additional 300-mm of length. Spacing's of steps shall be uniform and not exceeding 30-cms.

2.26.4.5 Providing all the scaffoldings, staging, ladders etc., shall be the sole responsibility of the **CONTRACTOR**.

#### 2.26.5 General safety rules

2.26.5.1 The **CONTRACTOR** shall use only tested equipment, tools, chains, ropes, etc. and shall periodically test them to ensure good working condition of such equipment, tools, chains, ropes, etc. Whenever required, valid test certificates shall be produced by the **CONTRACTOR** to the **OWNER**.

2.26.5.2 All necessary personnel safety appliances shall be kept available for the use of the persons employed at the site and maintained in conditions suitable for immediate use, and the **CONTRACTOR** shall take adequate steps to ensure proper use of safety appliances by those concerned.

- (i) All labour and supervisory personnel engaged in the erection work shall use safety helmets. All persons working at heights above 2-meters shall use safety belts and/or life lines.
- (ii) Workers employed on mixing asphaltic materials, cement and lime concrete/mortars shall use protective footwear and protective gloves.
- (iii) Those engaged in white washing and mixing or stacking of cement bags or any materials which are injurious to the eyes shall use protective goggles and hand gloves.
- (iv) Those engaged in welding and cutting work shall use protective face/eye-shields, hand gloves etc.
- (v) Stone breakers shall be provided with protective goggles and protective clothing, and seated at sufficiently safe intervals.
- (vi) Wherever men are employed on the work of lead painting, the following precautions should be taken:
  - a. No paint containing lead or lead product shall be used except in the form of paste or ready made paint.
  - b. Overalls and suitable face masks shall be provided for use by the worker when paint is applied in the form of spray or when a surface having lead paint dry is being rubbed or scraped.

2.26.5.3 Use of hoisting machines and tackles including their attachments, anchorage and supports shall conform to the following standard or conditions:

- (i) These shall be of good mechanical construction, sound material and adequate strength and shall be kept in good working order.
- (ii) Every rope used in hoisting or lowering materials or as means of suspension shall be of durable quality and adequate strength and free from defects.

- (ii) Every crane driver or hoisting appliance operator shall be properly trained and shall be conversant with safety regulation for using such equipment and appliances.
- (iii) In case of every hoisting machine and of every chain ring hook, shackle swivel and pulley block used in hoisting or lowering or as means of suspension, the safe working load shall be ascertained. Every hoisting machine and all gears referred to above shall be clearly marked with the safe working load.

2.26.5.4 All work areas shall be kept reasonably clean for easy movement of men and material.

2.26.5.5 All approach roads shall be kept reasonably free for easy movement of vehicles.

2.26.5.6 Temporary water line shall be so routed as to avoid road crossing and wherever necessary, shall be laid underground. Temporary water storage tank built for construction use shall be properly fenced, wherever necessary. All such temporary water lines and water storage shall be the responsibility of the **CONTRACTOR**.

2.26.5.7 Temporary electrical sub-station, equipment, switchgear, cable and wire, lighting, etc. should be installed in accordance with standard electrical practices and regulations.

2.26.5.8 Temporary cable and wire, including welding cable, shall be so routed as not to clutter the work area. Temporary electrical line for power and lighting shall be run overhead and shall be high enough as not to hinder movement of men, materials and vehicles.

2.26.5.9 Temporary substation equipment, switchgear and distribution boards shall be adequately enclosed, duly protected against rain water, suitably earthed and properly identified with caution boards

2.26.5.10 All joints in the temporary wires and cables shall be properly insulated.

2.26.5.11 All supervisors, welders and electricians engaged in the work shall possess necessary and valid license / certificate of permit to carry out such work and shall be adequately skilled and acquainted with standard rules, regulations, codes and practices.

2.26.5.12 All operators of construction equipment and all tradesmen engaged in different construction activities shall be adequately qualified, experienced and proficient to carry out all their jobs in a safe manner.

2.26.5.13 First aid kits and personnel adequately trained to administer first aid shall be kept readily available for emergencies.

2.26.5.14 Portable hand-lamps being used by construction crew shall be preferably connected on 24-V supply. If 230-V hand lamps are used, the cables shall be heavily insulated and adequately protected, earthed and bulbs should be protected with safety shields.

2.26.5.15 **CONTRACTOR** shall not use any structure or equipment erected or under erection for fastening, lifting or tying tackles or guy-ropes, which may impose loads which the structure or equipment are not designed to carry safely.

2.26.5.16 The **CONTRACTOR** shall not in the performance of the contract in any manner endanger safety or



unlawfully interfere with the convenience of the Public.

2.26.5.17 All areas used for storing and installing inflammable materials shall be adequately identified and shall carry no smoking signs.

2.26.5.18 Motors, gearing, transmission, electric wiring and other dangerous parts of hoisting appliances shall be provided with efficient safeguards. Hoisting appliances shall be provided with such means as to prevent the accidental descent of the suspended load. When workers are employed on electrical installations which are already energized, insulating mats, wearing apparel, such as gloves, sleeves and boots as may be necessary shall be provided. The workers shall not wear any rings, watches and carry keys or other materials which are good conductors of electricity.

2.26.5.19 All scaffolds, ladders and other safety devices mentioned or described herein shall be maintained in safe conditions and no scaffold, ladder or equipment shall be altered or removed while it is in use.

## **2.27 OWNER's Right to Withhold Payment**

**OWNER** shall have the right to withhold or nullify the whole or a part of any application of **CONTRACTOR** for payment to such extent as may be necessary to protect **OWNER** from sustaining any loss on account of defective work not remedied / replaced by **CONTRACTOR** and to release the amount withheld after fulfillment by **CONTRACTOR**.

## **2.28 OWNER's Responsibilities**

2.28.1 The **OWNER** shall provide free of cost to the **CONTRACTOR** suitable open space for putting up the storage for equipment and materials, the **CONTRACTOR**'s equipment, tools and tackles etc. brought to the site by the **CONTRACTOR** for the said erection, installation and commissioning work. The **CONTRACTOR** shall arrange for their own covered storage in the space provided to them. The transportation to the site, from the storage, shall be borne by the **CONTRACTOR**.

2.28.2 The **OWNER** shall also provide to the **CONTRACTOR** open office space (levelled, consolidated and with approach road) and drinking water at one point at site free of cost. Power (415-V AC, 4-W) and Telephone with STD facility also shall be provided as far as possible, but on chargeable basis.

2.28.3 The **OWNER** shall provide to the **CONTRACTOR** the required electrical power (415-V AC, 4-W) for erection & commissioning activities only, at one point free of cost. For fabrication activities the power will be provided on chargeable basis.

2.28.4 The **OWNER** shall provide free of cost to the **CONTRACTOR** adequate water supply at one point at factory site.

2.28.5 The **OWNER** declares that they have a clear and valid title free of encumbrances, to the site handed over to the **CONTRACTOR** for erection and commissioning of the said plant and that the **CONTRACTOR** shall have uninterrupted access to the use of the site to carry out the erection and commissioning services under this contract. Any breach of this warranty by the **OWNER** shall entitle the **CONTRACTOR** for extension of time proportionately for completion of the erection and commissioning services.

- 2.28.6 Accommodation for the **CONTRACTOR's** executives shall be provided, if available.
- 2.28.7 Open space, duly levelled, consolidated with approach roads and drinking water at one point for labour sheds shall be provided by the **OWNER**.
- 2.28.8 Permission to use special tools and tackles supplied along with the equipment for erection and commissioning are to be returned in good working condition. In case these tools and tackles are damaged during erection, and becoming worn-out, they shall be replaced free of cost by the **CONTRACTOR**.
- 2.28.9 Supply of service water shall be the **OWNER's** responsibility.
- 2.28.10 **OWNER** shall provide engineers and staff including skilled, semi-skilled and unskilled manpower for getting training in operation and maintenance during pre-commissioning and commissioning activities under the supervision of competent engineers and staff of the **CONTRACTOR**.
- 2.28.11 Workshop / lab facilities shall be extended to the **CONTRACTOR** by the **OWNER**, against written requests by the **CONTRACTOR** on chargeable basis, without affecting the **OWNER's** work.
- 2.28.12 Fire fighting assistance, as available with **OWNER**, shall be provided when necessary.
- 2.28.13 Provision of all lubricants and chemicals required until commissioning shall be **SUPPLIER's** responsibility.
- 2.28.14 Purchaser shall make all arrangements and provide all facilities and materials, adequate technical staff and labor, including skilled and unskilled for carrying out steam and water trial, commissioning and Performance Test.
- 2.28.15 Purchaser shall pay the statutory inspection and other fees and charges payable in respect of the installation, testing and commissioning including IBR fees.
- 2.28.16 Purchaser shall ensure supply of all chemicals, fuels, electric power, water etc. as required for erection and commissioning of Modernization of existing Evaporation system with BoP Project except for first fill or flushing which will be in Supplier's scope.
- 2.28.17 Purchaser shall ensure proper drainage and sewage facilities at site, adequate space for construction material, equipments, labor hutment, etc., open store and covered storage space for tools and tackles, machinery and equipment and for storage of delicate items like instruments and motors etc.
- 2.28.18 Purchaser shall ensure that all required permissions, licenses and approvals such as site clearance, approvals for set up of Modernization of existing Evaporation system with BoP project, pollution clearance and any other approval not specifically within the scope of the contractor are taken in such a manner so that site activities of the contractor are not stacked for want of these approvals etc.
- 2.28.19 Wherever approvals are required from Purchaser / Engineer the same shall be granted within 7 days except in the case of otherwise provided in the contract

#### IV. PROJECT INFORMATION

1. PROJECT TITLE : EPC of modernization of existing evaporation suitable for raw spent wash treatment to achieve 60% w/w solids, UF followed by UV for existing CPU and add on equipment in fermentation section & balance of plant Project
2. PURCHASER : M/s HPCL Biofuels Ltd (HBL)
3. REGISTERED OFFICE : HPCL Biofuels Limited. House No.9, Shree Sadan, 1st Floor, Patliputra Colony, Patna - 800013
4. PURCHASER'S ADDRESS FOR COMMUNICATION: Village Lauriya  
Lauriya Bagha Highway, West Champaran, Bihar  
Pranay@hpcl.in,  
manojks@hpcl.in, [abhishekkumar.singh2@hpcl.in](mailto:abhishekkumar.singh2@hpcl.in)
5. CONSULTANTS : MITCON Consultancy & Engineering Services Ltd.
6. CONSULTANT'S ADDRESS FOR COMMUNICATION : First Floor, Kubera chambers  
Shivajinagar, Pune - 5  
Email: [cpn@mitconindia.com](mailto:cpn@mitconindia.com)
7. PLANT LOCATION : Village Lauriya, Lauriya Bagha Highway  
West Champaran, Bihar
8. NEAREST RAILWAY STATION : Narkatiaganj, 15 Km  
Bettiah, 26 Km
9. NEAREST AIRPORT : Patna
10. PORT OF DISEMBARKATION : ---
11. AMBIENT TEMPERATURE (°C) : MAXIMUM : 45  
MINIMUM : 05  
PERFORMANCE DESIGN : 40  
ELECTRICAL DESIGN : 50
12. RELATIVE HUMIDITY (%) : A. MAXIMUM : 70  
B. MINIMUM : 40  
C. DESIGN : 60

13. RAINFALL  
(ANNUAL AVERAGE) : 1400 mm
14. ALTITUDE : 84 M above M.S.L.
15. SEISMIC COEFFICIENT: As per IS: 1893 (Zone IV)
16. WIND A. DIRECTION : SW (May-Sept) & NE (Oct-April)  
B. DESIGN WIND  
VELOCITY : As per IS: 875
17. Construction power  
(E&C Only) : 415V ( $\pm 10\%$ ), 3 Phase, 4 Wire, 50 (47 to 51.5) Hz AC with effectively earthed neutral will be made available at only one point for free of cost. Power for fabrication purpose will be on chargeable basis. Bidder's scope shall include complete distribution beyond this point including hardware required for the same

## V. ANNEXURES

### A. DRAFT BANK GUARANTEE FORMAT

This Guarantee made on the day of by the having its Branch at (hereinafter called “The Guarantor” which expression shall unless repugnant to the context or contrary to the meaning thereof, include its successors and assigns) of the one part.

IN FAVOUR OF M/s -----, a company, registered in the state of Karnataka under the companies act 1956, having its registered office at -----State (hereinafter called “The Purchaser” which expression shall unless repugnant to the subject or context, include their successors and assigns) of the other part.

WHEREAS M/s. (hereinafter called “The Seller” which expression shall unless repugnant to the subject or context include their legal representatives, administrators, successors or permitted assigns) had entered into an agreement vide letter of Intent dt. (hereinafter called “The said Agreement”) with the purchaser to design, prepare, supply, erect and commissioned the co-generation project for purchasers site at ----- (hereinafter called the Site) in accordance with the terms and conditions therein contained (hereinafter referred to as “The Said Plant”).

AND WHEREAS under the said agreement, the Purchaser required to pay to the sellers against security of a Bank Guarantee an advance payment of Rs. (Rupees: ) representing of the contract price for the purpose of procurement of materials / equipments for the said plant. Such guarantee to be valid till the full advance amount is adjusted against the base price of the actual deliveries of machinery and equipment received at site.

AND WHEREAS before advance payment as aforesaid is made the Guarantor has, at the request of the Sellers, agreed to give the Guarantee as hereinafter contained.

NOW THIS DEED WITNESSES AS FOLLOWS

- 1). In consideration of the premises the Guarantor, hereby undertake to pay to the Purchaser within 30 days of demand and without demur such a sum not exceeding Rs.

The Purchaser may demand representing of the contract price, and if the Guarantor shall fall to pay the same within the said period, the Guarantor, shall also pay on the sum demanded interest at the Bank lending rate then prevailing reckoned from the date of demand till the date of payment. Provided that the liability of the Guarantor hereunder shall reduce to the extent of the advance adjusted according to of the said agreement.

- 2). The Guarantor shall pay to the Purchaser on demand the sum under Clause 1 above without demur and without requiring the Purchaser to invoke any legal remedy that may be available to them. it being understood and agreed **FIRSTLY** that the Purchaser shall be the sole judge of and as to whether the Sellers have committed any breach(es) of any of the terms and conditions of the said agreement and **SECONDLY** that the right of the Purchaser to recover from the Guarantor any amount due to the Purchaser shall not be effected or suspended by reasons of the fact that any dispute or disputes have been raised by the Sellers with regards to their liability or that proceedings are pending before any Tribunal, Arbitrator(s) or Court with regards thereto or in connection therewith, and **THIRDLY** that the Guarantor shall immediately pay the aforesaid guaranteed amount to the Purchaser on demand, it shall not be open to the Guarantor to know the reasons of or to investigate or to go into the merits of the demand or to question or to challenge the demand or to know any facts affecting the deemed, and **LASTLY**, that it shall not be open to the Guarantor to require proof of the liability of the Sellers to pay the amount, before paying the aforesaid guaranteed amount to the Purchaser.
- 3). This Guarantee shall come into force from the date release of payment hereof and shall remain valid till the full advance amount is adjusted under the said Agreement, which according to the terms and conditions of the said Agreement is stipulated to be adjusted against actual deliveries of the machinery and equipment at site, but if the actual deliveries as aforesaid have not been completed by the seller within the said period for any reasons whatsoever the Guarantor, hereby undertakes that the Sellers shall furnish a fresh or renewed guarantees on the Purchaser's Proforma for such further period as the Purchaser may intimate failing which the Guarantor shall pay to the Purchasers a sum not exceeding Rs. /-(Rupees: ) or the residual amount of balance advance left after proportion to adjustment in accordance with Clause 1 above as the Purchaser may demand.

- 4) This Guarantee is in addition to and not in substitution for any other guarantee executed by the Guarantor in favour of the Purchaser on behalf of the Sellers.
- 5) The Sellers and Purchaser will be at liberty to vary and moodily the terms and conditions of the said agreement without effecting this guarantor is, hereby waived and the same shall be deemed to have been done with the assent of the Guarantor.
- 6) This Guarantee shall not be effected by any change in the constitution of the Guarantor or of the Seller nor shall the guarantee be effected by any change in the constitution of the Purchaser or any amalgamation or absorption with any other body corporated and this guarantee will be available to or enforceable by such body corporate.
- 7) This Guarantee is irrevocable except with the written consent of the Purchaser.
- 8) The neglect or forbearance of the Purchaser in enforcing any payment of moneys, the payment whereof is intended to be hereby secured or the giving of time by the Purchaser for the payment thereof, shall, in no way, release the Guarantor from its liability under this Deed.
- 9) The invocation of this guarantee shall be by a letter signed by the Purchaser
- 10) Notwithstanding anything stated herein before the liability of the Guarantor under this guarantee is restricted to Rs. /- (Rupees : ) and interest as provided in Clause 1. This guarantee shall remain in force upto // unless a demand or claim under this guarantee is presented to the Guarantor in writing within Six Months from the date, all rights of the Purchaser under the guarantee shall be forfeited and the Guarantor shall be released and discharged from all liability hereunder.

IN WITNESS WHEREAS for any on behalf of the Guarantor has signed this Deed on the day and year above written.

for and on behalf of

**B. PROFORMA FOR PERFORMANCE STATEMENT (For the last Five Years)**

Bid No..... date of opening  
 ..... Time ..... Hours

Name of the bidder .....

No. of years in service.....\*\*

Order placed by (full address of purchaser)	Order No. and date	Modernization of existing Evaporation system with BoP project capacity ( Liters)	Value of order	Date of completion of delivery		Remarks indicating reasons for late delivery, if any	Has the Modernization of existing Evaporation system with BoP has been satisfactorily Functioning? (Attach a Cert. From the Engineer in charge)
				As per Contract	Actual		
1	2	3	4	5	6	7	8

Signature and seal of the bidder .....

Note : \*\* - Indicate the number of years in the line of business



# APPENDIX - I

## BID FORM AND PRICE SCHEDULES

To  
M/s -----  
-----

Gentlemen,

Having examined the Tender Document, including the Specifications, the receipt of which is hereby duly acknowledged, we, the undersigned, offer to engineer, design, manufacture, supply, deliver, install and commission the specified ----- on EPC basis in conformity with the said Tender Document, for the sum of (Sum of Total Bid Amounts for Goods and Services in Words and Figures), or such other sums as may be ascertained in accordance with the Price Schedules attached hereto and made part of this Bid.

We undertake, if our Bid is accepted, to commence delivery within (60) days, and to complete installation and commissioning of all the items specified in the Contract within (365) days, calculated from the date of receipt of your Notification of Award.

If our Bid is accepted, we will provide the performance security, equal to 10 percent of the Contract price, for the due performance of the Modernization of existing Evaporation system with BoP and required bank guarantees for advances.

We agree to abide by this Bid for the period of 90 days from the date fixed for bid closing and it shall remain binding upon us and may be accepted at any time before the expiration of that period. Until a formal Contract is prepared and executed, this Bid, together with your written acceptance thereof in your Notification of Award, shall constitute a binding contract between us.

We understand that you are not bound to accept the lowest priced or any Bid that you may receive.

Dated this \_\_\_\_\_ day of \_\_\_\_\_ 2021

(Signature) \_\_\_\_\_

\_\_\_\_\_  
(In the Capacity of)

Duly Authorized to sign Bid for and on behalf of \_\_\_\_\_  
\_\_\_\_\_

\_\_\_\_\_  
(Signature of Witness)

Witness

Address

Note:

- All bids are to be only firm price bids.
- Purchaser may award separate contracts for supply and E&C
- Civil works, except cooling tower are excluded from scope. However, all structural steel, insert plates, pipe sleeves, foundation bolts, templates, fixtures, required to be embedded in RCC works, are in the bidders scope. All civil materials for cooling tower will be provided by purchaser.

## Price Schedule

The bidder agrees to engineer, design, procure, manufacture, supply, erect and commission excluding civil works of the ----- on EPC basis as specified in and forming part of this tender document at a Total Price as mentioned below, exclusive of taxes & duties, hereinafter referred to as the “Contract Price”, subject to terms and conditions as hereinafter provided, as per the break-up given below:

<b>A</b>	<b>Supply Ex-works (Ex-bidders or their sub-contractors workshop or place of supply) price in Lakhs, of :</b>	
(1)	EPC of modernization of Evaporation unit suitable for raw spent wash treatment to achieve 60% W/W solids along with UF followed by UV for existing CPU & add on equipment in Fermentation section & BoP Project according to specifications and details given	NOT TO BE QUOTED HERE
(2)	<b>Price of following necessary facilities in respect of above</b> <ul style="list-style-type: none"> <li>➤ Final painting (it shall include primer and final painting as per colour scheme to be given by the Purchaser / Consultant).-</li> <li>➤ Packing, forwarding charges</li> <li>➤ Freight up to the site</li> <li>➤ All consumable items such as welding electrodes, gases, emery papers, etc. required for erection purposes.</li> <li>➤ All insurance charges applicable</li> </ul>	NOT TO BE QUOTED HERE
(3)	<b>Spares as mentioned in Final Technical Offer</b>	NOT TO BE QUOTED HERE
	<b>Subtotal in Rs Lakh :</b>	
	<b>Sub total of A(1), (2) and (3)</b>	NOT TO BE QUOTED HERE
<b>B.</b>	<b>Indicative Taxes &amp; duties for Supply &amp; Service:</b> Custom duty @ ____ Excise duty @ ____ GST @ ____ Any other taxes & duties	<b>Extra at actual</b>
<b>C.</b>	<b>Price for Erection &amp; Commissioning</b>	
	<b>(Including all loading, unloading &amp; handling at site), commissioning and trial run and supervision thereof including supply of all consumables, Rs. In Lakhs:</b>	NOT TO BE QUOTED HERE
<b>D.</b>	<b>Indicative Taxes &amp; duties for Erection &amp; Commissioning and post commissioning Supervision:</b> GST @ ____ Any other taxes & duties	<b>Extra at actual</b>

The above price is firm & final. There is no provision for escalation in the cost of this project, for which both the parties have agreed to between as per scope of supply described herein.

Supply, Erection and completion of the Job (Installation of Modernization of existing Evaporation system with BoP) in all aspect as per satisfaction of the Purchaser/consultant including supply of all materials, consumables and labor and no extra cost will be borne by the client in any manner.

The total contract price offered above is exclusive of GST /Central / State VAT, Excise duty, Special Excise Duties, Custom Duties, works contract tax, local taxes and any other duties at the site only imposed by law, leviable on the plant and machinery supplied to the purchaser at total price offered and is also exclusive of single point Sales Tax, Excise Duties and special excise duties on finished bought items supplied directly to site from sub-contractors work. Bidder to quote with break-up of all applicable taxes & duties.

The increase or decrease in the amount of taxes and duties due to change in the rate / structure in the taxes and duties will be on Purchaser's Account, provided the material is supplied as per delivery / dispatch schedule.

Signature of Bidder with seal \_\_\_\_\_

Note :

- a. In case of Discrepancy between UNIT PRICE and total cost, the unit price shall prevail.
- b. Kindly mention unit price per meter also, for all piping and cabling.
- c. Bidder to give a statement of all taxes and duties and their rates applicable.
- d. Bidder to include description of goods being quoted, along with data sheet.
- e. Details of all the spare parts are required to be provided in the item master format (format will be shared by Purchaser to L1 bidder after award of PO) which will include all the technical details regarding the spare parts along with indicative price, approved suppliers with their details for ease in procurement after installation

## **APPENDIX - II**

### **PAYMENT SCHEDULE**

The PURCHASER shall pay the contract price in the following manner free of interest:

1. The payment terms will be as indicated below:

Total contract value will be divided as:

- **Total Supply value shall be maximum 80% of the total contract value**
- **Total E&C value shall be minimum 20% of the total contract value**
- **All Payments will be released only after 30 days from the date of certification of the bill by EIC & Consultant**

#### **Supply:**

- 5% of contract value for supply on signing of supply contract and submission & approval of design basis report and plant equipment layout
- 7.5% of contract value for supply on submission / approval of mutually agreed key drawings / information / documents/ civil load data (to be paid within 45 days of contract date) and against bank guarantee of requisite amount.
- 7.5% of contract value for supply on submission of copies of unpriced purchase orders for mutually agreed major bought out items / equipment (to be paid within 90 days of contract date) and against bank guarantee of requisite amount.
- 70% of contract value for supply against proforma invoice, payable pro-rata on receipt of material at site along with all test certificates, warranty documents & other relevant documents, if any , as per mutually agreed billing / delivery schedule ( to be submitted within 30 days of signing of the contract), duly certified by Purchaser / Consultant
- 10% of contract value for supply on receipt of all material at site duly certified by Purchaser / Consultant and on submission of performance bank guarantee of requisite amount and valid for Two year, after successful commissioning of the plant.

#### **Erection & Commissioning:**

- 10% on signing of E&C contract and on mobilization and start of major erection work at site
- 80% of contract value for E&C pro-rata on completion of erection as per mutually agreed E&C schedule, duly approved by Purchaser / Consultant
- 10% of contract value for E&C on successful commissioning and performance proving and on submission of performance bank guarantee of requisite amount and valid for two crushing seasons after successful commissioning of the plant

2. All Payments shall be made in Indian rupee only. In case of imports, the terms of payments will be as per standard International practice
3. Prices charged by the SUPPLIER for goods under the contract shall not vary from the prices agreed by the SUPPLIER and given in the price schedule. This is the firm price contract for SUPPLY.
4. Taxes and duties, transportation, shall be reimbursable at actuals. Based on the production of documents by the SUPPLIER.
5. Defects liability Period: 12 months from the date of completion of the entire job. (To be read together with General terms & Conditions)
6. As per GTC, Original PBG for defect liability period (If vendor chose not to deduct 10% retention) to be submitted at Purchase dept, Patna and copy at site.
7. SECURITY DEPOSIT: Successful bidder has to submit security deposit of 1% of the Purchase Order Value in form of Demand Draft / Bank guarantee of any Scheduled (Other Than Cooperative Bank) Bank drawn in favor of HPCL Biofuels Ltd, Patna, and Payable at Patna.

Security deposit will be acceptable in the form of Demand draft upto Rs. 50,000/- and in the form of Demand draft / Bank guarantee beyond Rs. 50,000/-. Composite Performance Bank Guarantee (CPBG) valid upto a period of 3 months beyond the expiry of defect liability period. Demand Draft/ BG should be drawn on Scheduled Banks, other than co-operative bank.

In case of no defects observed, the Security deposit shall be refunded interest free within 3 months of the completion of the job.

8. RETENTION MONEY- Retention Money under Defect Liability Period should be 10% of PO value and will be released after one year from the date of commissioning & handover. Bidder may submit BG of equivalent amount or this 10% will be deducted from his bills against retention money

10% of the total value of the Running Account and Final Bill will be deducted and retained by the Owner as retention money on account of any damage/defect liability that may arise for the period covered under the defect liability period clause of the Contract free of interest. Any damage or defect that may arise or lie undiscovered at the time of issue of completion certificate connected in any way with the equipment or materials supplied by contractor or in workmanship shall be rectified or replaced by the contractor at his own expense failing which the Owner shall be entitled to rectify the said damage/defect from the retention money. Any excess of expenditure incurred by the Owner on account of damage or defect shall be payable by the Contractor. The decision of the Owner in this behalf shall not be liable to be questioned but shall be final and binding on the Contractor. Thus, deduction towards retention money is applicable only in case of job/works contracts (civil, mechanical, electrical, maintenance etc.) where any damage or defect may arise in future (i.e. within 12 months from the date of completion of job) or lie undiscovered at the time of issue of completion certificate.

**APPENDIX - III**  
**NO DEVIATION LETTER**

**(On Bidders Letter Head)**

**Ref No. :**

**Date :**

**To,  
The Chief Executive Officer  
HPCL Biofuel Ltd  
Patna, Bihar  
800013**

**Subject: Declaration of No Deviation for Technical & Commercial Bid Submission for EPC of Modernization of existing Evaporation system with BoP project, Lauriya Site**

Dear Sir,

We refer the bid document Volume - I (Commercial) & Volume-II (Technical) for above package, queries raised by us & clarifications received, discussion during pre-bid meeting held on -----

We hereby confirm that, there are no commercial & technical deviations in our bids & our bids shall comply with the Commercial (Volume I) & Technical (Volume II) bid documents, clarifications & MOM of Pre-bid meeting.

Regards,

(Authorized signature)

Regards,

(Authorized signature)

Signature and Seal of the Bidder

HBL/TEN/PUB/20-21/227 dated 06.02.2021

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**(COMMERCIAL & TECHNICAL UNPRICE BID)**

## APPENDIX IV

### PENALTY FOR SHORTFALL IN PERFORMANCE

#### 1. Modernization of existing Evaporation system & Aux. with Balance of Plant

The following gives the penalties leviable for the shortfall in performance of the plant and equipment supplied.

Sr. No.	Nature of shortfall	Penalty applicable
1.	Failure to meet the guaranteed auxiliary Power consumption (for every kW increase or part thereof from the guaranteed parameter)	Rs.1,00,000
2.	Shortfall in capacity for every 1% reduction in Evaporation rate & Concentrated Product output	Rs. 1,00,000
3.	Failure to meet the guaranteed Final solids	Rs. 1,50,000

The following items are those guarantee parameters in which the shortfall in Performance is not acceptable more than the permissible tolerance indicated:

Sr. No.	Item	Unit	Tolerance
1	The Evaporation capacity is lower than the guaranteed value, at rated parameters by more than	%	5.0
2	The total steam consumption ( at 1.5 Kg/cm <sup>2</sup> , G) is higher than the guaranteed figure by more than	%	5.0
3	PH , TS, COD, BOD for UF followed by UV	%	2.0
4	Feed PH & Alcohol Temperature (Evaporation system)	%	2.0



**SECTION II- TECHNICAL EPC BID FOR MODERNIZATION OF EXISTING  
EVAPORATION WITH BOP**

## **PROJECT INTRODUCTION**

### **PROJECT AT A GLANCE**

Hindustan Biofuels Limited, Lauriya Unit (HBL, Lauriya) is a public limited Company, engaged in manufacturing of non-potable and industrial alcohol. HBL, LAURIYA is situated at Lauriya village, Taluk: Betiah, District: West Champaran, Bihar.

HBL, LAURIYA having 60 KLPD capacity distillery to produce ethanol, adjacent to the existing sugar plant. HBL, Lauriya now proposes to modernization of existing evaporation for treatment of raw spent wash, addition of sludge decanter with feed pump and addition of Ultra Filtration followed by UV for existing CPU.

The proposed project will produce fuel ethanol from own C & B-heavy molasses, as well as procured molasses from nearby sugar factories as raw material. The steam and power requirement for the add on sections will be made available from the new slop fired incineration boiler & condensing turbine.

This EPC bid covers engineering, supply to commissioning of the additional sections/equipment in existing distillery plant along with all required and specified balance of plant, including civil works.

The ethanol plant will have standalone incineration boiler and suitable turbine & hence, will be self-sufficient in steam and power requirement and will operate for about 300 days consistently

## SECTION - 1

### SCOPE OF SUPPLY

#### 1.1 SCOPE OF SUPPLY

- 1.1.1 Certain expressions used in the Specification relate to various stages of the Contract. The overall scope of work included in each stage is briefly outlined below for guidance, but not so as to relieve the Bidder of his obligation to do anything that may not be so described or is reasonably to be inferred as necessary to complete his performance of the Contract in accordance with all its terms.
- 1.1.2 The Bidder shall design, manufacture, supply, construct, and commission the specified additional sections/equipments required by the Purchaser. The scope of the works will cover the execution of civil, structures, buildings, mechanical equipment, electrical, instrument & automation, erection, testing, commissioning and maintenance as detailed in the specifications.
- 1.1.3 “Design” includes developing the Item Specifications and Drawings contained in the Contract, in order that full information shall be provided in good time by the Bidder to the Purchaser and Consultant concerning the equipment and facilities to be supplied and all other work to be carried out under the Contract.
- 1.1.4 “Supply” includes manufacturing or procuring the specified items and spare parts, carrying out all tests and facilitating all inspections prior to packing and transporting the same, delivering the same to Site.

The design, manufacture (including procurement, quality assurance, manufacture/ Construction, installation, Pre-commissioning and delivery), assembly at site of additional Sections/Equipments comprising of:

- a. 1 No sludge transfer pump
- b. 1 No’s of additional Sludge Separation Centrifugal Decanter adjacent to existing sludge separation decanter.
- c. Additional Section of Forced Circulation Evaporators adjacent to existing evaporation section.
- d. Additional Section of Ultra Filtration followed by UV to existing CPU
- e. Mechanical Balance of Plant
- f. Civil load data for additional Sections/Equipment
- g. Automation and Instrumentation
- h. Piping, insulation and cladding

- i. Staging, Structure, Platform and Staircases
- j. Electrical equipment & complete Electrical

The supply also includes transportation (including, without limitation, unloading and hauling to, from and at the site), delivery to site and storage; as well as the material handling, transportation from project storage yard to erection site, checking, chipping and leveling of foundations, pre-assembling etc.

- 1.1.5 “Construct” includes constructing/ assembling/ erecting/ installing as appropriate all civil, mechanical, electrical, process and instrumentation works and items included in this document to form a complete and operational Distillery Plant.
- 1.1.6 “Complete” includes carrying out all Tests on Completion in order that the Purchaser may take over the Works in accordance with the Contract.
- 1.1.7 “Commission” includes the Tests on Completion, witnessing the Performance Tests and carrying out such ongoing advisory and training activities as may be required under the Contract or otherwise agreed from time to time with the Purchaser.
- 1.1.8 “Maintain” includes carrying out all corrective and remedial work required for the Works during the Period of Maintenance set out in the Contract, but excludes work arising from fair wear and tear due to use of the Works by the Purchaser.
- 1.1.9 The Plant shall be supplied complete, including all accessories and materials required to ensure the efficient operation of the Works at the specified performance levels.

Any equipment, device or material even if not included in the original bid, but found necessary for the safe and satisfactory functioning of the units under the bid shall be supplied, erected and commissioned by the Bidder without any extra cost to the Purchaser, as if such equipment, material or work were originally specified and formed part of the scope of work.

- 1.1.10 All equipment shall be designed for the matching of existing 60 KLPD Ethanol plant. The additional sections/equipments shall be capable of continuous operation for minimum 300 days.
- 1.1.11 The Design parameters to be used for the equipment design shall be as stated in the Equipment Specifications PART II, and in the specification for the individual items. In the event of any contradiction, the parameters used in the detail specification shall apply.
- 1.1.12 All pipe work and electrical distribution systems unless otherwise specified, shall be installed for the initial capacity of 60 KLPD Ethanol.

## 1.2 PROJECT DESCRIPTION

- 1.2.1 The integrated project of Hindustan Biofuels Ltd. (HBL, Lauriya) consists of the additional sections/equipments for the existing 60 KLPD Distillery (RS/Ethanol & IS) plant and all associated infrastructure if any.
- 1.2.2 HBL, LAURIYA is proposing for the Project with a 22 TPH Slop fired Incineration Boiler.
- 1.2.3 The Cogeneration plant is proposed to generate power of 3.0 MW.
- 1.2.4 Additional section of Forced Circulation Evaporation Plant will be designed to produce concentrated spent wash of 58 to 60% w/w solids.

## 1.3 WATER QUALITY

Raw water / Filter water / Soft water will be available at proposed water treatment plant. Supplier has to take the water from desired location with the approx. distance is 50 meter. Below mentioned are the specifications for the design consideration.

Below mentioned water quality to be consider for process design,

- A. FILTER WATER:** - Process water should be filtered and shall not contain any E.COLI or COLIFORM bacteria with total germs count being limited to 60 Nos/ml. The chloride content shall be less than 75 ppm.

### Specifications: -

Parameters	Unit	Value
pH	----	6.5 -7.5
Chloride (Cl) Expressed as NaCl	mg/lit	<75
H2S	mg/lit	Nil
Residual Free Chloride	mg/lit	Nil
Silica(SiO2)	mg/lit	<75
Turbidity	NTU	<10
Total Germs	Nos/ml	<60 CFU
Coliform Bacteria	Nos/ml	Nil
E .Coli	Nos/ml	Nil

**B. SOFT WATER:** - (Cooling Tower make up water, Dilution Water for Decanters, Alcohol Scrubbers, Vacuum Pumps sealing Water)

**Specifications: -**

Parameters	Unit	Value
pH	----	6.5 -7.5
Turbidity	NTU	<10
Residual Free Chlorine	mg/lit	<0.5
Reactive Silica as SiO <sub>2</sub>	mg/lit	<50
Chloride as Cl <sup>-</sup>	mg/lit	<75
Hydrogen Sulfide as H <sub>2</sub> S	mg/lit	Nil
Total Hardness as CaCO <sub>3</sub>	mg/lit	<5
Total Dissolved Solids (TDS) as Ions	mg/lit	<250
Total Suspended Solids (TSS)	mg/lit	<10
Sulphates as SO <sub>4</sub>	mg/lit	<30

**1.4 PROCESS DESCRIPTION:**

B-Molasses/ C-Molasses from the sugar factory is used as raw material, with help of yeast propagation and then fermentation, fermentable sugar get converted into Ethanol. The fermented wash after clarification is feed to distillation system to get different product & alcohol further dehydrated to produce ethanol. Spent wash and spent lees generated in distillation is further treated as in effluent treatment plant, multi stage evaporation is proposed. Concentrated spent wash is then feed to incineration boiler along with supporting fuel like bagasse/coal.

The main plant shall be designed for producing 60 KLPD total Ethanol with its molasses composition more particularly fermentable sugar with a variation of  $\pm 5\%$  quantity and quality

**Capacity of Existing 60 KLPD Ethanol @ 99.8% v/v**

Sr. No	Product	Production Liters/Day	Speciation v/v % Alcohol
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1	Rectified spirit	(Minimum) 60,000	95
2	Impure spirit	(Maximum) 3,000	94.68
3	Ethanol	(Minimum) 60,000	99.8

### Design Basis:

This section intends to specify the basis for the design of additional sections/equipments based on molasses fermentation and distillation. Process and minimum essential requirement for stable and consistent performance of the plant for minimum 300 days every year operation.

### Basis for Selection

1. The additional sludge transfer pump of 5 m<sup>3</sup>/hr capacity.
2. The additional 1 No sludge separation centrifugal decanter shall be designed for separation of maximum sludge from the fermented wash after hydro cyclone.
3. Additional section of Forced Circulation Evaporator shall be designed for the further concentration of raw spent wash after existing evaporation and to achieve 58% to 60% w/w solids in concentrated spent wash to operate round the clock throughout the year for minimum 300 days.
4. Additional section of Ultra filtration followed by UV shall be design for the further treatment of CPU treated water to reuse for molasses dilution in fermentation.
5. The sludge contents in concentrated slop ( to be fed to Incineration Boiler) to be below 5000 mg / Kg. Bidder to ensure best sludge separation system to be designed / installed to achieve the said sludge content level, even molasses quality may vary.

The plant shall be designed, manufactured and approved latest amendments of applicable process and Mechanical design, statutory regulation and safety aspect for plant itself and environment considering all five principle of Engineering.

## 1.5 General Information

### 1.5.1 Capacity and Performance of additional evaporation section

Sr. No	Details	Unit	Value
1	Feed Flow	M3 / Day	347
2	Input solids	% w/w	27
3	Concentrated Slop	M3 / Day	162

4	Output Solids	% w/w	58
5	Process Condensate	M3 / Day	185

#### 1.5.2 Quality of Power Generation & Distribution from Incineration Boiler & Steam Turbine

i.	Generation - Voltage	11 KV
	- Phase	3
ii.	Distribution - Voltage	415
	- Frequency Hz	50 (±2%)

#### 1.5.3 Steam Consumption

Designed steam consumption of additional sections	As mentioned in the performance guarantee Ref: Section 8
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#### 1.5.4 Ultra Filtration followed by UV

Separate UF followed by UV for existing CPU to be installed. Treated water shall be used for process.

#### 1.5.5 Project Commissioning

The project to be commissioned within 6-months from signing of contract/release of first advance whichever is later.

### 1.6 DESIGN CONCEPT

Further to the scope of statement, the Bidder shall develop the design of the plant to enable manufacture, fabrication, construction, installation and operation of all items of equipment.

Initially the Bidder will submit the Design Basis Report (DBR) and based on the approved DBR, the specifications and drawings will be provided as part of these Contract documents. The Bidder shall, however, develop detailed designs of all aspects of the Distillery plant including construction, process system, mechanical, electrical, and control system design.



In conducting all aspects of the design, the same shall ensure achieving the desired performance of the additional sections/equipments detailed in Section 7.

Consideration shall be given to the efficiency of each unit of equipment and overall thermal and process efficiency of the additional sections/equipments.

## **1.7 MECHANICAL AND ELECTRICAL DESIGN**

The standards used in the design of mechanical and electrical plant shall be in conformity with the standards and the detailed plant specifications in section 3. Design considerations in the use of materials shall be as outlined in section 2 above. Mechanical & Electrical plant shall be designed to enable all of the requirements of the Distillery Plant. The Design basis and specifications shall be indicated clearly in the drawings.

## **1.8 CIVIL & STRUCTURAL DESIGN**

### **1.8.1 Introduction**

The Bidder is required to carry out the design for additional sections/equipments for the civil (Civil engineering) and structural works for its supply. Layout drawing issued with this bid document only provide to a guide line basis for tendering. The Bidder is required to develop the civil (load data- Dynamic and Static) and structural design to ensure compatibility with the equipment to be supplied and that safe limits for loading of foundations and structures are not exceeded. The standards for civil and structural works shall be as generally given in section 7.

The structural steel and machinery staging requirements shall be as specified in section 7 and the structural works, including miscellaneous fittings and finishes, shall be as given in these specifications. The Bidder will have to vet the civil engineering drawings for constructions which will be provided by client based on load data, drawings & information provided by the Bidder.

### **1.8.2 Design loads**

- a) General: Design loads shall generally be taken from Indian Standards except where otherwise stated in other design sections.
- b) Wind Loading: Wind loading shall be calculated in accordance with Indian Standard taking due account of conditions prevailing at the project site.
- c) Earthquake Loading: Structures to be designed for resistance to seismic forces.

### 1.8.3 Structural steel work design

Structural steelwork design shall generally be in accordance with Indian Standard and using rolled steel sections Grade IS 2062.

## 1.9 BATTERY LIMITS

Most of the activities and works related to this Contract will be performed within the factory fence indicated on the site plan and as mentioned in the Section 10 Terminal Points

## **SECTION – 2**

### **PROCESS DESIGN & INSTALLATION REQUIREMENTS**

#### **2.1 PROCESS DESIGN & INSTALLATION REQUIREMENT**

Engineering, Procurement, Construction (EPC) supply to Hindustan Biofuels Ltd (HBL, LAURIYA) site, erection and commissioning, with the Bidder bearing full responsibility for performance as per specifications, for additional sections of forced circulation evaporation, Ultra Filtration followed by UV and balance of plant (Mechanical, Electrical & Instrumentation) on turnkey basis.

The main plant includes additional 1 No sludge transfer pump, additional 1 No centrifugal sludge decanter, additional section of forced circulation evaporation, Ultra Filtration followed by UV for existing CPU and Balance of Plant (Mechanical) MBOP.

The plant & machinery included in the scope of supply detailed in the specifications but it is the total responsibility of the EPC Bidder to ensure completeness of supply within the terminal points defined in chapter 10. Hence any Plant & machinery, equipment not specifically included in the specifications or any details of included specification, but required for ensuring completeness of supply and a fully working installation with performance, are to be included by the Bidder.

#### **2.2 DESIGN PARAMETERS**

##### **Design Basis**

This section intends to specify the basis for the design of additional sections/equipments in fermentation section, evaporation section and CPU section. Process and minimum essential requirement for stable and consistent performance of the plant for minimum 300 days every year operation.

**a. Proposed additional Evaporation Section:**

<b>Sr. No.</b>	<b>Specifications</b>	<b>Details</b>
1.	Capacity:	347 m3/day
2.	Initial Solids	27% w/w solids
3.	Final Solids	58% w/w solids
4.	Feed pH	4 to 4.5
5.	Alcohol Vapour temperature	67 to 69 Deg. C
6.	Evaporation Rate	185 m3/day
7.	Concentrated product out.	162 m3/day

**b. Proposed Ultra Filtration followed by UV:**

<b>Sr. No</b>	<b>Parameter</b>	<b>Value</b>
1	Inlet Flow rate	*350 m3/day
2	Temperature	*32°C
3	PH	*7-7.50
4	TSS, ppm	<5
5	TDS	+/-15% Same as inlet
6	COD, ppm	Less than 350
7	BOD, ppm	Less than 200

**2.3 BASIS FOR SELECTION**

1. Add on forced circulation evaporation plant shall be designed standalone.
2. The UF followed by UV plant be shall be designed for Zero Liquid discharge (ZLD) for treatment of process condensate& lees, can be recycle to process plant area.
3. The Multiple effect evaporation plant shall be designed such that concerted spent wash

can be used in boiler along with supporting fuel like coal or bagasse.

4. The sludge contents in concentrated slop ( to be fed to Incineration Boiler) to be below 5000 mg / Kg. Bidder to ensure best sludge separation system to be designed / installed to achieve the said sludge content level, even molasses quality may vary.

The plant shall be designed on latest technology, manufactured and approved latest amendments of applicable process and Mechanical design, statutory regulation and safety aspect for plant itself and environment considering all five principle of Engineering.

## 2.4 SPECIFICATION FOR THE PRODUCT

### a. Proposed additional Evaporation Section:

Sr. No.	Specifications	Details
1.	Capacity:	347 m3/day
2.	Initial Solids	27% w/w solids
3.	Final Solids	58% w/w solids
4.	Feed pH	4 to 4.5
5.	Alcohol Vapour temperature	67 to 69 Deg. C
6.	Evaporation Rate	185 m3/day
7.	Concentrated product out.	162 m3/day

### b. Proposed Ultra Filtration followed by UV:

Sr. No	Parameter	Value
1	Flow rate	*350 m3/day
2	Temperature	*32°C
3	PH	*7-7.50
4	TSS, ppm	<1

5	TDS	+/-15% Same as inlet
6	COD, ppm	Less than 200
7	BOD, ppm	Less than 100
8	Power consumption	*
9	H2S	*
10	Residual Free chlorine	*
11	Total hardness expressed as Caco3	*
12	Turbidity	*

## 2.5 BRIEF SPECIFICATION /REQUIREMENTS

### A) EVAPORATOR SYSTEM:

1. Installed capacity of Evaporator system shall be designed for one plant operating at 100% load with consistent performance and solid concentration with steam economy.
2. Evaporator system to be deigned considering the using of raw (molasses) spent wash having solid concentration of \*26-27% to concentrated spent wash having concentration \*58-60% on w/w basis, continuously.
3. Plant has to design consider variation in solid concentration in spent wash composition without affecting the plant performance, steam economy.
4. Bidder shall ensure for consistent steam economy for molasses based spent wash.
5. Bidder shall ensure Optimized power consumption
6. Evaporator & condenser spent wash piping, condensate piping, vacuum &vent piping shall be complete in SS 304.
7. Bidder shall consider outlet of outlet of integrated evaporation spent wash for removal of dissolved gases, ensured by Bidder and successful evaporator performance.
8. Bidder shall ensure Plant design is worked out on continuous basis.
9. Bidder shall ensure Plant design worked out with minimum time for CIP.
10. PLC system is offered for smooth operation of plant.

11. All electrical including MCCs, Lighting, Earthing & Lightning Protection and electrical cables are included.
12. Entire Instrumentation including Level / Pressure / Temp / Flow, etc. control loops in all effects & vessels are to be provided.
13. Plant has to be designed to such operation shall not adverse effect on environment.
14. Supply shall ensure, plant layout will be as per all statutory rules and regulation more particularly factory inspector.
  - a. \*\*Solid concentration in concentrated spent will be confirm on the requirement of incineration type boiler plant Bidder.

#### **B. MECHANICAL BALANCE OF PLANT**

1. Ultra Filtration followed by UV shall be designed for 350 m<sup>3</sup>/day CPU treated water with separate pumps and piping.
2. Bidder shall consider live steam, temperature and pressure, turbine exhaust, PRDS, considering the requirement of temperature and pressure of steam for process.
3. System Installed capacity of UF followed by UV plant shall be designed for one plant operating at 100 % load with consistent performance and product purity.
4. Installed plants/ Auxiliaries shall be inbuilt provision to consider the peak load requirement and plant operate at lower turndown.
5. MBOP has to be designed with proper hazardous classification.
6. All necessary changes in either equipment or in piping while switching over from one product to another, to change the source and all operational flexibility, emergency & all these provision stepwise documented separately.
7. Bidder shall ensure, while designing the plant, for friendly environment.
8. Bidder shall ensure, plant layout will be as per all statutory rules and regulation more particularly factory inspector.

#### **2.6 SCOPE & REQUIREMENT:**

**The additional sections/equipments shall be complete more particularly including items mentioned below:**

1. All equipment like Evaporators, Tanks, vessels, Condensers, Preheaters, Decanter, Pumps, cooler, Piping, Storage tank etc. with proper supporting, painting, insulation and labelling.
2. Integral piping with proper supporting, Insulation, Painting, Labelling.

3. Hot insulation as per IS standard.
  4. All control valves shall have bypass valve and isolation valve arrangement for maintenance of instrumentation.
  5. All integral piping for Process lines, steam, cooling water supply return, Process/soft water, service and instrument air, process piping, condensate, effluent piping.
  6. Instrumentation and control shall be suitable for total operation for plant and storage through PLC.
  7. Steam flow meter and totalizer.
  8. All requisite valve and proper valve selection.
  9. All vents to elevate at safe location.
  10. All drain to connected to nearby gutter.
  11. All electrical power cabling from MCC onwards including MCC.
  12. All signal and control cabling from additional sections and its equipment up to plant, PLC marshalling cabinet about 100 mtr distance.
  13. All other supporting auxiliaries and plant components required for safe, reliable and continuous evaporation for spent wash concentration.
  14. All equipment will be designed and manufactured as per ASME section VIII
  15. All heat exchanger will be designed as per TEMA.
  16. All large storage tanks will be designed & manufactured as per API 650.
  17. Suppler shall identify all critical lines and ensure all lines will be safe in operation.
  18. Bidder shall mention the life of the plant.
  19. Erection and commissioning tool & tackles and requisite spares shall be considered by Bidder.
  20. Bidder shall consider suitable Material of construction, proper composition considering fluid properties and process parameters.
  21. Bidder shall furnish all necessary engineering data /drawing, operating philosophy and trip logic for Ethanol plant, evaporation and for integration with other section of plant PLC system.
  22. The design, Manufacturing, Inspection, supply, construction, testing and performance of the distillery plant and its accessories shall comply with the requirement of applicable latest Indian Standard. Bidder shall furnish a quality assurance plan for review and approval by client/ consultant and strictly comply with the approval quality plan.
  23. Bidder shall ensure proper supporting, painting, insulation, labeling, accessibility and maintainability for equipment and instruments.
  24. Bidder shall ensure proper area to be kept for man movement, piping area, staircase,
- Signature and Seal of the Bidder      **HBL/TEN/PUB/20-21/227 dated 06.02.2021**      **Page 96 | 179**

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and maintenance area bay.

25. Required plant air conditioning for Control Room. Bidder to provide heat load calculation during engineering.
26. Obtaining all required statutory approvals for construction of additional sections/equipments like electrical inspectorate approval, IBR approvals, labour commissioner, excise, factory inspector as applicable, electrical inspector for electrical works, registration & payment of all taxes & duties for Bidders' staff & labour, as per all applicable laws, etc. Statutory fees, if any, will be paid by the Purchaser and applications required.
27. The scope of work not mentioned in this tender document but essential for successful commissioning and operation of the plant is to be considered in the scope by the Bidder.

**2.7 Mechanical Balance of Plant (MBOP) shall be complete more particularly including items mentioned below:**

1. All equipment/ Auxiliaries like pumps, Piping, Storage tank etc. with proper supporting, painting, insulation, labeling.
2. PRV, Steam distribution and condensate handling, piping with proper supporting, insulation, Painting, Labeling.
3. Raw and treated Spent wash, pumps and handling Piping, Storage tank etc. with proper supporting, painting, insulation, labeling.
4. Compressed air piping.
5. Fire water piping and equipment as per Fire & Safety guidelines for additional sections/equipments.
6. All control valves shall have bypass valve and isolation valve arrangement for maintenance of instrumentation.
7. All integral piping for Process lines, steam, cooling water supply return, Process/soft water, service and instrument air, process piping, condensate, effluent piping.
8. Instrumentation and control suitable for total operation for balance of plant through PLC of respective plant area, storage.
9. All requisite valve and proper valve selection
10. All vents to elevated at safe location
11. All drain to connected to nearby gutter.
12. All electrical power cabling from MCC on onwards to respective driving
13. All signal and control cabling from respective section plant and storage and its equipment up to plant, PLC marshaling cabinet about 70 m. distance.

14. All other supporting auxiliaries and plant components required for safe, reliable and continuous year round operation.
15. All equipment will designed & manufactured as per ASME section VIII.
16. All pumps will designed and manufactured as per ASME.
17. All heat exchanger will be designed as per TEMA std.
18. Supplier shall identify all critical lines, basis for critical line ensure for all lines will be safe in operation.
19. Bidder shall mention the life of the plant, resin, insulation etc.
20. Site fabrication, Erection and commissioning tool & tackles and requisite spares shall be considered by Bidder.
21. Bidder shall consider suitable Material of construction, proper composition considering fluid properties and process parameters.
22. Bidder shall furnishings all necessary engineering data /drawing, operating philosophy and trip logic for plant and if required for integration with respective section PLC system.
23. The design Material, construction, Manufacturing, Inspection, testing and performance of section of MBOP and its accessories shall comply with the requirement of applicable latest Indian Standard, Bidder shall furnish a quality assurance plan for review and approval by client/ consultant ad strictly comply with the approval quality plan.
24. Bidder shall ensure proper supporting, painting, insulation, labeling, accessibility, maintainability for equipment and instruments.
25. Bidder shall ensure proper area to be kept for man movement, piping area, staircase, ladder, flat form, railing, maintenance area bay.
26. Pipe rack shall consider all process and utility piping, load for insulation, instrument and electrical cable, mountings, loops.
27. Yard piping and pipe rack shall consider man movement, vehicle and crane movement while road crossing.
28. Proper culverts/casing to be provided for underground piping while crossing the road, storm water drain, gutters.

**2.8 Electrical Balance of Plant (EBOP) shall be complete more particularly including items mentioned below:**

1. All equipment/Auxiliaries like MCCs, Panels and Cabling with cable accessories, Illumination, Earthing & Lightning Protection shall be part of the scope of this contract.

2. Design, manufacture, supply, erection, testing & commissioning of following electrical equipment & systems shall be considered,
  - i. 415V MCCs as per section wise loads
  - ii. LT Power & Control cables, cable terminations & FRP cable trays with covers and all required accessories including supports.
  - iii. Illumination system with Lighting DB, SLDB, LED type Lighting fixtures flame proof Lighting fixtures where ever required as per hazardous area classifications.
  - iv. Earthing & Lightning Protection system as per relevant IS & applicable IEC for all buildings & structures within battery limits.
  - v. Fire protection system for MCC room area as per statutory requirements.

## **2.9 Entire Instrumentation & Control System as mentioned below:**

**In the existing distillery unit, there are spare I/Os in Juice Evaporation system. Bidder has to use these IO's for proposed secondary stand-alone evaporation system. The Engineering Station is already available at site.**

Bidder has to provide additional Operating System (OS) similar to existing OS with related license.

Bidder to verify the details of the existing system prior to procurement so as to avoid any mis-match from the existing system.

All the field instruments including control cabling from the marshalling cabinet / receiving signals from junction box & equipment etc. for proposed evaporation plant will be in Bidder's scope.

The integration of all the inputs / outputs signals for continuous monitoring, operation, data logging, data analysis, alarms, safety interlocks, annunciations etc. will be achieved through the existing PLC.

The additional sections/equipment will be smoothly started, normally operated, provided with necessary interlocks & emergency trips, monitored, controlled and smooth shut down from the PLC.

Bidder will have to do the necessary programming, logic building, graphics development required for successful operation of their Plant being provided

## SECTION - 3

### TECHNICAL SPECIFICATIONS - MAIN PLANT

#### 3.1 BRIEF TECHNICAL SPECIFICATIONS

##### A. MULTI EFFECT EVAPORATION

This section intends to specify the basis for the design of standalone Evaporation plant. Multi effect evaporation Process after distillation and minimum essential requirement for stable and consistent performance of the plant for minimum 300 days every year operation.

##### **Basis for Selection**

1. Evaporator system shall be designed for raw spent having solid concentration 27% to 28% w/w concentration.
2. Evaporator system is ONE (for achieving desired solid concentration i.e. from 27 to 28 % solids in raw spent wash to 58-60 % solid concentration suitable for boiler) for 347 m3 per Day raw spent wash feed capacity, operates continuously, with highest possible solid concentration, minimum steam and power consumption and higher efficiency.
3. Evaporator system shall be designed to operate round the clock throughout the year for minimum 300 days.

#### **TECHNICAL SPECIFICATIONS FOR STANDALONE SPENT WASH EVAPORATION**

##### **I. DESIGN BASIS**

<b>Sr. No.</b>	<b>Specifications</b>	<b>Details</b>
1.	Capacity:	347 m3/day
2.	Initial Solids	27% w/w solids
3.	Final Solids	58% w/w solids
4.	Feed pH	4 to 4.5
5.	Steam pressure & temperature	1.5 Bar (g) / 116 Deg. C
6.	Evaporation Rate	185 m3/day
7.	Concentrated product out.	162 m3/day

## II. EQUIPMENT'S: -

Sr. No.	Particulars	Specifications
1.	Sludge Decanter for Raw Spent Wash: <b>a.</b> Type <b>b.</b> MOC <b>c.</b> Capacity <b>d.</b> Quantity	Centrifugal Wetted part SS 316 15 m3/hr 3 No's (2 W + 1 SB)
2.	FEED Tank for Raw spent wash evaporation: <b>a.</b> Type <b>b.</b> MOC <b>c.</b> Shell thick (mm) <b>d.</b> Capacity	Existing evaporation product tank along with pumps & motors will be used as feed tank
3.	EVAPORATOR CALENDRIA-I (FORCED CIRCULATION Type) <b>a.</b> MOC- (Shell, tube, bonnet, dish end & nozzles etc.) <b>b.</b> Shell thick (mm) <b>c.</b> HTA (M <sup>2</sup> ) <b>d.</b> Tube size- OD mmx Tube thick mm x Tube length (M)	Shell – SS 304, Tube – SS 316 5 To be specified 38.1 X 1.6 X 6
4.	EVAPORATOR CALENDRIA-II (FORCED CIRCULATION Type) <b>a.</b> MOC- (Shell, tube, bonnet, dish end & nozzles etc.) <b>b.</b> Shell thick (mm) <b>c.</b> HTA (M <sup>2</sup> ) <b>d.</b> Tube size- OD mmx Tube thick mm x Tube length (M)	Shell – SS 304, Tube – SS 316 5 To be specified 38.1 X 1.6 X 6

Sr. No.	Particulars	Specifications
5.	<p style="text-align: center;"><b>EVAPORATOR CALENDRIA</b></p> <p><b>FORCED CIRCULATION TYPE. (Stand By)</b></p> <p>a. MOC– (Shell, tube, bonnet, dish end &amp; nozzles etc.)</p> <p>b. Shell thick (mm)</p> <p>c. HTA (M<sup>2</sup>)</p> <p>d. Tube size- OD mmx Tube thick mm x Tube length (M)</p>	<p>Shell – SS 304, Tube – SS 316</p> <p>5</p> <p>To be specified</p> <p>38.1 X 1.6 X 6</p>
6.	<p>Vapor Separators for FORCED CIRCULATION Type - I</p> <p>a. MOC</p> <p>b. Shell thick (mm)</p> <p>c. Diameter (mm)</p> <p>d. Height (mm)</p>	<p>SS 304</p> <p>5</p> <p>To be specified</p> <p>To be specified</p>
7.	<p>Vapor Separators for FORCED CIRCULATION Type – II</p> <p>a. MOC</p> <p>b. Shell thick (mm)</p> <p>c. Diameter (mm)</p> <p>a. Height (mm)</p>	<p>SS 304</p> <p>5</p> <p>To be specified</p> <p>To be specified</p>
8.	<p>Vapor Separators for FORCED CIRCULATION (Stand By)</p> <p>a. MOC</p> <p>b. Shell thick (mm)</p> <p>c. Diameter (mm)</p> <p>a. Height (mm)</p>	<p>SS 304</p> <p>5</p> <p>To be specified</p> <p>To be specified</p>
9.	<p style="text-align: center;"><b>Surface Condenser</b></p> <p>a. MOC– (Shell, tube, bonnet, dish end &amp; nozzles etc.)</p> <p>b. Shell thick (mm)</p>	<p>Shell – SS 304, Tube –</p>

Sr. No.	Particulars	Specifications
	c. HTA (M <sup>2</sup> ) d. Tube size- OD mmx Tube thick mm x Tube length (M)	SS 304 5 To be specified 25.4 X 1.2 X 6 or 12
10.	Product Tank for concentrated spent wash with agitator & steam coil provision: a. Type b. MOC c. Shell thick (mm) d. Capacity	Vertical Cylindrical SS 304 4 10 m <sup>3</sup>
11.	Process condensate Tank for evaporation condensate: a. Type b. MOC c. Shell thick (mm) d. Capacity	Vertical Cylindrical SS 304 4 10 m <sup>3</sup>
12.	Steam condensate Tank for steam condensate: a. Type b. MOC c. Shell thick (mm) d. Capacity	Existing evaporation steam condensate tank will be used for the same
13.	Insulation and cladding Insulation shall be provided to all equipment's and vapour ducts above 60° Wherever required.	75 MM thickness for equipment's and 60 MM for vapor ducting

### III. Auxiliary

Sr. No.	Particulars	Specifications
1.	Vapor Ducts Material of Construction	SS 304
2.	Piping for a. Condensate & non – condensate b. Feed and Final Product c. Cooling water d. Steam Condensate	SS 304 SS 304 MS 'C' Class MS 'C' Class
3.	Seal Water cooling system a. Tanks: b. Pumps c. PHE d. Capacity Separate close loop system shall be provided for Vacuum pump seal cooling system and other process flow pump seal cooling system.	To be specified To be specified To be specified To be specified
4.	CIP System a. Tank: b. Pumps 1 + 1 No. c. MOC	Existing evaporation CIP system to be used for the same
5.	PRV Station to reduce pressure form 3.5 Bar (g) to 1.5 bar (g) with steam control valve and flow meter	With all necessary accessories and pumps with motor.

### IV. PUMP & MOTORS –WITH DOUBLE MECHANICAL SEAL

Sr. No	Particulars	M.O.C.	Type	Capacity	Head in M.	Qty.
1.	Circulation Pumps for Calendria –I	SS 316 Contact Parts	Centrifugal	To be specified	To be specified	1 No

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Sr. No	Particulars	M.O.C.	Type	Capacity	Head in M.	Qty.
2.	Circulation Pumps for Calendria -II	SS 316 Contact Parts	Centrifugal	To be specified	To be specified	1 No
3.	Circulation Pumps for Calendria (Stand By)	SS 316 Contact Parts	Centrifugal	To be specified	To be specified	1 No
4.	Process Condensate Transfer Pump	SS 316 Contact Parts	Centrifugal	To be specified	To be specified	1W + 1SB
5.	Product Transfer Pump for product tank.	SS 316 Contact Parts	Centrifugal	To be specified	To be specified	1W + 1SB
6.	Steam condensate Transfer Pump	CI	Centrifugal	Equal of existing pump	To be specified	1 No
7.	Vacuum Pump	SS 316 Contact Parts	To be specified	To be specified	To be specified	1W + 1SB

<b>V. PIPING, FLANGES &amp; VALVES-</b>					
Sr. No.	Particulars	M.O.C.	Class	Remark	
1.	Piping – (Including piping supports) a. Steam b. Spent wash	MS-IBR SS-304	-- --	For all SS-304 Piping - Sch.10	
2.	Valves – a. Spent wash b. Steam	SS-304 C.I.	-- --	Specify type of valve	

**Note:** – Pumps piping, fittings, pipe supports, valves, instrumentation & electrical items required for all utilities as per battery limit should be in the scope of Bidder. Bidder should specify all the details for this particular requirement.

- Sealing water system, soft water to all pumps gland-Intel and out let water header with piping and water collection tank, PHE and pumps to be provided.
- Pumps- 1+1 Nos. (1 No. in operation +1 No. process standby).
- Non return valves (NRV) should be provided for each pump delivery line.
- Pressure gauge should be provided for each pump at suction & delivery.
- Safety guards for all motors.
- All flanges should be as per ASME/ANSI B 16.5.
- All ball valves should be full port type only.
- For piping every 12 M distance flanges should be provided.
- All SS-304 Piping-Sch. 10.

### 3.2 ADDITIONAL EQUIPMENTS: -

#### I. TECHNICAL SPECIFICATIONS – ULTRA FILTRATION FOLLOWED BY UV UNIT

Bidder shall consider Implementation of “Zero Liquid Discharge” operation for molasses based 60 KLPD Ethanol distilleries.

This section intends to specify the basis for the design of Ultra Filtration followed by UV. Part of treated water from existing CPU shall be further treated in proposed Ultra Filtration followed by UV unit to reuse the water for molasses dilution in fermentation section. The proposed section shall be minimum essential requirement for stable and consistent performance of the plant for minimum 300 days every year operation.

#### INPUT: -

Sr. No	Parameter	Value
1	Inlet Flow rate	*350 m3/day
2	Temperature	*32°C
3	PH	*7-7.50
4	TSS, ppm	<5
5	TDS	+/-15% Same as inlet
6	COD, ppm	Less than 350

7	BOD, ppm	Less than 200
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- Bidder shall provide proper collection tank at intermediate stage, proper retention time, cooling at feed stage.
- Bidder shall ensure system for proper drain of sludge.
- Provision for proper dosing of chemicals, nutrient.
- Ensure proper flirrtation form series of filter and ultra-filtration;

### **SCOPE OF SUPPLY**

#### **UF PLANT –**

<b>1. UF FEED PUMP</b>	
Type	Centrifugal
Capacity	To be specified
MOC	CI with SS304 impeller
Quantity	2 nos. (1W+1SB)

<b>2. BASKET FILTER</b>	
Quantity	1 No.
Capacity	To be specified
Media	25 micron
MOC	SS 316

<b>3. BAG FILTER</b>	
Quantity	1 No.
Capacity	To be specified
Media	25 micron
MOC	SS 316

<b>4. UF SYSTEM</b>	
Feed Flow	To be specified
Product flow	To be specified
Area	To be specified
Recovery	85 to 90 %
Module Type	Hollow Fibre
MOC	PES
Piping	1 lot
MOC of Piping	Header –SS 316, Lateral – UPVC

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Auto Control Valves	6 No.
Type	Pneumatically Actuated
MOC of valve disc	SS 304
Skid	1 No.
MOC of Skid	MS Powder Coated

#### 5. CEB 1 DOSING SYSTEM

Quantity	2 no. (1W+1SB)
Chemical	Caustic and Chlorine
Capacity	0 – 100 LPH @ 3 Kg/cm <sup>2</sup>
Type	Mechanical diaphragm operated
Solution tank Capacity	200 liter
Skid	1 no
MOC	MS Powder coated

#### 6. CEB 2 DOSING SYSTEM

Quantity	2 no. (1W+1SB)
Chemical	Acid
Type	Mechanical diaphragm operated
Capacity	0 – 100 LPH @ 3 Kg/cm <sup>2</sup>
Solution tank Capacity	200 liter
Skid	1 no
MOC	MS Powder coated

#### 7. UF BACKWASH STRAINER

Quantity	1 NO.
Flow rate	To be specified
MOC	SS 316

#### 8. UF BACKWASH PUMP / CIP

Quantity	2 no. (2W )
Capacity	To be specified
Pump type	Centrifugal
MOC of pump	SS 304
Motor Rating	7.5 kW

#### 9. CIP SYSTEM FOR UF PLANT

CIP Tank	1 No.
MOC of CIP Tank	LDPE
Volume	1000 Lit
Micron Filter	1 no.
CIP Piping	1 lot
MOC	UPVC

#### 10. TREATED WATER PUMP

Type	Centrifugal
Capacity	To be specified

MOC	CI with SS 304 impeller
Power	7.5 Kw/ 3 Phase
Quantity	2 nos. (1W+1SB)

<b>11. INTERCONNECTING PIPING &amp; FITTINGS</b>	
MOC	Under Water – CPVC /HDPE Other piping –HDPE/MSEP
Accessories	Valves, Flanges, Reducers, Joints, Bends etc.
Quantity	1 lot. within the Battery Limit

<b>12. CONTROL PANEL (Common For all)</b>	
Electric control panel	1 No.
Type	Compartmentalized
MOC	MS Powder coated
Controller	1 no
Type	Microprocessor Base
PLC	1 No.
Type	UF Matic (Aster)
Contactors	1 set for above scope of supply
Operation	Semi-automatic
Electrical & Instrument Cabling	1 lot within battery limit
Cable Tray	1 lot
MOC	GI
Cable treys supports	1 lot in MS
LPBS	1 lot
Earthing	1 set above ground only
Energy meter	1 No.

**UV SYSTEM: -**

<b>1. UV FEED PUMP + MOTORS</b>	
Type	Centrifugal
Capacity	To be specified
MOC	CI with SS 304 impeller
Power	3 Phase

Quantity	2 nos. (1W+1SB)
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<b>2. ULTRA VIOLET SYSTEM</b>	
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Quantity	1 No.
UTV%	65-70%
No of UV lamp	Suitable
MOC	SS 316L (Electropolished)

**NOTE:-**

1. The panel will be floor/Skid mounted
2. There will be individual MCB for each contactors and overload relays.
3. The panel will have ON/OFF and Trip indication button for each contactor. The Panel will be non-compartmentalize.
4. Required instruments to be installed and the Process parameters to be provided in PLC

**II. TECHNICAL SPECIFICATIONS FOR SLUDGE SEPARATION SYSTEM**

<b>1. SLUDGE TROUGH WITH AGITATOR</b>	
---------------------------------------	--

Type	Cylindrical/Vertical
Capacity	2 m3
MOC of Tank	SS304
Quantity	1 no
MOC of Agitator	Wetted part SS 304
Quantity	1 No

<b>2. SLUDGE TRANSFER PUMP</b>	
--------------------------------	--

Type	Centrifugal
Capacity	5 m3/hr
MOC	CI with SS 304 impeller
Quantity	1 no

<b>3. SLUDGE DECANter</b>	
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Type	Centrifugal
------	-------------

Capacity	5 m3/hr
MOC	Wetted part CF8
Quantity	1 no

### 3.3 SPECIFICATION FOR ELECTRICAL:

All electrical distribution system with in the distillery plant, including MCC panels, power & control cables, accessories, Indoor & outdoor Illumination, earthing & lightening protections, all mandatory safety devices, instrumentation, etc., will be included in the Bidder's scope.

Power supply up to MCC at 415V, 4 wire system will be fed to MCC by other agency. From MCC onward internal distribution (internal power distribution including related panels / switch boards / starters / cables / protections will be in the scope of EPC Bidder.

#### i. MOTOR CONTROL CENTERS (MCCs)

MCCs will be made from CRCA (Cold Roiled Cold Annealed) sheet metal fabrication. MCC will be non-draw out type, compartmentalized non-flame proof type with fuse less system and located at non-flameproof area. The Panels shall be CPRI type tested.

MCC will be fabricated from 14/16-gauge MS CRCA sheet, floor mounted, suitable for indoor installation, vermin/dust proof, weatherproof with IP52 degree of protection. Cable entry shall be from the bottom as a standard feature. Top cable entry may be provided, if required as per layout requirements.

#### 1.1 MCC shall have following feeder arrangements,

##### ❖ Incoming feeder :

- 415V, 3200A, TPN MDO/ EDO, ACB with microprocessor based OC, SC & EF protection
- Restricted Earth Fault Protection Relay
- Under Voltage & Over Voltage protection relay
- ACB ON, OFF, Trip indications
- R,Y,B supply indications
- Ammeter with selector Switch
- Voltmeter with Selector Switch
- Multi-function meter with RS 485 port

##### ❖ Outgoing feeders :

- 415V, TPN MDO ACB (above 800A rating) / fix type MCCB (Up to 630A rating) with

microprocessor based OC,SC & EF protection

- ON, OFF, Trip indications
- Ammeter with selector Switch
- Multi-function meter with RS 485 port

**1.2** MCC shall have following feeder arrangements,

❖ **Incoming feeder :**

- One main Incomer
- 415V, TPN MDO/ EDO ACB (above 800A rating) / fix type MCCB (Up to 630A rating) with microprocessor based OC,SC & EF protection
- ON, OFF, Trip indications
- Ammeter with selector Switch
- Voltmeter with selector switch

❖ **Outgoing DOL Starter feeder up to 22KW :**

- MPCB with microprocessor based OC & SC protection
- ON, OFF, Trip indications
- Ammeter
- Contactor min. 1 size higher than type 2 coordination.

❖ **Outgoing Star Delta Starter feeder above 26KW :**

- MCCB with microprocessor based OC & SC protection
- ON, OFF, Trip indications
- Ammeter with selector Switch
- Contactors min. 1 size higher than type 2 coordination.
- Star Delta timer

❖ The panels shall be manufactured with following criteria,

- All Bus bars shall be Air insulated and of ALUMINIUM. Bus bar size shall be selected based on Temperature limit of 85 °C at Bus bar for the rated current. Max. Current density of bus bar shall not be more than 0.7 A /sq. mm. for PCC & 0.8 A / sq. mm. for MCCs. All bus bars shall be provided with heat shrinkable sleeves of Full Voltage rating. with insulation shrouds at joints.
- Length of MCC shall be limited to 10M.
- Maximum operating load on MCC shall be limited to 500KW.
- Squirrel Cage Motors up to 22 KW shall have automatic DOL Starter suitable for operating from MCC, PLC and PB Station near Motors.
- Motor rating above 26 KW up to 160 KW shall be with Automatic Star Delta -Starter suitable for operating from MCC, PLC and PB Station near Motors.
- In PCC and MCC there shall be min. One spare feeder for each rating.



- VFD shall be provided as per the functional requirement. Local / Remote speed control to be provided
  - MCC shall be floor mounted self-supporting, dust and vermin proof, fixed type construction.
  - Rating of Switchboard incomer ACB/SDF shall be 1.2 times the operating load current.
  - Push Button Station with Shrouded type actuator for ON push button, Lockable Mushroom type actuator for OFF Push button with Aluminum die cast enclosure shall be provided. Push Button Station for Motors above 22KW rating shall be provided with suppressed scale Ammeter. Push Button Station for VFD shall have Speed Setting Potentiometer and speed indicator in addition to Push Buttons and Ammeter.
- ❖ All routine tests shall be carried out on the panel in presence of purchaser or his representative. These tests shall include following:
    - a. Verification of components ratings and operation.
    - b. High voltage measurement test.
    - c. Insulation Resistance measurement.
    - d. Control testing.
  - ❖ Approval on following drawings shall be obtained before manufacturing the panels
    - a. General arrangement drawing.
    - b. Wiring Diagram.
    - c. Detail bill of material.
    - d. Type test certificate

## **2. POWER FACTOR IMPROVEMENT**

- Plant PF shall be required to improve above 0.98
  - ❖ This is achieved by providing :
 

APP Capacitor Banks at MCCs and Provide Automatic Power Correction Panel with required no. of APP type capacitor banks in 415V PCC. Fixed type capacitors shall be connected near MCC with appropriate capacitor duty contactor and FSU feeder in MCC.

To determine number of capacitors following consideration be given,
- Operating KW & Average operating P.F. to be maintained
- Drive with VFD shall maintain P.F. above 0.95. These loads shall not to be considered for deciding capacitor rating.

## **1. POWER CONTROL CABLES**

Electrical to interconnect equipment in Bidder scope within specified battery limits, comprising XLPE insulated, PVC sheathed, Copper conductor cables up to 6 sq. mm. and Aluminum conductor cables above 6 sq. mm. for power and armored copper conductor control cables shall be provided. Necessary FRP ladder / perforated cable trays shall be provided. Necessary built up cable trenches wherever required shall be provided by Bidder.

- ❖ All cables shall be 1.1KV grade PVC/ XLPE insulated.
- a. The cable sizing calculations shall be submitted by Bidder as per the fault level of system. The cable sizing shall be done with 50KA fault current for the duration of 0.2 sec.
- b. The necessary derating factors as recommended by manufacturers shall be considered while deciding the cable size. These shall be mainly comprising of,
  - Derating for temperature,
  - Derating for depth of laying,
  - Grouping factor,
- c. The instructions given for erection of the cables shall be followed as per manufacturer's recommendations.

## **2. ILLUMINATION SYSTEM**

The illumination system shall be flame proof and consist of complete Lighting panels, lighting fixtures, cables, junction boxes cables etc.

- a. The illumination system shall be provided as per the recommended lux levels and good engineering practices followed in industry today.

Following lighting sources are considered,

Process area – Industrial LED type High Bay / Mid bay

Industrial type LED batten fitting

Panel Room – Industrial type LED batten fitting

Control Room – LED fixture with Mirror reflector

Outdoor Lighting – LED Well Glass in process equipment areas &

LED Flood Light fixtures for peripheral lighting.

- b. Following lux levels are recommended,

Control room - 300 Lux

Process areas - 150 Lux.

Outdoor areas - 50 Lux.

- c. The illumination system shall be comprising of following main equipment,
  - Main Lighting Panel
  - Lighting MCB DB.
  - Lighting Fixtures with junction box
  - Cabling / point wiring

### **3. EARTHING & LIGHTENING PROTECTION SYSTEM :**

The measurement of soil resistivity shall be done by Bidder after award of the assignment. For design purpose, the soil resistivity value of 100  $\Omega$  meter shall presently be considered.

The earthing shall have following specifications:

- a. The entire earthing installation shall confirm to IS 3043.
- b. Earthing electrode shall be CI Pipe type.
- c. The earthing electrode shall be 100 mm diameter 3M long C.I. pipe buried under ground up to the level of 2.5 mtrs.
- d. Earthing terminal shall be complete with watering pipe, funnel screen & earthing bus bars.
- e. Earthing pipe buried under ground shall be surrounded by 300 mm thick homogeneous layer of charcoal and salt.
- f. Earthing chambers shall be provided with CI covers of size 450mm x 450 mm or with circular cover having 600 mm dia.
- g. All the material required for the earthing system shall be supplied and installed by the Bidder. The main grid conductor shall be hot dip G.I. strips of 75 mm x 10 mm size.
- h. All the material required for making earthing stations/ pit like plate, charcoal, salt etc. shall be supplied by the Bidder. Excavation and refilling for laying of earth strip and for earth pit shall also be in Bidder's scope.
- i. The entire earthing installation shall be done in accordance with IS specifications and standard engineering practices.
- j. The entire earthing system shall fully comply with Indian electricity act and rules, The Bidder shall carryout any changes desired by the electrical inspector & state electricity board authorities in order to make the installation conforming to I.E. rules. The EI & KSEB will be final authority for the system which Bidder will have to follow & execute in his scope.
- k. The locations of earth conductors, earth electrodes, earthing points of equipment's shall be determined by the Bidder in consultation with Engineer in charge at site. Any changes in the methods, routing, size of conductor etc. shall be subject to the approval of engineer in charge.
- l. The excavation and refilling of earth necessary for laying underground earth conductor and for earth electrode shall be in Bidder's scope. There will not be a separate agency employed by purchaser for this purpose.
- m. The main earth grid shall be laid at a depth of 600 mm below Ground level. In case of built in trenches, earth strip shall be laid along the trench and shall be firmly cleated to the wall or

cable supports. It shall be protected against mechanical damage. Joints and tapping in the main earth grid shall be made in such a way that reliable and good electrical connections are permanently ensured. All joints below grade level shall be welded and suitably protected by giving two coats of bitumen and covering with tar tape.

- n. When the earthing strips are joined together minimum overlap of 100 mm shall be provided. To have better joint, the overlapped portion shall be properly welded and covered with tar tape
- o. Conduits in which cables have been installed shall be earthed bonded and earthed. Cable armour shall be earthed at both ends by providing GI/ copper clamp and PVC wire of suitable size near each cable gland.
- p. The electrodes shall be tested for earth resistance by means of standard earth tester.
- q. A disconnecting facility shall be provided for individual earth pit to check earth resistance.
- r. Earthing system includes provision of earthing to distillery equipment, structures, panels etc. with suitable earthing conductor.
- s. All paint, scale and enamel shall be removed before earthing connection are made.
- t. Anchor bolts or fixing bolts shall not be used for earthing connections.
- u. Entire earthing system and lighting protection system shall be tested for continuity by earth testing equipment after completion of the installation.
- v. Earth resistance value shall be checked and verified. If it is high then corrective measures such as addition of earth pit shall be taken to obtain desired value.
- w. The record of earth resistance and test results shall be maintained for future reference.

### **3.7 PLC BASED INSTRUMENTATION & CONTROL SYSTEM**

- 1. The additional sections/equipment will be complete with the basic instrumentation and control system, necessary for its safe and efficient operation and will be in the Bidder's scope.
  - 2. The I/Os from the existing PLC will be utilized by the Bidder with appropriate engineering as required for software development.
  - 3. Instrumentation shall be complete in every respect and liberal to the extent of providing data on all operation variables sufficient for the safe efficient, easy operation, startup shut down of the plant.
  - 4. All instrument and equipment shall be suitable for use in hot, humid and Tropical industrial climate in which corrosive gases and / or chemicals may be present. As a minimum, all instruments and enclosures in field shall be dust proof, weather proof as per NEMA 4 (IP:55) and secure against the ingress of flue gas, dampness and vermin. All external surfaces shall be suitable treated to provide anti-corrosion protection.
  - 5. Location of tap of connection shall be either from the side or from the top of the equipment but not from the bottom. This requirement is applicable to both pipes and vessels. The location of lower side connection shall be high enough to prevent plugging due to dirt or other suspended solids in addition, the connection shall be short, vertical or horizontal and without pockets.
  - 6. Material of construction of instrument shall be consistent with temperature, pressure,
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corrosion condition and other process requirement.

7. Ranges for instruments shall be selected, in general, such that in normal process operation is between 40% and 60% of span for linear and from 60% to 90% of span for square root.
8. The complete instrument system shall be designed for safe operation, using normally closed contacts which open on fault condition.
9. Adequate alarms shall be provided to give audible and visual warning of malfunctions. The Bidder shall also provide alarm contacts for the operation of parallel alarms, common pre-alarm and shut down alarm by the purchaser wherever indicated.
10. Gauge glasses shall be provided for all level measurements requiring automatic or manual control or monitoring. They shall have at least the same pressure and temperature rating as that of equipment on which they are to be installed. They shall have ball check auto shut off valves suitable for the required temperature.
11. Isolation and bypass valves shall be installed with all control valves. Hand wheels and air lock valves shall be considered for all control valves.
12. Control valves sizing formula shall, in general, be as per ISA-75, 07. Control valves shall be sized for the available pressure drop at normal flow and shall permit up to 125% of the maximum flow. The Bidder shall submit the sizing calculation for all control valves. DP shut off shall be 10% more than upstream pressure for actuator sizing.
13. Orifice plate calculations shall in general, follow BS 1042. Orifice diameters shall be selected so that d/D ratio is between 0.2 to 0.7 for gases and up to 0.75 for liquids. Bidder shall submit the sizing calculations for orifice plates.
14. All transmitters shall be provided with output meter / output gauge at the transmitter end. All transmitters shall be smart type.
15. The Bidder shall ensure that the packing of instruments and associated equipment is adequate to prevent damage from such contingencies as rough handling, weather, condensation, dew, vermin and vibrations.
16. All Solenoid valves shall be universal type and continuous rated type.
17. Comprehensive instrumentation and control equipment will be provided for each major areas i.e Distillation, Fermentation, Evaporation, Electrical system and Balance of Plant including data transfer of major parameters with incineration boiler & its cogen Plant.
18. The Centralized control / monitoring shall be from a Remote Central Control Room, where the PLC and its sub systems including the operator console, shall be located.
19. DCS/PLC Hookup: From incineration boiler / Cogen Plant DCS and existing MEE instrumentation system with required software & compatibility with internet so as to transfer daily / shift wise MIS to Management / Senior officers of Plant.

The key instrumentation and control system shall be as follows:

#### 2.1.1 **For Main Plant and its auxiliaries**

2.1.1.1 The control of the Plant like operation / start-up / shut down / trip, shall be realized directly from the existing PLC. All the signals required for controlling the operation shall be processed by the PLC and necessary actuating signals for the various final control elements shall be driven from the PLC.

2.1.1.2 The major control includes the following, as a minimum:

- i. Level control
- ii. Pressure Control
- iii. Flow Control
- iv. Temperature Control

Signals from the following shall be taken to the PLC for monitoring / interlocking purpose.

- i. Feed pumps and transfer pumps
- ii. Dosing Systems
- iii. Plant safety and protection interlocks

2.1.1.3 Various electrical inputs from the transducers and the digital signals from MCC panels shall be processed in the PLC system for achieving the necessary interlocks / controls.

2.1.1.4 The PRDS functions shall be directly processed through the existing PLC.

2.1.1.5 The design of the total control system will be such that the following sub system functions will be handled by the respective equipment. The existing control / operation philosophy have to be used for the same.

~~2.1.1.6~~ The field instruments that are primarily responsible for measuring the process parameters will be having the following major design features:

- i. All the field instruments / equipment that are used shall be of the same make for ensuring the smooth and optimal maintenance including efficient spare parts management.
- ii. All field instruments used for sensing transmission and measuring shall be of electronic smart type with signal transmission in current mode of 4-20 mA.
- iii. All control valves and control damper drives will be of pneumatic type because of their fast response and ease of maintenance.
- iv. Appropriate de-rating of electronic components and parts.
- v. All the instruments shall have communication facility thro RS 485 interface.
- vi. Important plant parameters, that are required to assess the plant efficiency, must be serially communicated to the operator station for the purpose of display / logging.
- vii. All solid state systems / equipment shall be able to withstand the electrical noise and surge as encountered in actual service conditions and inherent in a power plant and shall meet the specification requirements of surge protection.

- viii. All solid state electronic system / equipment furnished shall meet the requirements of Burn-in and Elevated temperature test.
- ix. All the instrumentation cables shall be flame retardant low smoke type.
- x. The instrumentation cables and wires shall function without breakdown for surges experienced in the control system. Voltage class and insulation level shall be compatible with the signals they convey.  
Apart from the above integrated control system, local gauges will be provided near the equipment / pipelines at essential parts of the plant for the purpose of operator guidance.

### 2.1.2 Scope Of Supply

- a. Design, system & software engineering, manufacture, supply of required hardware & licensed software, testing, inspection, packing, forwarding, transportation, Site Acceptance Test (SAT), erection & commissioning, post commissioning assistance till plant stabilisation.
- b. The integration of all the inputs / signals for continuous monitoring, operation, data logging, data analysis, alarms, safety interlocks, annunciators etc. will be achieved through the existing PLC.
- c. Bidder to carry out engineering of system hardware and software to meet functional requirement in line with the existing operations.
- d. The additional sections/equipment will be smoothly started, normally operated, provided with necessary interlocks & emergency trips, monitored, controlled and smooth shut down from the existing PLC.

### 2.1.3 Other details

Location: The location of the new Operating Station being provided by the Bidder will be either in the existing Central control room (CCR) or in the Evaporator Section. The exact location will be decided during detailing.

- i. Monitoring of process parameters, equipment running status, motorised valves' open / close positions
- ii. Open loop controls viz. opening and closing of dampers, control valves, motorized valves, speed setting of variable speed drives in manual mode
- iii. Closed loop controls
- iv. Alarms: Process alarms viz. level high, pressure low etc. and overload / trip alarms of drives
- v. Operation: Start / stop drives, opening and closing of motorised valves. The operation from CCR shall be with safety interlocks, which shall be executed in respective panels or PLC from where the operation is carried.

### 2.1.4 Operator cum Engineering Interface Sub-System

**The OS will be in-line with the existing OS. The major requirements are detailed below:**

- a) The operator interface sub-system shall provide the centralized information to the plant operator / Engineer in the following details.
  - (i) Indication of all analog and digital process variables of control loops, open loops and all loop related parameters.
  - (ii) Manipulation of control loops including changing set point, mode, output, configuration, turning and computational constants.
  - (iii) Graphic displays and status indication.
  - (iv) Alarm displays and annunciation.
  - (v) Compilation of graphic displays.
  - (vi) Self-diagnostic messages.
  - (vii) Required interlocking schemes
- b) The Engineering interface sub-system shall be used for configuring, tuning and maintenance of the system. It shall be possible to perform the following system configuration functions.
  - (i) Data base configuration including overview, group, loop, multi-loop and Multi-variable control configuration.
  - (ii) Configuration or re-configuration of alarms settings, their values, addition or deletion of any control block or component in loop
  - (iii) Tuning of control loops like changing P.I.D., dead time values, etc.
  - (iv) Compilation of graphic displays.
  - (v) Compilation of logs/report/historical trend points.
  - (vi) To call detailed self-diagnostic displays for maintenance aid.
- c) Each Engineering / operator station shall consist of TFT monitor and keyboard, each driven by independent electronics.
- d) The stations shall be housed in the consoles.
- e) Each Station shall be of industrial type and size shall be 22".
- f) All the operator station shall be interchangeable. However under normal operating Condition, each operator station shall be assigned a specific area. The system shall have global database available at each operator station. Further any change made in the database of one operator station shall automatically update the database of other operator station.
- g) Process displays - Similar to existing philosophy being used.

### 2.1.5 Instruments

Details of field instruments have been provided in the specifications of respective equipment. The same is also summarised below:

- a. All instruments and equipment shall be suitable for use in a hot, humid and tropical industrial climate in which corrosive gases and / or chemicals may be present. As a minimum, all instruments and enclosures in field shall be dust proof, weather proof to NEMA 4 (IP:55) and secure against the ingress of flue, dampness and vermin. All external surface shall be suitably treated to provide anti-corrosion protection.
- b. The instruments like control valves, thermo wells, orifice flanges, level instruments etc. has to be certified with warranty & guarantee.
- c. Location of tap off connections shall be either from the side or from the top of the equipment but not from the bottom. This requirement is applicable to both pipes



- and vessels. The location of lower side connection shall be high enough to prevent plugging due to dirt or other suspended solids. In addition, the connections shall be short, vertical or horizontal and without any pockets.
- d. Materials of construction of instruments shall be consistent with temperature, pressure, corrosion conditions and other steam generator requirements.
  - e. The design of control panel shall incorporate provision for expansion by installing space capacity. Each panel shall be designed to accommodate 10% minimum additional equipment including 10% spare cable/ tube entry points.
  - f. Instrument power circuits shall employ an isolation transformer and individually protected from fault with the help of MCB's and fuses. Power supply to the individual instrument shall be disconnect able with the help of switch and protected with the help of fuse.
  - g. Ranges for instruments shall be selected, in general, such that in normal process operation the indication on the indicator or chart is between 40% to 60% of span for linear and 60% to 90% of span for square root.
  - h. The complete instrument system shall be designed for safe operation, by using normally closed contacts which open on fault conditions.
  - i. Adequate alarms shall be provided to give audible and visual warning of malfunction. The Bidder shall also provide alarm contacts for the operation of parallel alarms, common pre-alarm and shut down alarm by the Purchaser wherever indicated. All lamps shall be provided with lamp test facility.
  - j. Gauge glasses shall be provided for all level measurements requiring automatic or manual control or monitoring. They shall have at least the same pressure and temperature rating as that of equipment's on which they are to be installed. They shall have ball check auto shut off valves.
  - k. Isolation and bypass valves shall be installed with all control valves. Hand wheels and air lock valves shall be considered for all control valves.
  - l. Control valve sizing formula shall, in general, be as per ISA-75, 07. Control valves shall be sized for the available pressure drop at normal flow and shall permit up to 110% of the maximum flow. The Bidder shall submit the sizing calculations for all control valves. DP shut off shall be 10% more than upstream pressure for actuator sizing.
  - m. Orifice plate calculations shall in general, follow BS 1042. Orifice diameters shall be selected so that d/D ratio is between 0.2 to 0.7 for gases and steam and up to 0.75 for liquids. Bidder shall submit the sizing calculations for orifice plates.
  - n. Main steam generator stop valve & air vent valve will be motorized and shall be designed in accordance with ASME code for valves (ASME B 16.34) and Indian Boiler Regulations.
  - o. All transmitters shall be provided with output meter/output gauge at the transmitters end. All transmitters will be smart type.
  - p. The Bidder shall ensure that the packing of instruments and associated equipment is adequate to prevent damage from such contingencies as rough handling, weather, condensation, dew, vermin and vibrations.
  - q. All solenoid valves shall be universal type and continuous rated type.
  - r. Bidder will adhere to the approved makes for all instruments as provided in this document. Bidder will provide data sheets for all gauges, transmitters, thermo-wells, flow meters, energy meters, electrical meters, orifice, vortex meters, rota meters, impulse piping, etc. for approval of Purchaser / Consultant during engineering

## 2.1.6 Estimated Bill Of Material

Sr. No	Description
	<b>PLC System</b>
I	<b>Bidder has to use the existing PLC system from the juice evaporation section having spare IO's</b>
II	<b>One Engineering cum operator station for proposed evaporation plant</b> , TFT 22" color monitors, required consoles with chairs, required hardware for SOE recorder, LED digital displays (150 x 250 mm) for Process Parameters
III	Interconnecting cables between System Cabinets Marshalling cabinets Relay Cabinets from Field / Electrical Panels
IV	Power Cable for system cabinets
V.	<b>Erection Hardware</b>
1.	Erection Material
2.	Cable Gland Wiring and cabling accessories
VI.	<b>Software</b>
	As required for OS including License Key
	Project – application engineering Documentation Supervision of installation & commissioning

## 2.1.7 TENTATIVE SECTIONWISE INSTRUMENTAT LIST

Below is the tentative list & type of instruments to be installed in each section.

SR.NO.	DESCRIPTION	TYPE OF INSTRUMENT	QTY. (NOS)
<b>LEVEL TRANSMITTERS</b>			
1	PROCESS CONDENSATE	DPT	1

SR.NO.	DESCRIPTION	TYPE OF INSTRUMENT	QTY. (NOS)
2	CONCENTRIC SPENT WASH TANK	REMOTE SEAL	1
3	DIRTY CONDENSATE TANK	REMOTE SEAL	1
4	EVAPORATOR –I, II, Stand By	REMOTE SEAL	3
<b>CONTROL VALVES</b>			
1	PROCESS CONDENSATE	GLOBE	1
2	CONCENTRIC SPENT WASH TANK	GLOBE	1
3	DIRTY CONDENSATE TANK	GLOBE	1
4	EVAPORATOR –I, II, Stand By	GLOBE	3
5	STEAM FLOW CONTROL	GLOBE	1
<b>PRESSURE TRANSMITTERS</b>			
1	VAPOUR LIQUID SEPERATOR- I, II, Stand By	Diaphragm	3
<b>TEMPERATURE ELEMENTS (RTD)</b>			
1	TEMPERATURE OF FEED INLET OF PRE HEATER	RTD with TT	1
2	TEMPERATURE OF FEED OUTLET OF PRE HEATER	RTD with TT	1
3	TEMP. OF VAPOUR-LIQUID SEPARATOR- I, II, Stand By	RTD with TT	3
4	TEMPERATURE OF CWR	RTD with TT	1
5	TEMPERATURE OF CWS	RTD with TT	1
<b>FLOW TRANSMITTERS</b>			
1	Spent Wash Feed	Existing evaporator product flow meter will be used as feed flow meter	
2	Conc.Product Out	Magnetic Flow Meter	1

SR.NO.	DESCRIPTION	TYPE OF INSTRUMENT	QTY. (NOS)
3	Process Condensate Out	Magnetic Flow Meter	1
4	Steam Inlet	OFA+DPT	1
<b>FLOW INDICATORS</b>			
1	Soft Water To Vacuum Pump	GLASS TUBE ROTAMETER	1
<b>PRESSURE INDICATORS</b>			
1	Motor for Circulation Pump I, II, Stand By	DIAPHRAGM	3
2	Motor for Process condensate pump	BOURDON	1
3	Motor for Conc. Spent wash Feed Pump	DIAPHRAGM	1
4	Motor for VP Seal Water Pump	BOURDON	1
5	Motor for m/c sealing water Transfer Pump	BOURDON	1
6	Motor for Dirty condensate transfer Pump	BOURDON	1
7	Vapour Liquid Separator I, II, Stand By	BOURDON / DIAPHRAGM	6
8	Steam Inlet Pressure Before PRV	BOURDON	1

**Note: -**

1. The above list is tentative and minimum. Bidders to add the instruments wherever applicable as per process requirement.
  2. All the Transmitters will be SMART Type
  3. The required accessories will be part of instruments
  4. All the Flow meters to be provided with Remote Display Unit.
  5. 24 VDC auxiliary power supply to be provided to 2 Wire systems including flow meters
- The detailed instrument list to be furnished by the Bidder along with the control philosophy & control logics

## **SECTION – 4**

### **TECHNICAL SPECIFICATIONS - BALANCE MECHANICAL ITEMS OF PLANT**

#### **4.1 COOLING TOWER**

Bidder has to use the existing juice evaporation cooling tower with pumping station for proposed evaporation. Required pipe line modification has to be done by bidder.

#### **4.2 INSTRUMENT AIR COMPRESSORS SYSTEM**

Bidders has to take the compressed air from existing air compressor and distance is about 50 mtr from proposed evaporation.

#### **4.3 FIRE FIGHTING & PROTECTION**

Existing Fire protection system to be extended by Bidder with required portable Fire Extinguishers as per site plan

**SECTION – 5**  
**PIPING DESIGN & VALVE REQUIREMENTS**

**5.1 REQUIREMENT FOR PIPING AND VALVE**

**PIPING**

1. All steam, condensate piping and header, mountings on/in line, condensate pot will be as per applicable IBR standard,
2. All piping will be aesthetically and neatly laid on pipe rack with proper supporting, proper color coding and labeling.
3. The Plant and Process piping will include compressed air, water, drain, vent, purging etc.
4. All piping required for effectively connecting all utilities, sources, product storage, raw material feed tank.
5. The piping provided in all respect including valves, fitting, supports, special items as required. Necessary support material, towers, trestles to support and anchor the pipelines at regular span/intervals shall be supplied. Suitable expansion loops and hangers shall be provided wherever necessary.
6. Proper slope for all piping shall be maintained wherever necessary.
7. Suitable expansion loops and hangers shall be provided so as to ensure compliance with applicable codes and to limit the stress and movement, reaction to within the allowable values.
8. The flow velocities in pipelines shall be limited to be following values:
  - i. Steam condensate : 2 m/Sec
  - ii. Compressed air : 20 to 25 m/Sec
  - iii. Saturated steam : 15 to 20 m/Sec.
  - iv. Process vapors : 30 to 50 m/Sec.
  - v. Spent Wash : 1.6 m/Sec.
9. Pipe rack with service platform where is necessary shall consider all process and utility piping, load for insulation, instrument and electrical cable, mountings, loops.
10. Yard piping and pipe rack shall consider man movement, vehicle and crane movement while road crossing and have service platform.

11. Proper culverts/casing to be provided for underground piping while crossing the road, storm water drain, gutters.
12. Firefighting system shall be designed considering all fluids, material are present and to be handled in the plant.
13. Firefighting system shall be designed considering other underground piping, storm water and gutters.

## 5.2 Valve Selection and MOC

<b>Sr. No.</b>	<b>Fluid</b>	<b>For 50 NB &amp; Below</b>	<b>More than 50 NB</b>
1.	Process & cooling water –	Flanged end type Ball valve CS/CI body	Gear operated Butter fly valve CI body & SGI disc.
2.	Air	Flanged end type Ball Valve with contact part SS304 A & body Cs.	
3.	Spent wash	Flanged end type Ball valve with SS304 contact	Gear operated Butterfly valve with CI body and SS 304 disc
4.	Spent lees	Flanged end type Ball valve with SS304 contact	Gear operated Butterfly valve with CI body and SS 304 disc
5.	Steam condensate	Flanged end type Gate valve with CI body	Flanged end type Gate valve with CI body
6.	Steam	Flanged end type Globe valve as per IBR	Flanged end type Gate valve as per IBR

**SECTION – 6**  
**INPUTS FOR CIVIL & STRUCTURAL CONSTRUCTIONS**

**6.1 MAJOR CIVIL WORKS**

Bidder to provide all required inputs including load data, drawings and layouts as inputs for designing the civil works for all plant & equipment in his scope. Design and construction of civil works will be done by Bidder.

- a. Foundations for Add on Equipment in Fermentation & Evaporation unit
- b. Foundations for UV/UF system.
- c. Panel rooms, sheds for equipment
- d. Provisions for street lighting, yard lighting, area lighting etc. within battery limits.
- e. Drainage channels, storm water drains



**SECTION – 7**  
**PROCESS/PERFORMANCE GUARANTEE PARAMETERS**

**7.1 Proposed additional Evaporation Section:**

<b>Sr. No.</b>	<b>Specifications</b>	<b>Details</b>
1.	Capacity:	347 m <sup>3</sup> /day
2.	Initial Solids	27% w/w solids
3.	Final Solids	58% w/w solids
4.	Feed pH	4 to 4.5
5.	Alcohol Vapour temperature	67 to 69 Deg. C
6.	Evaporation Rate	185 m <sup>3</sup> /day
7.	Concentrated product out.	163m <sup>3</sup> /day

**3.3 Proposed Ultra Filtration followed by UV:**

<b>Sr. No</b>	<b>Parameter</b>	<b>Value</b>
1	Flow rate	*350 m <sup>3</sup> /day
2	Temperature	*32°C
3	PH	*7-7.50
4	TSS, ppm	<1
5	TDS	+/-15% Same as inlet
6	COD, ppm	Less than 200
7	BOD, ppm	Less than 100
8	Power consumption	*
9	H <sub>2</sub> S	*
10	Residual Free chlorine	*
11	Total hardness expressed as Caco <sub>3</sub>	*
12	Turbidity	*

### 7.3 STEAM CONSUMPTION AT 1.5 KG/CM2 (G)

<b>SR. NO</b>	<b>Product /Area</b>	<b>Steam Consumption Kg/Lit</b>
1	Stand Alone Secondary Evaporation	To be specified

### 7.4 SECTION WISE POWER CONSUMPTION

<b>SR. NO</b>	<b>Section</b>	<b>Operating Load</b>	<b>Connected Load</b>
1	Decanter section	To be specified	To be specified
2	Standalone Evaporation		
3	Ultra Filtration followed by UV		
4	Raw water/Soft Water/DM water		

**Note: Bidders to provide section wise power breakup**

## **SECTION – 8**

### **DOCUMENTS & DRAWINGS LIST**

#### **8.1 DOCUMENTS AND DRAWING LIST**

The supplier shall provide all engineering drawings, documentation during contract period at respective time of project life cycle for submission, approvals & record, total six set along with all soft copies of all detailed technical documents, drawings, complete with all technical information, data sheet, commissioning protocol, operation manual ,maintenance manual, spare part catalog, with vendor contact detail with all general information etc. in respect of supply, more particularly following, Bidder shall provide separate schedule for engineering documentation submission along with the project schedule.

Details of all the spare parts are required to be provided in the item master format (format will be shared by Purchaser to L1 bidder after award of PO) which will include all the technical details regarding the spare parts along with indicative price, approved suppliers with their details for ease in procurement after installation

#### **8.2 BASIC PROCESS DESIGN: (Bidders to be provided along with quotation)**

1. Process description
2. Design basis including water balance, mass balance, power balance etc.
3. Fluid category index and Basic Material of construction
4. Line sizing and pressure drop calculation
5. Section wise PID
6. Preliminary equipment layout and elevation
7. Equipment list
8. Process control and instrumentation logic / philosophy
9. Instrument list
10. Thermal Design for re-boiler, heat exchanger and cooler.
11. Pump hydraulics, pump data sheet
12. Equipment data sheet
13. Spare part List

### **8.3 DETAIL ENGINEERING**

1. Piping Design
2. Design Basis
3. Line list
4. Critical line list with basis and stress analysis
5. Thickness calculation
6. Piping material specification
7. Equipment layout and elevation including support, staging & platforms etc.
8. Piping plans at various level
9. Isometric drawing
10. Piping support standard
11. Pipe supports
12. Special item list with all detail specification
13. Terminal point list with condition
14. Civil load data
15. Foundation load data
16. Valve list and valve data sheet
17. Stress analysis and/ or Finite element analysis wherever applicable.

### **8.4 MECHANICAL DESIGN**

The Bidder shall provide all technical information including operating & maintenance manuals and spare parts catalogues with all general information brochure, leaflets, etc. in respect of all items of supply, including followings:

1. Design basis
2. Thickness calculation
3. Equipment General arrangement drawing
4. fabrication drawings
5. Equipment support arrangement
6. Nozzle orientation
7. Civil load data

### **8.5 ELECTRICAL**

The Bidder shall provide all technical information including maintenance manuals and spare parts catalogues with all general information brochure, leaflets, etc. in respect of all items of supply, including following:

1. Basis

2. Single line diagram
3. MCC panel GA
4. MCC panel internal specification
5. Cable specification
6. Cable routing layout
7. List of motor with all details
8. MCC panel charging producer

## **8.6 INSTRUMENTATION**

The Bidder shall provide all technical information including maintenance manuals and spare parts catalogues with all general information brochure, leaflets, etc. in respect of all items of supply, including followings:

1. List of documents & document submission schedule with document nos.
2. Instrumentation design basis.
3. Quality Assurance procedure.
4. Instrument index specifying the tag wise details of individual instrument,
5. Location service, type of signal, P&ID no. Line no or equipment no. make model no. as a minimum.
6. Write up and control logic diagram.
7. Control Narrative and interlock description.
8. Technical specifications and data sheets of all the field instruments with all ordering information.
9. General arrangement drawings for all the field instruments.
10. Terminals details of all the field instruments.
11. Instrument cable tray routing drawing.
12. Instrument location and elevation drawings.
13. Instrument cable schedule and junction box schedules.
14. All factory test certificates and calibrations certificates.
15. Calculations and sizing details for Orifice flow meters, control valves, magnetic flow meters etc.
16. Field instrument calibration reports.
17. List of commissioning spares.
18. List of 2 years operational spares.
19. PLC panel control wiring diagram (as-built), power wiring diagram
20. Final PLC software back up.

## **8.7 ERECTION, COMMISSIONING AND MAINTENANCE**

1. Erection Protocol

2. Pre commissioning check list
3. Commissioning protocol
4. Six sets of Operation Manual
5. Six sets of Maintenance manual
6. Six sets of final as built drawings.

#### **8.8 QUALITY ASSURANCE PROCEDURE,**

1. Engineering and documentation
2. Procurement process
3. Manufacturing process
4. Welding procedure
5. Site fabrication
6. Installation of plant, machinery & piping
7. Project management, site supervision
8. Water trails, Hydro testing, blowing, Pre commissioning & commissioning

#### **8.9 FORCES AND MOVEMENT DIAGRAM FOR ALL MATING POINTS.**

Terminal point list, with Pressure temperature condition, coordinate and with all required information

8.9.1 All test certificate

8.9.2 As built drawing for all mentioned documents.

8.9.3 IBR folder for all pipe lines, equipment, and pressure part comes under IBRpreview.

## SECTION - 9

### APPROVED MAKES, CRITICAL COMPONENTS

Approved makes are specified in the tender for various equipment /materials, but it is sole responsibility of the bidder to ensure that all equipment /materials of best quality & genuine make are procured and decision of Purchaser with regard to selection of any of the makes stipulated in the tender shall be final. In case specifications/ make of any item or work is not mentioned in the list of approved list for any particular item then contractor has to provide the documentary proof for the same & basis the documentary proof, Purchaser may approve the revised specification / make on their sole discretion.

**A typical standard preferred list of vendors is provided below.**

S. No.	Description	Make
<b>A.</b>	<b>Mechanical</b>	
1.	Centrifugal Pump for water	KSB/Mather & Platt/KBL
2.	Progressing Cavity pump	Rover/Rotmac/Hydroprokav
3.	Spent wash pump	Micro finish/KSB
4.	Plate Heat Exchanger	Alfa Laval/Kelvion
5.	Air Blower / Vacuum pump	PPI / TMVT
6.	Expansion Joint	
	Metallic Joint (Others)	Metallic Bellows / Flexotherm /Fluidyne Engineers / Lonestar Industries / Flexican Bellows / Pepiflex
7.	Couplings	Fenner / Love Joy /Resoflex / Utkarsh
8.	Bearings	SKF / FAG
9.	Water Level Gauge	
	Tubular Type	WJ NETA / Levcon / Chemtrol /Asian / R.K.Dutt
	Transparent	Levcon / Chemtrol /Asian
10.	Insulation	
	LRB	Min Wool / Rock Wool Industries / Lloyd Rock Fibres / Rockwool (I) Ltd
	Aluminum Cladding	BALCO /INDALCO / HINDALCO
11.	Traps	J.N. Marshall / Pennant

<b>S. No.</b>	<b>Description</b>	<b>Make</b>
12.	Spring Hangers	Sarathi Engg / Pipe Supports
13.	Orifice Plates	Micro precision / Hydro pneumatics / Fairflow / IL / General instruments / Gurunanak / Placa
14.	Flow Nozzles	Microprecision / Engineering Specialties - Kolkata / General Instruments
15.	Metallic Bellows	Flexicon / Lone Star / Metallic Bellows / Instrumentation Ltd.
16.	Motors	Crompton/ABB/Siemens
17.	MS Plate	Tata / SAIL / Jindal
18.	SS Plate/Coil	Jindal
19.	Structure	Tata
	<b>Valves</b>	
1.	Control Valves	Dembla/Forbes Marshall/ MIL/BHEL
2.	Safety Valves	BHEL / TYCO SANMAR / L&T/KSB
3.	Solenoid Valves	Avcon / Asco / Rotex / Veljan / El-Omtic / Nucon
4.	Solenoid Operated Ball & Butterfly Valves	El-O-Matic / Rotex /Virgo
5.	Solenoid Gangs	Avcon / Nucon / Rotex
6.	Ball Valves	Micro Finish // Rotex / Flow Jet /BHEL/L&T
7.	Valves - Ball (Screwed)	GM / Unison
8.	Valves – Butterfly	Tyco-Keystone / Crane /Virgo/Inter Valve
9.	Valves - Gate/ Globe/NRV	BHEL/Flowjet / MIL/Forbes Marshall
10.	Vacuum Relief Valve	KSB / BHEL
11.	Pressure reducing valve	Forbes Marshall/Mazda
	<b>Electricals</b>	
1.	LT Bus Duct	Enpro / Elpro /C&S / L&T & equivalent
2.	HT Switch Gear	ABB / Siemens /Schneider & equivalent
3.	LT PCC / MCC	CPRI approved
4.	Energy Meter	MECO / AE /IMP / Enercon / Easunrexrolle
5.	Motors	Crompton / ABB / Siemens / Kirloskar



<b>S. No.</b>	<b>Description</b>	<b>Make</b>
6.	Power & Control Cables	Finolex / Polycab/ Incab & equivalent
7.	Air Circuit Breakers	L&T / Siemens/ GEC / ABB & equivalent
8.	Fuse	L&T / Siemens/ EE / BCH / ABB
9.	Switches	L&T / Siemens/ BCH / ABB & equivalent
10.	Switch/Fuse Unit	L&T / Siemens/ BCH / ABB & equivalent
11.	Thermal Overload Relays	L&T / Siemens/ ABB & equivalent
12.	Contactors	L&T / Siemens/ BCH / ABB & equivalent
13.	Ammeter/Volt Meter	AE / Mecor / Rishab / Enercon & equivalent
14.	Push Buttons	Siemens / Teknik & equivalent
15.	Control Transformer	Kappa Consolidated / Rowsons / Cortina
16.	Selector Switch	Salzer / Kaycee & equivalent
17.	Indicating Lamps	Siemens / Tecnic & equivalent
18.	MCB	MDS / Indo Asian / Siemens & equivalent
19.	Terminal Blocks	Elmex / Jainson / IML & equivalent
20.	MCCB	L&T / E.E / Siemens / ABB / Schneider
21.	Timer	L&T / E.E / Siemens & equivalent
22.	Cable Glands	Cabend / Baliga / Comet / Exprotecta
23.	Air Conditioning	Carrier Aircon Ltd / Blue Star Ltd / LG / LLOYD Electronics
24.	Battery & Battery Charger	Exide / Amaron & equivalent
25.	Lighting Material Flameproof	Philips / Bajaj / GE / Crompton Greaves/ Havells
26.	UPS	Emerson / Numeric / Hirel
	<b>INSTRUMENTS</b>	
1.	SMART Transmitters	Yokogawa / Emerson / Honeywell / E & H/
2.	Temperature Gauges / Sensors	H.Guru / Waaree Instruments / Forbes Marshall/ Radix Micro System
3.	Pressure Gauges	H. Guru / Waaree Instruments / Forbes Marshall / Radix Micro System /

<b>S. No.</b>	<b>Description</b>	<b>Make</b>
4.	Thermo Couples	Nutech Engineers / Tempsons / Thermal Instruments
5.	Pressure Switch / Temperature Switch	Switzer / Indfoss
6.	Level Switch (Float Type)	Levcon / Chemtrol
7.	Limit Switch	Pneumatic Controls / Jai Bajaj / BCH / Siemens / Honeywell
8.	Transducers	Elster / Meco / Masibus / Rishabh
9.	Transmitters	Rosemount / Siemens / ABB / YBL / SMAR/Emerson
10.	Contactless Level Transmitter	Yokogawa / Emerson / E&H
11.	Auto Manual Loader	Micromax / Masibus
12.	I/P Convertors	ABB / C G Hartman & Braun / Moore
13.	Digital Indicator	Teletherm / MCIH / Masibus
14.	Air Filter Cum Regulator	Placka / Veljan / Shavo
15.	Compensating Cables	Thermopads / Associated / Cords / Technocab/Polycab/Icon
16.	Magnetic flow meters	Rosemount / Forbes / E & H / Yokogawa / Samar
17.	Flow meter Rota meters	Bernoulli's / Eureka / Spinks Controls
18.	PRS & PRDS	Forbes Marshall- Area / Samson
19.	Actuated Control Valves	Virgo/Tyco /Cranes / Delval / Crone / Dembla / Bray / Air Power

**SECTION – 10**  
**TERMINAL POINTS**

**a. MECHANICAL**

Slurry from existing hydro cyclone	Purchaser has to provide at the inlet of sludge trough in fermentation section
Sludge from Decanter	Bidder has to provide at the inlet of trolley with required chute and supporting structure
Clarified fermented wash from decanter	Bidder has to provide at the inlet of existing beer well with required piping, valves and supporting structure
Raw water/Clarified Water/Soft Water	Bidder has to take from existing header in respective sections with distance approx. 20 meter.
Cooling Water Supply for proposed Evaporation	Bidder has to take the cooling water supply from existing Juice Evaporation Cooling Tower circulation pumps with approx. distance 30 meter.
Cooling Water Return from proposed evaporation	At the inlet of existing juice evaporation cooling tower top distribution header with approx. distance 40 meter.
Concentrated spent wash feed @ 27% w/w solids to proposed evaporation	At the outlet flange of existing evaporation product transfer pump with approx. distance 20 meter.
Steam @ 1.5 Kg/cm <sup>2</sup> (g) & 120 °C	Bidder to be taken from existing distillery steam header with providing suitable PRV with approx. distance 30 meter.
Steam Return Condensate from evaporation	Bidder has to connect the steam condensate with pumps to existing steam condensate header with approx. distance 50 meter.

Safety valve exhaust	Outside of plant building at safe location and elevation
Vent	Outside of plant building at safe location and elevation
Drains if any	At the inlet of common pit located at proposed CPU Unit
Concentrated Spent wash from proposed standalone evaporation	Bidder has to provide the slop (Provide 2 separate lines with same size which will operate 1 w + 1 SB) @ temperature of the minimum 70 Deg C at the inlet of feed tank located in slop fired incineration boiler, with required steam heating or blowing arrangement. The approx. distance is 350 meter.
Process Condensate from proposed evaporation plant	At the inlet of existing CPU equalization tank with approx. distance 150 meter.
Treated water feed from existing CPU	At the inlet of Ultra Filtration Section
Treated water from UF followed by UV Section	At the inlet of respective fermenters with isolation valves & flow meter. The approx. distance is 250 meter.

**b. INSTRUMENTATION**

Instrument Air	Bidder has to take the compressed air from existing compressor
Instrumentation/PLC & Cabling	Entirely in EPC Bidder's scope  (I/Os from existing PLC to be used), all other works such as programming, logic building, graphics development will be in Bidders scope

**c. STRUCTURAL BY BIDDER**

Structural from RCC footings, ladders, platforms, supports and foundation bolts & required templates for the same, insert plates to be in bidder scope.

Purchaser will provide only RCC footings and entire distillery / ethanol plant will be on own steel structures.

Equipment support	Included
Piping support, cable trays supporting	Included
Proper platform, Staircase/ladder and railing for operation, maintenance	Included

**d. ELECTRICAL:**

At the incomer of proposed section MCC panel (MCC Panel of adequate size and further distribution and thereafter included in Bidders scope). Cabling etc. is in Bidder scope

**e Earthings:**

Entirely in bidders scope within terminal points. Earth pits will be provided by Purchaser

**F Illuminations / Lighting / Lightning:**

Entirely in bidders scope within terminal points. Outdoor lighting along the building periphery is in bidders scope

## **SECTION – 11**

### **IMPLEMENTATION SCHEDULE**

#### **11.1 PROVISIONAL MASTER**

A Provisional Master Schedule which contains a limited number of activities included.

#### **11.2 DETAILED MASTER SCHEDULE**

Within 30 days of the Commencement Date under the General & Special Conditions of Contract, the Bidder shall provide the Detailed Master Schedule (in Primavera) which shall contain:

1. Construction Schedule
2. Manufacturing Schedule
3. Mobilization Schedule
4. Drawing Schedule indicating drawings to be produced, schedule of drawing production and approvals
5. Inspection Schedules
6. Overall Integrated Master Schedule
7. Billing breakup & billing schedule

#### **11.3 SCHEDULE UPDATES**

The schedules within the Master Schedule will be updated on a monthly basis in accordance with the monthly progress meetings.

#### **11.4 CONSTRUCTION SCHEDULE**

The Construction Schedule shall contain the following

1. A detailed bar chart of the work program for each subsection of the Construction including civil works and erection of steelwork and equipment

2. A critical path plan showing critical areas, start, finish dates and floats
3. Resource Plan  
Showing all Construction Equipment, Labour and Materials to be used in accordance with the Construction Schedule.

### **11.5 MOBILIZATION SCHEDULE**

The mobilization Schedule shall contain

1. A detailed bar chart of the mobilization program for erection
2. A program of camp construction
3. Resources to be used in mobilization
4. Manufacturing Schedule

The Manufacturing Schedule shall contain

- a) A breakdown of each section of the equipment into its mechanical/electrical components
- b) An estimated detailed manufacturing Schedule
- c) A critical path delivery schedule showing key items.

### **11.6 DESIGN / DRAWING SCHEDULE**

The Design/Drawing Schedule shall contain:

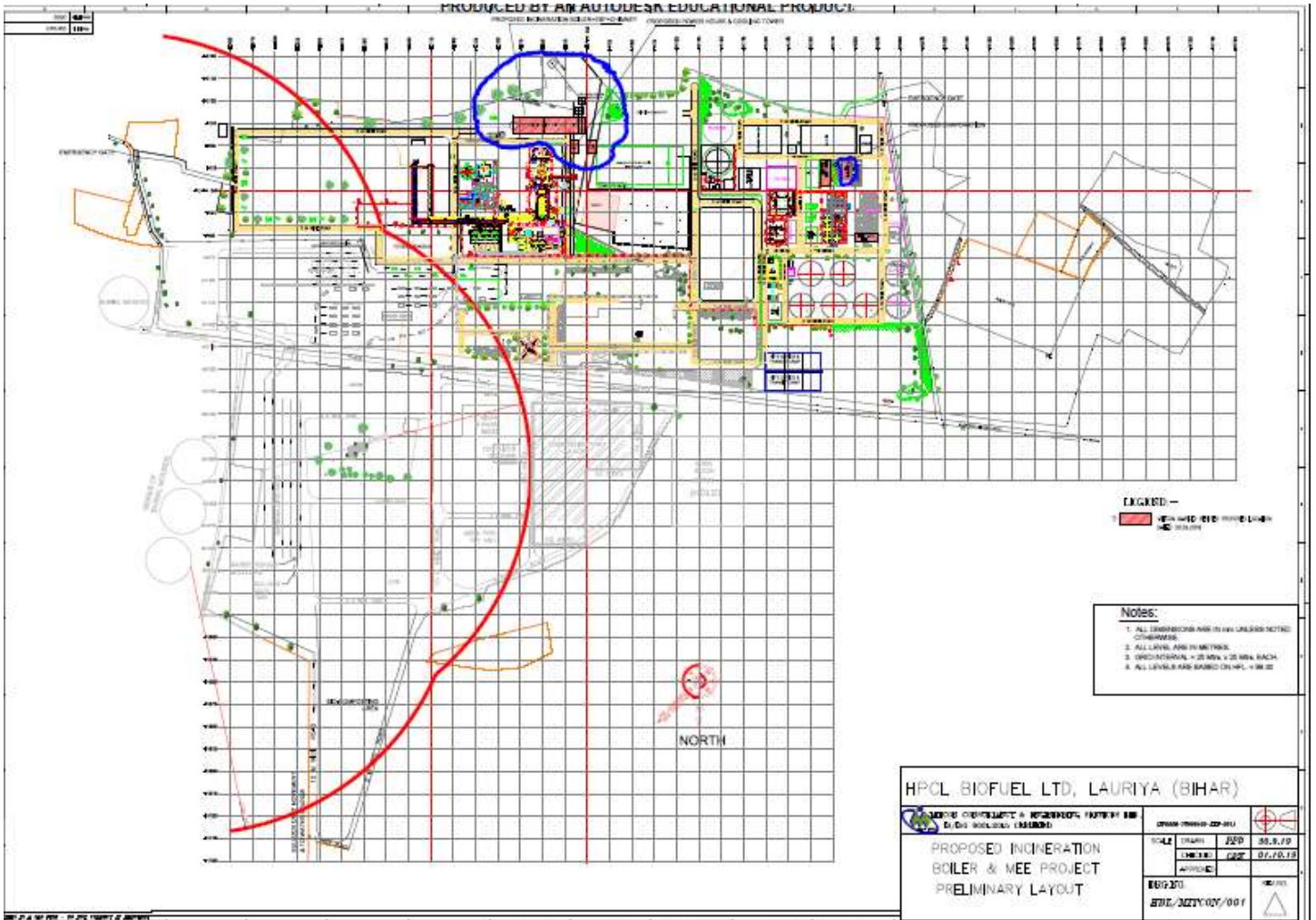
1. Release of load data for Civil Works
2. Preliminary Site Plan
3. Design Schedule related to construction identifying critical area.
4. Process, Mechanical and Electrical Designs
5. Schedules of Submissions and Approvals
6. Inspection Schedule
7. Integrated Master Schedule

The Integrated Master Schedule shall contain

- a. An overall bar chart of Contract Activities
- b. Critical path plan showing critical areas, start and finish dates and floats

# APPENDIX –I

## PLANT LAYOUT FOR LAURIYA SITE





## APPENDIX II

### SPECIFICATION FOR BULK CHEMICAL HANDLING SYSTEM

#### 1.0 Technical Specification:

#### 1.1 Bulk Sulphuric Acid handling system

##### 1.1.1 Bulk Sulphuric acid storage tank (BSAST):

1.1.1.1 The capacity of bulk Sulphuric acid storage tank shall be 10 m<sup>3</sup> and BSAST shall be of horizontal cylindrical storage tank with semi-ellipsoidal dished end designed as per IS 2825. The material of construction of tank shall be **FRP** with **PP** lined (**14 mm thick**). The tank shall be provided with suitable ladder & platform for accessing valves and man holes. The minimum diameter of the man hole shall be 500 mm. Also it shall be provided with tubular type level gauges, vortex breaker, fume absorber, overflow, drain with isolation valve, vent etc. The tank shall be hydro tested at an atmospheric pressure for 30 minutes duration. The nozzles for level gauge and overflow shall be provided on the shell side of the tank and not on the dished end.

1.1.1.2 Double isolation valve shall be provided at the drain line and outlet of bulk Sulphuric acid storage tank.

1.1.1.3 One isolation valve shall be provided at drain line of dyke arrangement.

#### 1.2. Sulphuric Acid Transfer Pump

1.2.1 The capacity of Sulphuric acid transfer pump shall be 5 m<sup>3</sup>/hr with suitable head to transfer the acid from the lorry tanker to the bulk Sulphuric acid storage tank. The material of construction of acid transfer pump shall be as per specification for centrifugal pumps.

1.2.2 The suction of Sulphuric acid transfer pump shall be provided with flexible hose (approx. length - 10 m) suitable to connect to lorry tanker and discharge piping from pump discharge to BSAST inlet. The acid will flow from bulk Sulphuric acid storage tank to acid measuring tanks by gravity and the pipe line shall be suitably sized. The minimum size of the interconnecting piping (UPVC) between bulk Sulphuric acid storage tank and acid measuring tanks shall be NB 40. The approximate length of the piping from BSAST to acid measuring tanks shall be 20 M.

1.2.3 The valves in bulk Sulphuric handling system shall be of UPVC diaphragm valves. The MOC of pipelines shall be UPVC for transferring the H<sub>2</sub>SO<sub>4</sub> from BSAST to Acid measuring tanks.

### **1.3 Bulk caustic handling system**

#### **1.3.1 Bulk Caustic Storage Tank (BCST)**

1.3.1.1 The capacity of bulk caustic storage tank shall be 15 m<sup>3</sup>. BCST shall be of horizontal cylindrical storage tank with semi-ellipsoidal dished end designed as per IS 2825. The minimum shell & dished end thickness shall be 8 mm. The tank shall be supported on steel saddles welded to the shell and designed as per BS 5276, Part-2. The material of construction of the tank & the dished end shall be IS: 2062, Gr.B (FE 410W B). The tank shall be provided with suitable ladder & platform for accessing valves and man holes. The minimum diameter of the man hole shall be 500 mm. Also it shall be provided with reflux type level gauges, vortex breaker, fume absorber, overflow, drain with isolation valve, vent etc. The tank shall be hydro tested at an atmospheric pressure for 30 minutes duration. The nozzles for level gauge and overflow shall be provided on the shell side of the tank and not on the dished end.

1.3.1.2 Double isolation valve shall be provided at the drain line and outlet of bulk caustic storage tank.

1.3.1.3 One isolation valve shall be provided at drain line of dyke arrangement.

#### **1.3.2 Caustic Transfer Pump**

1.3.2.1 The capacity of caustic transfer pump shall be 10 m<sup>3</sup>/hr with suitable head to transfer the caustic from the lorry tanker to the bulk caustic storage tank. The material of construction of caustic transfer pump shall be as per specification for centrifugal pumps.

1.3.2.2 The suction of caustic transfer pump shall be provided with flexible hose (approx. length - 10 m) suitable to connect to lorry tanker and discharge piping from pump discharge to BCST inlet. The caustic will flow from bulk caustic storage tank to alkali measuring tanks by gravity and the pipe line shall be suitably sized. The minimum size of the interconnecting piping between bulk caustic storage tank and alkali measuring tanks shall be NB 40. The approximate length of the piping from BCST to alkali measuring tanks shall be 20 M.

1.3.2.3 The valves in bulk caustic handling system shall be of CPVC diaphragm valves / suitable for 48% caustic lye

## APPENDIX – III

### TYPICAL PAINTING SUMMARY FOR EXPOSED STEEL

1.	Environment	:	Tropical, Dry & Arid
2.	Painting Procedure <ul style="list-style-type: none"> <li>• Primer</li> <li>  Dry Film Thick. (DFT)</li> <li>  Coverage</li> <li>  Thinner</li> <li>  Volume of Thinner</li>   <li>• Paint               <ul style="list-style-type: none"> <li>• Colour</li> </ul> </li> </ul>	:	One coat of red oxide zinc chromine 25 microns per coat 8 M <sup>2</sup> per litre T101 5% by volume  Two coats of synthetic enamel to IS 2932 or Equivalent <b>Structurals</b> Concern to all packages like WTP, etc. a. Ground colour – <b>Dark Admiralty grey</b> b. 1 <sup>st</sup> colour band – <b>French blue</b> c. Gratings & Chequered Plate --- <b>Black</b> d. Staircase, Ladder, Rungs --- <b>Red</b> e. Vertical & Cage ---- <b>Black</b> f. Railing Post ----- <b>Red</b> g. Ducting's (uninsulated)- <b>Dark Admiralty Grey</b>
3.	Application	:	Primer ----- One coat at site Paint ----- Two coat at site

Note : Above painting work will be carried out after completion of erection work & before handing over to client

## APPENDIX - IV

### PIPING AND WELDING PROCEDURE

#### A. Design, Fabrication, Supply, Site Assembly, Erection & Testing of Piping, Codes and Standards

1. All piping systems including sub-contracted materials shall comply with all currently applicable statute, regulations and safety codes in the locality where the equipment will be installed. The piping shall also conform to the latest editions of the codes and standards as listed below. Nothing in this specification shall be construed to relieve the **BIDDER** of his responsibility.
2. The equipment and work under this contract shall conform to the following Standards / codes, as applicable:
  - a. American National Standard ASME code - ASME B 31.3 and all other associated ASME Standards.
  - b. American Society of Testing and Materials (ASTM) Specification.
  - c. American Society of Mechanical Engineers (ASME) Codes.
  - d. American Petroleum Institute Standards (API).
  - e. The relevant British Standard Specification (BS)
  - f. The relevant European Norms (EN)
3. In the case of conflict between codes & standards referred to herein and the specification, the **BIDDER** shall bring to the notice of the **PURCHASER** for resolution. The **PURCHASER**'s decision is final.

#### 4. Design Requirement

##### 4.1 Pipe sizing & pressure drop

The pipe sizing shall be done considering the reasonable velocities, which are generally followed in the industry. The pipe velocity selection shall be in such a way that it meets the pressure drop between two points.

##### 5. Description Average velocity in meter / second

Nominal pipe size in mm below 50 50 to 150 200 & up

Header, general service 2.0 kg/sq.cm. (g) & up - 1.5 - 2.4 2.1 - 2.4

The process piping velocity shall be as per the process requirement and the same shall be furnished for **PURCHASER**'s review.

The pipe size shall be selected in such a way that the actual pressure drop in all piping system is not be greater than 85% of the available pressure drop.

For two phase flows in piping, the pipe sizing shall be critically designed and selected in such a way that no vibrations and noise will be encountered.

Signature and Seal of the Bidder

HBL/TEN/PUB/20-21/227 dated 06.02.2021

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The pipe diameter selection shall be for the maximum flow through the pipe, taking into consideration of margins provided in the pumps also.

## **6. Piping layout minimum requirement**

All piping shall be routed so as to avoid interference with other pipes and their hangers and supports, electrical cable trays, ventilation ducting, structural members, equipment etc. Adequate clearances shall be ensured with respect to the above to accommodate insulation and pipe movements.

All piping shall be grouped where practicable and shall be routed to present a neat appearance.

The piping shall be arranged to provide clearance for the removal of equipment requiring maintenance and for easy access to valves and other piping accessories required for operation and maintenance.

Piping shall generally be routed above ground but where specifically indicated /approved by the **PURCHASER** / **PURCHASER**'s REPRESENTATIVE, the pipes may be arranged in trenches. Pipes at working temperatures above the ambient shall however not be buried.

Overhead piping shall have a minimum vertical clearance of 2.3 meters above walkways and working areas and 6 meters above roadways unless otherwise approved by the **PURCHASER** / **PURCHASER**'s REPRESENTATIVE.

Any specific requirement for the process piping layout has to be followed. Those specific requirements shall be clearly brought out in the drawing submitted for **PURCHASER**'s review.

## **7. Pipe stress analysis**

The stress analysis of piping shall be carried out as per IBR standard (including latest amendments) for process steam and as per ASME B31.3 (including latest amendments) for all process piping wherever applicable. The pipe stress shall be analyzed using piping software, Caepipe or Caesar or approved equal.

The piping connected to rotating equipments shall be stress analysed and critically reviewed, even if the design temperature / operating temperature / clean out & steam out temperature is lower than 100 Deg.C

The stress analysis of piping shall be carried out for all possible operating conditions of the equipment such as normal operating, upset condition operating, working & standby operation, clean out conditions etc.

The pipe stress analysis shall be carried out for critical equipment where ever rotating equipments is involved.

Piping stress analysis is generally not required for pipe size NB 40 and below, except when specifically required for the purpose of evaluating support movements for selection of springs.

The pipe stress analysis is to be carried out in order to ensure that the stresses are well within ASME B 31.3 requirements and the piping load on the nozzles is less than the allowed load of the equipment.

The piping has to be stress analysed without friction & with friction and the most severe of these two conditions shall be used for comparing the allowable stress and allowable load.

Wind loading shall be considered for insulated pipe size of NB 600 at an elevation of around 8 M & above from the ground level.

Pipe stress report shall be submitted for **PURCHASER**'s review.

The **BIDDER** shall design and prepare all fabrication isometric drawings.

The **BIDDER** shall ensure that the design is as per ASME B 31.3. The **BIDDER** shall furnish the calculations for reinforcement for nozzle openings and calculations for welded attachments carried out on the piping.

## **8. Other requirements**

All flanges for size up to NB 600 shall be as per ASME B 16.5 and for size above NB 600 shall be as per ASME B16.47 series A.

All pipe to pipe joints shall be by butt welding only and no couplings shall be used for size NB 65 and above.

SS fittings up to NB 350 as per A403, NB 400 and above – mitre bends – 4 piece mitre bends, R = 1.5D, NB 40 and below – SW as per B16.11/A234, NB 50 to NB 350 as per B16.9

The selection of electrodes shall be as per Table furnished below.

No rerolled pipes shall be used.

Gas cutting for bolt holes including for U clamp supports shall be prohibited  
Screwed end pipes and pipe fittings shall be threaded as per NPT.

For hole size NB 50 and below on pipes, shall be done by drilling only.

Welding ends for butt welding shall be as per standard – “V” bevel with an included angle of 75 Deg.

## **9. Branch connections:**

Equal & Reducing tees shall be used up to NB 80.

From NB 100 & above, as per branching calculations, reducing tees, reinforcement pads, pipe to pipe connections shall be used.

Socket welded half coupling shall be used for pressure gauge connections of NB 15.

No branch welding shall be used for equal branch (NB 100 & above), and only tees as per ASME B 16.9 or ASME B 16.11 to be used.

All GI screwed pipes / fittings are not to be welded and shall be sealed with suitable sealing material.

For a saturation steam line, where the chances of collection of condensate during operation is envisaged, each drain point shall be provided with a drain pot arrangement with the drain pot end covered by butt welding end cap as per ASME B 16.9. The drain tapping shall be taken from the drain pot arrangement.

All saturation steam piping system and steam piping system whose operating temperature are close to saturation temperature, shall be provided with a steam trap arrangement at each drain. The steam trap shall be provided with a bypass regulating globe valve.

At all high points and low points of the piping system and wherever required as per system requirement, drains and vents shall be provided. The minimum size of the drain and vent shall be NB 25 and NB 15 respectively.

At all screwed valves and screwed connections on equipment, unions shall be provided to facilitate disassembly. Likewise, unions shall also be provided at suitable points on straight lengths of screwed pipelines.

All valves shall be located on pipelines to operate them from the nearest available platforms and for easy access for maintenance.

All local instruments shall be located on pipelines as to render them observable from the nearest available platforms and accessible for maintenance.

Piping with operating temperatures above or below the ambient shall be routed so as to provide adequate flexibility for the pipes.

Tap-off on main lines for field routed pipe work, if not indicated on **PURCHASER's** layout drawings, shall be suitably located by **BIDDER** to suit the layout evolved by him.

At all intersection joints, it is **BIDDER's** responsibility to design and provide suitable reinforcements as per the applicable codes and standards.

## **10. Specialities**

The material of construction, size, type and the design parameters & selection of the steam traps, pump suction strainers, control valves, gate, globe & check valves, butterfly valves & wafer type check valves, and metallic expansion bellows shall be as mentioned in the relevant section of this bid document.

## **11. Materials**

All materials supplied under this contract shall conform to the following:

- a. Material shall be as mentioned in the relevant section of this bid document.
- b. The **BIDDER** shall furnish the piping specification sheet clearly indicating the material selected for various process piping.
- c. All materials shall be certified by proper material test certificates. All material test certificates shall carry proper heat number or other acceptable references to enable identification of the certificate with the material it purpose to certify. The heat number shall also be indicated on the material certified.

## **12. Fabrication**

Pipeline NB 50 mm and above size are deemed prefabricated. **BIDDER's** shall prepare necessary fabricated isometric drawings based on **PURCHASER's** layout drawings for those piping systems. **BIDDER's** fabrication drawings shall be taken into account the requirement of this piping specifications and also all applicable codes and standards. Fabrication and erection of piping systems NB 50 mm and above size shall be as per **BIDDER's** fabrication drawings. In case of systems requiring statutory clearance, fabrication and erection shall commence only after the necessary clearance have been obtained from the statutory authorities. **BIIDDER's** fabrication drawings including isometrics if required shall carry all details of fabrication, welding etc. as may be required for obtaining the necessary statutory clearance.

Piping NB 50 mm and above size shall be fully fabricated at **BIDDER's** Works or in the pre-fabrication yard in the site, which shall be adequately equipped with the required machinery, templates, gauges, tools and tackles etc. The extent of fabrication at works shall be such as to restrict field welding to circumferential line joints alone. Further, the number of circumferential line joints to be performed in the field shall be held to a minimum, limited by transport considerations and erection constraints.

Pipelines having size NB 40 mm and below are deemed field run and are hence fabricated in site.



All welded attachments on pipelines shall be of same material as the parent pipeline and shall be subjected to the same fabrication and welding procedures as the associated piping.

The use of companion flanges to connect two pieces of pipe and the use of odd or short pieces of pipe in making up long runs is prohibited.

Where welded pipe or fittings are used, longitudinal welds in adjoining sections shall be staggered to a minimum of 90 degrees during fabrication. All piping shall be fabricated true to lines and elevations as indicated on the piping drawings.

No welding shall be carried out on lined pipes.

Cutting of standard elbows to odd angles as required per layouts, is included in **BIDDER's** scope.

Neither butt nor branch joints shall be closer than twice the pipe diameter to any other joint in the same pipe except where "weldolet" type fittings are used in which case the branch weld must be made to the "weldolet".

All welded branch connections shall be of suitable structural adequacy by virtue of the intrinsic weld connection, reinforcing plates or rings or material inherent in the branch. It is the **BIDDER's** responsibility to provide reinforcement wherever necessary for branch connections. Welded branch connections are not an acceptable alternative where tees have been specified.

All threads on piping components shall be taper pipe threads as per applicable standards. The nipples shall be fabricated by the **BIDDER** at site as required.

The **BIDDER** shall cut the pipe short for cold spring for all hot lines in accordance with the data furnished by the **PURCHASER**. In addition to the cut for cold spring, a length of pipe must be cut to attain slope when the line is in the hot position. The additional cut must not add to the cold spring in the system. In order not to add to the cold spring, the pipe must be detailed and fabricated so that the affected horizontal runs will be sloped to the proper angle when installed in the field before the final weld is made. At the point of closure, the two end of pipe should be separated only by the required amount of cold spring. **PURCHASER's** specific approval on the correctness of cold cut gaps shall be obtained before cold pulling the pipelines if required.

No external support shall be welded on valves and specialities except as provided by the Manufacturer.

All pipe flanges and contact surfaces shall be concentric with the axis of the piping. All flanges and fittings shall be accurately machined and drilled true to the template.

No welding / gas cutting shall be done locally to valves with soft seating components in order to prevent distortion of the soft seats.

### **Welding and Non-Destructive Examination**

Welding, non-destructive examination of welded joints and repair of weld defect areas shall conform to the specification furnished in the relevant clause of this document.

Final welding of joints shall be undertaken only after the setup of piping is fully checked with respect to layout drawings if necessary and required.

At equipment terminal points, welding shall be carried out after taking into account specific requirement and / or recommendations of the equipment

**BIDDER.**

### **Cleaning, Flushing & blow-out**

All piping including valves and specialities shall be cleaned by the **BIDDER** before and during erection to remove grease, dirt, dust scale and welding slag.

Before erection all fabricated pipe work, assemblies, sub-assemblies, fittings and components etc. shall be thoroughly cleaned internally and externally by blast cleaning or by power driven wire brushes. The brushes shall be of the same or similar material as the metal being cleaned.

After erection, all piping shall be mass flushed with water. The cleaning velocities in the piping shall be at least 1.2 to 1.5 times the operating velocities in the pipelines.

All compressed air pipe work shall be cleaned by blowing compressed air.

All fuel oil, light oil and lubricating oil lines shall be cleaned by pickling.

Alternately, these lines can be cleaned by steam blowing subject to the timely availability of steam for this purpose.

For purposes of steam blowing, **PURCHASER** will make available low pressure steam as required. It is **BIDDER's** responsibility to install necessary temporary pipe work for blowing and remove the same after blowing.

### **Inspection and testing**

On completion of erection, the inside of all pipes, valves, fittings etc, shall be clean and free from loose scale and foreign matter before subjecting the line to any test / inspection.

All piping systems shall be tested hydrostatically pneumatically by the **BIDDER** after erection, at pressures given in the applicable codes listed in Data sheet or as given in the line designation schedule. The test pressures shall be maintained until all welded/flanged joints are inspected for leakage or at least for ten minutes.

Mechanical equipment and pressure relieving devices should be blanked-off or removed from the line during pressure testing and control valves should be set in the open position for the duration of the test.

Orifice plates should not be erected until hydrostatic testing and cleaning operations are completed.

Lines having check valves should have the source of test pressure located on the upstream side.

Expansion joints, instruments, filters and similar equipment for which the maximum permissible cold test pressure is lower than the hydrostatic test pressure applied to the system, shall be removed or blanked off from the line before testing. The **BIDDER** shall consult the **PURCHASER / PURCHASER's REPRESENTATIVE** for specific guidance if required.

Test pressure readings may be taken at the lowest point of the system being tested provided the effect of static head is taken into consideration.

When conditions require a test pressure to be maintained for a period of time, during which the testing medium in the system might be subject to thermal expansion, provision may be made for the relief of excess pressure thereto.

After hydrostatic test any leaky joints shall be cut out and repaired or completely replaced and test repeated until the test has been satisfactorily passed. If any valve is found to be leaking part the bonnet joint or steam gland packing, **BIDDER** shall replace the gasket or gland packing and retest the system to the satisfaction of **PURCHASER**.

After completion of hydrostatic test, orifice plates shall be withheld for the hydrostatic tests and shall be installed in an approved manner. Orifice plate shall however be installed after completion of cleaning operations.

Clean water at a temperature of not less than dew point or 10 Deg.C whichever higher, nor exceeding 50 Deg.C should be used for hydrostatic test to be ensured by **PURCHASER**.

The rate of pressure increase must not exceed 7 kg/sq.cm. per minute.

No one should be allowed near piping/equipment under test when the test pressure is near the yield strength or when test pressure over 35 kg/sq.cm. are being applied. The pressure should be lowered by 10% before inspection for the leaks.

When draining the fluid, the pipelines should be vented slowly to avoid excessive vacuum.

A block valve is required on the line from the test pump to the pipeline/equipment under test.

Only calibrated test gauges should be mounted in the upright position. Pump discharge gauge must be visible to the pump operator for the duration of the hydro test.

## **Painting**

All piping & its appurtenances shall be adequately protected against corrosion during manufacture, fabrication, shipment and storage by appropriate protective paint. Use of grease or oil for this purpose is prohibited.

Unless otherwise stated elsewhere in the specification, after installation, all above ground pipe work which are neither galvanised nor insulated shall be finish painted for MS pipes. However the piping in Stainless steel material will not be painted.

All hangers and supports including associated auxiliary steel on all pipelines including galvanised and insulated pipelines shall be finish painted.

For detailed specification for surface preparation, mixing & application of paints including colour coding for piping and structures shall be as referred in this specification.

Prior to applying finish paint, all painted surfaces shall be furnished with two coats of primer recommended by the manufacturer of the finish paint. All MS insulated piping shall be applied with two coats of primer.

All painting materials such as paints, varnishes, primers, solvents, thinners etc. shall be supplied by the **BIDDER**.

## **Welding Specification for Piping System**

### **Scope**

This specification shall apply to all welded pipe joints of carbon steels including stainless steels for distillery process plant piping system. This specification is applicable to shop fabrication, site fabrication & field erection. The welded joints are hereby defined as including:

All the line joints of the longitudinal and circumferential butt-welded type.

All the attachment of castings, forgings and flanges to pipe.

Welded manifold headers and all other sub-assemblies.

Welded branch connection with or without saddles and reinforcement rings.

Fabrication of built-up fittings.

The attachment of smaller connections for drips, drains, instruments, branch lines, weldolets, sockolets, thermowells, couplings etc. If applicable.

Closure of joints for inspection plugs and similar joints.

Any other similar joint not specified above but encountered during fabrication and / or erection stage. It is imperative that the **CONTRACTOR** makes every effort to secure the same high degree of competent supervision and workmanship during field erection as is intended for shop fabrication in view of the adverse field conditions of weather, piping location etc.,

**The piping systems are generally classified as follows:**

Carbon steel pipe system for temperature 218° C and less and pressure 17 kg/sq.cm (g) and less.

**Stainless steel piping.**

7.10.2.1.3 Material specifications for the above systems are generally covered by the following.

**Carbon Steel Piping**

Carbon Steel Piping to ASTM A 106 Gr. A, ASTM A 106 Gr.B, ASTM A 106 Gr.C, ASTM A 53 Gr.A, ASTM A 53 Gr.B, API 5L Gr. B, ASTM A 672 Gr. B60 C1-12, ASTM A 672 Gr.B70 C1-12, IS 3589, IS 1239 or equivalent and corresponding materials for fittings, flanges, valves etc.

**Stainless Steel Piping**

Stainless Steel Piping to ASTM A 312 TP 304, 316 etc. or equivalent and corresponding materials for fittings, flanges, valves etc.

**Codes and Standards**

The welding of fusion welded piping system shall comply with currently applicable regulations, codes and safety codes in the locality where it will be installed. It shall also conform to the latest applicable standards. Nothing in this specification shall be construed to relieve the **BIDDER** of this responsibility. In particular, the pipe welding shall conform to the latest edition of the following codes and standards.

ASME codes for process piping - ASME B 31.3.

Indian Boiler Regulation – IBR

ASME Pressure Vessel Codes  
Section II Part C – Specifications for welding rods, electrodes &  
filler metals Section V – Non destructive examination  
Section VIII – Rules for construction of pressure vessels  
Section IX – Welding & Brazing qualification

Specification of the American Welding Society.

Standards of Pipe fabrication Institute.

Any other codes and standards which are required to perform the specified welding.

The above mentioned codes and standards form an integral part of this specification. In the event of conflict between this specification and the codes and standards listed above, this specification shall govern.

## 19. **Welding Processes**

The welding process that are used in the fabrication of pipes and fittings are restricted to shielded metal arc welding and gas tungsten arc welding (argon arc) or a combination of the two.

Argon arc root pass shall be employed for all, carbon steel piping only applicable for IBR lines. Subsequent welding, after root pass can be carried out by manual shielded metal arc welding with coated electrodes. For pipes of wall thickness less than 6 mm, the entire welding shall be carried out by tungsten inert gas welding process. When using tungsten inert gas welding process, welding without addition of filler metal shall not be done.

For critical carbon steel piping system, the TIG root pass shall be employed and subsequent welding after root pass can be carried out by manual shielded metal arc welding with coated electrodes. Only applicable for IBR lines.

For Non-critical carbon steel piping system, the entire welding including root pass may be carried out by manual metal arc welding.

Where special welding techniques are recommended by equipment manufacturer for piping connecting to equipment, appropriate qualification test and welding technique shall be followed. The specific and detailed instructions of equipment manufacturer regarding welding, preheating, stress relieving etc., shall be strictly adhered to by the **BIDDER** at no extra cost to the **PURCHASER**. Only applicable for IBR lines.

## **Procedure and Performance Qualification**

No production welding shall be undertaken until the procedure qualification test which are to be used have been established as per ASME boiler & pressure vessel code Section IX and / or IBR. The test results and specimens from qualification test of the welding process and

welding operators shall be made available to the **PURCHASER / CONSULTANT** for approval. Where results of existing procedure qualification and of welders are acceptable to the **PURCHASER / CONSULTANT**, such results shall be kept on file and be subject as to review regularly. Where doubt exists regarding the acceptability of any qualification test, a retest may be required. All such qualification tests and specimen testing shall be conducted in the presence of the **PURCHASER / CONSULTANT** if required.

The Cost of all procedure qualification test shall be borne by the **BIDDER**.

The **BIDDER** shall prepare a written specification containing the information detailed in Section IX of ASME form QW-482, 483 & 484A (WPS, PQR & WPQ). These documents shall be provided to the **PURCHASER / CONSULTANT** for review if required. The **BIDDER** shall prepare certificate of welder performance qualification test containing the information detailed in ASME Section IX. These shall be kept on file and made available to the **PURCHASER / CONSULTANT** upon request.

### **Welders and Supervisors**

Unless otherwise agreed, the **BIDDER** shall advise to **PURCHASER / CONSULTANT** in writing, at least 3 weeks before any welder is employed on the work, the names and qualifications of the proposed welders and welding supervisors. It shall be the **BIDDER'S** responsibility to ensure that the welders employed by them or their **SUB-BIDDER**, on any part of the contract either at their works or at site are fully qualified as required by the code. Each welder shall qualify for all types of welding and materials he may be called upon to weld. There will be a separate welder for carbon steel and stainless steel material welding and also different welding techniques. I.e.: Argon and metal arc welding.

Should the **PURCHASER / CONSULTANT** require to test or retest of any welder, the **BIDDER** shall make available at no extra cost to the **PURCHASER**, the men, equipment and materials for the test. The cost of testing the welds shall be borne by the **BIDDER**.

Welding supervisors shall have adequate qualifications and experience in supervising welding of pipe joints with knowledge of non-destructive testing.

All welding including the tacking of all welds shall be carried out by approved welders only. Any weld made by other than the unapproved welder shall be cut out and re-welded. **BIDDER** will qualify separate tack welders for doing the tack welding while during the fit up/fabrication work; the tack will be directly on pipe weld joints.

For the purposes of identification and to enable tracing the full history of each line, records of weld completed by each welder has to be maintained by the **BIDDER** and records are to be handed over to the **PURCHASER / CONSULTANT**

For each welder, a record card shall be maintained showing the procedures for which he is qualified. These record cards shall be specified joint details, consumables and their repair

frequency. The record shall be reviewed every fortnight by the **PURCHASER / CONSULTANT** and those welders whose work requires a disproportionate amount of repair shall be disqualified from welding on the basis of visual inspection of weld joints. Re-qualification of welders disqualified more than two times shall be entirely at the discretion of the **PURCHASER / CONSULTANT**. This clause is applicable to IBR piping only. However, the **BIDDER** will submit the qualification/records for process piping as per their own QAC plan as mentioned in relevant sections of this contract.

### **Preparation of Weld Ends**

The surfaces to be welded shall be smooth, uniform and free from fins, tears and other defect which would adversely affect the quality of weld. All weld faces and adjoining surfaces for a distance of at least 150mm from the edge of the welding groove or 12 mm from the toe of fillet in the case of socket weld or fillet welded joints shall be thoroughly cleaned of rust, scale, paint, oil or grease outside.

Unless otherwise specified, all pipe joints shall be butt-welded. All butt welds shall be full penetration welds. Butt Joints

Butt joints shall be prepared as per ASME B 16.25, unless otherwise specified. Groove angle of the single V butt joints shall be  $37.5 \pm 2.5$  Deg

Unless noted otherwise, all butt welds shall be made without using backing rings.

### **Tee, corner and lap joints**

Fillet welds shall have a throat dimension equal to the nominal thickness of either of the joint members.

Weld edges of full penetration groove welds for Tee joints shall be prepared with minimum included angle of 45 Deg.

The ends shall be prepared by machining, grinding or flame cutting. Where flame cutting is used, the effect on the mechanical and metallurgical properties of the base metal shall be taken into consideration. Flame cutting alloy steel pipes is not allowed. However, flame cutting of carbon steel pipes is permitted. Wherever practicable, flame cutting shall be carried out by machine. Manual flame cutting edges shall be permitted only where machine flame cutting is not practicable and with the approval of the **PURCHASER / CONSULTANT** and such surfaces shall be ground or dressed to a smooth finish as required by the specification and to the satisfaction of the **PURCHASER / CONSULTANT** if required. Slag, scale or oxides shall be removed by grinding to bright metals at least 2 mm beyond the burnt area.

Thermal cutting of carbon steel piping shall be performed under the same conditions of preheat and post heat as for the welding of carbon steel material. However post heat is not required when:



The heat affected zone produced by thermal cutting is removed by mechanical means immediately after cutting. However in any case of removing, slag, scale or oxide shall be removed by grinding to bright metals at least 2 mm beyond the burnt area, or, Thermal cutting is part of fabrication, manufacturing or erection sequence leading to a weld end preparation where heating immediately follows.

For the piping systems that are supplied by the **PURCHASER** but being erected by the **BIDDER**, beveling of pipes for butt welds shall be required. For systems with **BIDDER** supplies and erects, the pipe ends shall be bevelled to conform to applicable codes / standards. At connections to equipment the bevelling of piping shall confirm to the requirement of the equipment connections.

Any change in the joint configuration must be done with the acceptance of **PURCHASER / CONSULTANT**.

All weld joint fit-up shall comply with the tolerances specified on the design drawings or applicable codes and standards.

If the **BIDDER** uses the header arrangement with central location of Oxygen and Acetylene for cutting and edge preparation operation, the arrangements shall be in accordance with the best safety practices and standards and shall be approved by the **PURCHASER / CONSULTANT**.

Before fitting up the weld joint, the profile and dimensions of the weld end preparation shall be offered to the **PURCHASER / CONSULTANT**.

All fit-ups shall be offered to the **PURCHASER / CONSULTANT** prior to welding the root pass.

### **Welding of Pipes**

All vertical welding shall be carried out in the "UP" direction unless otherwise approved by the **PURCHASER / CONSULTANT**.

The maximum face width of any manual arc or inert gas weld run shall be as per standard as specified in ASME.

No single run horizontal / vertical position manual metallic arc weld fillet shall exceed 8 mm in size.

Fillet welds shall have a throat dimension at least equal to the nominal wall thickness specified for the pipe. Each leg of the fillet weld shall have a length of at least 1.25 times in the nominal wall thickness of the pipe. Socket and fillet welds shall have a minimum of two (2) weld layers.

All tack welds shall be made using a qualified procedure and qualified welders. Any preheat requirement specified on the welding procedure shall also apply to tack welds. All tack welds shall be examined visually for defects, and if found defective shall be completely removed.

As the welding proceeds, tack welds shall be either removed completely or shall be properly prepared by grinding or filling their stopping and starting ends so that they may be satisfactorily incorporated in the final weld.

Welded-on branches for all piping systems shall be of full penetration type connection.

Preheating prior to tack welding and welding shall be employed as a means of crack prevention and improving general weld reliability. At no time during welding, temperature of the joint shall not be allowed to fall below the minimum preheat temperature. Excessive preheating shall be avoided.

When welding alloy steel, it is strongly recommended that interruption of welding shall be avoided. Where such interruption is unavoidable, either the preheat shall be maintained during interruption or the joint shall be wrapped in dry asbestos blankets to ensure slow cooling. Before recommencing welding, preheat shall be applied again.

No welding shall be done if there is impingement of rain, snow, sleet or high wind on the weld area.

Welded on bridge pieces and temporary attachment should preferably be avoided. Where approved by the **PURCHASER / CONSULTANT**, they may be used material of these shall be compatible with material which they are temporarily welded. All the weld pieces shall be removed after welding of pipe joint and the weld area ground flush and subjected to Magnetic particle / Dye-penetrant examination before applying any post weld heat treatment. These pieces shall be welded by qualified welders and with electrodes compatible with the parent pipe material. The preheating requirements shall be applied and maintained during the welding of pieces. These temporary attachments shall be removed by grinding, chipping or flame gouging. When arc flame gouging is used at least 3.2 mm of metal shall be left around the pipe surfaces, which shall be removed by grinding. This clause is applicable to critical lines i.e. IBR lines.

The arc shall be struck only on those parts of the parent metal where weld metal is to be deposited. When inadvertent arc strikes are made on the base metal surfaces outside the joint groove, the arc strikes shall be removed by grinding and shall be examined by liquid penetration or magnetic particle inspection procedures.

Oxides shall not be permitted to form during welding or heat treatment or both on the internal surface of pipe, which will not be subsequently cleaned. Inert gas purging will be an acceptable method to prevent such oxidation. All joints in material which contain 1¼% or more chromium shall be purged to assure that less than 1% of oxygen is present on the joint under side before initiation of the welding. The purging operation may be terminated

when 5mm thickness of weld metal is deposited into the joint. The **BIDDER** may submit examples of other procedures for consideration of the **PURCHASER / CONSULTANT**.

Argon gas used in GTAW process for shielding and purging gas purity shall be minimum of 99.95 %. Purging shall be carried out at the flow rate depending on diameter of pipe until six (6) times of the volume between dams is displaced. In no case shall the initial purging period be less than ten (10) minutes. After initial purging the flow of the backing gas shall be reduced to a point where only a slight positive pressure prevails. Any dams used in purging shall be fully identified and removed after welding and accounted for in order to avoid leaving them in the system.

Thorough check shall be exercised to maintain the required interpass temperature.

All equipment necessary to carryout the welding for supporting of the work, for the pre-heating and the post-heating including thermal insulation for retaining the heat and for the protection of the welder shall be provided by the **BIDDER** This clause is applicable to critical lines i.e. IBR lines if applicable.

After deposition, each layer of the weld metal shall be cleaned with a wire brush to remove all slag, scale and defects to prepare for the proper deposition of the next layer. The material of wire brush shall be compatible with pipe material. Special care shall be taken to secure complete and thorough penetration of the fusion zone into the bottom of the weld. In case, where the weld joint on pipes 100 mm NPS and larger has to be radiographed as per the requirement of this specification, it is recommended that the root run be checked by liquid penetrant or magnetic particle procedures. This clause is applicable for IBR lines.

Gouging or back-gouging of butt welds may be carried out wherever feasible by grinding, chipping, machining or other approved methods, but the surface of cut must be cleaned to remove any carbon or oxidised metal before commencing the welding.

Repair of weld metal defects shall meet Cl. 127.4.11 of ASME B31.1 and /or IBR.

Upon completion of welding, the joints shall be wrapped in dry asbestos blankets to ensure slow cooling unless post-weld heat treatment is applied immediately. This clause is applicable to critical lines i.e. IBR lines if applicable.

No welding or welded parts shall be painted, plated, galvanised or heat-treated until inspected and approved by the **PURCHASER / CONSULTANT** welds shall be prepared / ground in such a way that welds surfaces merge smoothly in to the base metal surface.

Except where necessary to grained flush for nondestructive examination purpose, the centre of reinforcement for butt welds shall be as below.

**Component Thickness (mm) Maximum Reinforcement (mm)**

Up to 13 2.0

Over 13 to 25 2.5

Over 25 to 50 3.0

Over 50 4.0

The reinforcement shall be crowned at the centre and tapered on each side of the joined members. The exposed surface of the weld shall be ground where required to present a workman like appearance and shall be free from depressions below the surface of the joined members. The exposed surface of the butt welds shall be free from under cuts greater than 0.5 mm in depth, overlaps from abrupt ridges and valleys and shall merge smoothly into the pipe surface at the weld toe. However, undercuts shall not encroach on the minimum section thickness.

All welds shall be subjected to the approval of the **PURCHASER / CONSULTANT**.

In the event of several unsuccessful repair attempts or if the **PURCHASER / CONSULTANT** feels that a satisfactory repair is not feasible, the joint shall be completely remade.

Post weld heat treatment shall be carried out as per Cl. 132 of ASME B 31.1 and / or IBR.

### **Identification of Welds**

Whenever code symbol stamps are required on carbon steel and Ferritic alloy steel piping, they shall be applied directly to the pipe with low stress dotted design metal die stamps or to a small stainless steel plate especially provided for such marks. These plates shall be lightly tack welded to the pipe using electrodes (of diameter 2.5 mm or less) of the type specified for the material. Before making the required tack weld, the pipe material in the immediate surrounding area shall be preheated as required by electric means or propane or natural gas burners.

Cooling shall take place under asbestos insulation in a draft free area. Stresses relieving of these welds are not required. Steel stamping directly on the surface of alloy steel piping with other than low stress die stamps shall not be permitted.

### **Seal welds**

Seal welding shall be done by qualified welders and in accordance with approved drawings.

If necessary, threaded joints that are to be seal welded shall be made without the use of thread lubricating compound

### **Preheating**

Preheating prior to tack welding and welding shall be employed as a means of crack prevention and to improve general weld reliability.

### **Carbon Steel**

Welded joints in carbon steel piping where tensile strength is below 4900 Kg/Sq.Cm, the carbon content does not exceeding 0.3% and design thickness not exceeding 19mm need not be preheated except where the ambient temperature is below 16° C. For this condition the joint shall be heated to ambient before any welding is performed. When the thickness is 19mm and above, shall be preheated before any welding is performed as follows:

WALL THICKNESS (MM)	MINIMUM PREHEAT (° C)	METAL TEMPERATURE
19 TO 38	100	
38.1 TO 63	125	
Above 63	150	

Weld joints in carbon steel piping where the tensile strength is 4900 Kg/Sq.Cm, or greater or where the carbon content exceeds 0.3% When the thickness is 19mm and above, shall be preheated before any welding is performed according to the following requirement.

WALL THICKNESS (MM)	MINIMUM PREHEAT (° C)	METAL TEMPERATURE
19 TO 38	125	
38.1 TO 63	150	
Above 63	150	

### **Austenitic Stainless Steel**

Welded joint in Austenitic Stainless Steel Piping need not be preheated except where the ambient temperature is below 0 ° C. For this condition, the joint shall be heated to 40 ° C by propane, natural gas or electrical means before any welding is performed.

### **Pre-heat for dissimilar Material**

When parts of two different materials are joined together, the material requiring higher pre-heat shall govern.

### **Stress Relieving (applicable only for IBR piping).**

Stress relieving of piping material is required when so specified and shall be performed as specified in ASME and / or IBR.

### **General Requirement**

A complete automatic temperature recording shall be made of preheating and stress relieving operations where propane gas burners or electrical resistance coils are employed. A complete temperature record of the preheating and stress relieving operations shall be made by means of box type potentiometer. Other means of recording the temperatures are permitted subject to **PURCHASER / CONSULTANT** approval.

Stress relieving may be performed locally or fully in furnace. Local stress relief shall be performed with electric induction or electric resistance coils. Suitable gas burning equipment using natural gas or propane may be employed.

At no time during stress relieving / preheating cycle shall any water or liquid cooling medium be employed.

Where members being joined are unequal in thickness the dimension of the heavier section shall govern the selection of width of the heated band and the duration of the holding period.

When local stress relief is performed, the area of the welded joint and the adjacent material extending for a distance of at least three (3) times the width and widest part of the weld on each side of the weld shall be heated by band.

Thermo couple shall be placed at least 2 locations on the weld to 180 each other. One more thermocouple shall be placed in order to measure the half peak temperature during heat treatment. Half peak distance shall be calculated from the formula.

$$\text{Distance} = 2.5 \sqrt{rXt}$$

r = Radius of the component.

t = Thickness of the component.

Half peak temperature shall be not less than one half of the specified weld temperature measured at the weld.

For local stress relief using electrical methods the minimum of two (2) thermocouples tack welded to the surface of the potentiometer shall be used on the pipe under at least four (4) layers of asbestos paper. The hot junctions of thermocouples shall be located on either side of the joints at least 12 mm from the edge of the joint but no further away than 100 mm. When employing induction heating, at least six (6) turns of induction cable shall be wrapped on top of the asbestos paper protecting the thermocouples with the first turn approximately of 150 mm from the centre of the weld.

Local stress relief using gas torches or ring burners may be employed. However the procedure shall be limited to pipe below 100 mm nominal bore and must be approved by **PURCHASER / CONSULTANT**.

The stress relieving shall be maintained for a period of time proportioned on the basis of one hour per 25 mm of wall thickness of the thickest section of the joint. The parts to be heated shall be brought slowly to the required temperature and the heating rate shall not exceed 150 °C.

For tubing joints and for socket welded joints, pads, bosses and couplings, one (1) thermocouple shall be positioned on the minimum distance of two (2) pipe wall thickness from the weld.

For welds used for attachment of base brackets, two (2) thermocouples shall be used for determination of pre-heating and stress relieving temperatures. They shall be tack welded directly to the header located 180 Deg. apart on the circumference of the header and the mid-way between adjacent legs.

Piping on both sides on any joint shall be adequately supported throughout the preheating, welding and stress relieving operations to prevent distortion. After PWHT, the hardness of the weld metal and the parent metal shall be jointly measured with the digital hardness tester to verify satisfactory completion of the stress relieving process.

### **Carbon Steel**

Welded joints on carbon steel pipe where the nominal pipe wall thickness of the heaviest material being joined is greater than 19 mm shall be stress relieved upon completion of the welding operation.

When the height of the boss above OD of the pipe is 19 mm or greater the weld shall be stress relieved.

When the wall thickness of the coupling or a pad is greater than 19 mm the weld shall be stress relieved.

When local stress relief is employed, the weld joints shall be heated to a temperature of not less than 600°C. This temperature level shall be maintained within the limits of 610° C +/- 10°C for a period of time proportioned on the basis of one hour per 25 mm of wall thickness but in no case less than 30 minutes. The weld area shall be allowed to cool and undisturbed in a still air to a temperature not exceeding 300° C.

All welded joints which are locally stress relieved in pipes of 100 mm NB and larger shall be heated by means of electrical induction coils or resistance heating. Welded joints in pipes smaller than 100 mm NB shall be stress relieved by means of electrical resistance coil or suitable propane or natural gas torches only.

When full furnace stress relieving is employed for a welded assembly, the entire fabricated section shall be heated uniformly and at no time during the subsequent heating cycle, shall the temperature not be allowed to exceed 620° C or fall below 600° C. The furnace shall then be adjusted so that the material will cool at a controlled rate not to exceed 150° C until 300° C is reached. However, in no case the cooling rate shall not exceed 150° C per hour. At that time, the furnace may be shut off, the door opened and the piping material allowed to cool normally to handling temperature.

### **Heating and Cooling**

The carbon steel after having reached their specific stress relief temperatures may be cooled under wraps (i.e.) leaving the induction coils or resistance heaters and insulation in place. This means that at the stress relief temperature the power to the furnace or heating coils may be shut off and cooling takes place in the furnace or with all insulation and coils remaining on the pipe. The stress relieving coils and insulation shall only be removed after the pipe has cooled below 300° C.

For furnace stress relief, the doors of the furnace may be opened after the power is shut off at 300° C. The thermocouples controlling the temperature shall remain during the cooling

cycle so that the excessive cooling, if it occurs, can be observed and immediately corrected. The rate of heating and cooling shall conform to Cl. 132.5 of ASME B 31.1 and / or IBR. This stress relieving coils and insulation shall be removed only after piping has cooled to below 300° C or if stress relieved in a furnace, the pipe may be removed from the furnace and permitted to cool in still air at a temperature of not below 10° C.

**Local Stress Relief (applicable only for IBR piping).**

All welded joints in pipe 100 mm NPS size and larger shall be locally stress relieved by means of electric induction coils or resistance welding. Welded joints in smaller pipe sizes shall be stress relieved by means of electric resistance coils or suitable propane or natural gas torches only. For full furnace stress relief of a welded assembly, the entire fabricated section shall be heated uniformly to the temperature specified. The temperature shall be maintained for a period of time proportioned on the basis of one hour per 25 mm of wall thickness of the piece having the greatest wall thickness in the furnace charge, but in no case less than one hour.

**Austenitic Stainless Steel**

Joints in Austenitic stainless steel piping need not be stress relieved after welding.

**Electrodes**

The specification and size of the electrodes, voltages, amperages, thickness of beads and number of passes shall be as specified in the approved welding procedure or otherwise agreed in writing. In general, basic coated electrodes shall be used which shall be deposited with weld metal having the same or higher physical properties and similar chemical composition to the members being joined. For each batch of approved brand, certificate showing compliance with the specification shall be secured and shall be submitted to the

**CONSULTANT** for review before being released for use on project piping. All electrodes shall be purchased in sealed containers and stored properly to prevent deterioration. All low hydrogen electrodes shall be baked in mother oven between 300 to 350° C for one hour and stored in holding oven at 80 to 100° C before being used. The recommendation of the electrode manufacturer shall be followed.

For welding of all grades of steel and alloys by the GTAW process, a two (2) percentage thoriated tungsten electrode conforming to AWS / ASME section II part C classification shall be used.

**Carbon Steel**

All electrodes to be used in carbon steel shall conform to ASME SEC II PART C or any other equivalent codes.

As welding electrodes deteriorate under adverse conditions of storage leading to dampness in the electrode coating, they should be normally stored in air conditioned rooms or in hot boxes or ovens in their original sealed containers whose temperatures shall be maintained within specified limits. Thermometer shall be used to monitor the room temperature in



which the electrodes are stored. The condition of electrodes shall be frequently inspected. The electrodes with damage to coating shall not be used. Electrode shall remain identified until consumed.

The type of electrode used should be only those recommended by the manufacturer for the use in the position in which the welds are to be made. Electrodes which have the areas of flux covering broken away or damaged shall not be used.

All the pressure piping shall have root run carried out using "TIG" process and further run by attested electrodes for various material combination and the selection of electrodes shall be as specified in Exhibit.

### **Inspection and Testing**

The **PURCHASER / CONSULTANT** shall have accessibility to inspect the welding area in other related operations at any time and at any stage of fabrication.

The **PURCHASER / CONSULTANT** may require non-destructive testing of any weld for reasons other than those given in the specification. The responsibility for the cost of such testing shall be mutually decided between the **PURCHASER** and the **BIDDER**.

The **BIDDER** shall inform the **PURCHASER / CONSULTANT** when the weld preparation and setting up for welding of various members selected by the **PURCHASER / CONSULTANT** is in progress so that the **PURCHASER / CONSULTANT** can inspect the assembly before welding starts.

The responsibility of **PURCHASER's / CONSULTANT** shall in no way reduce the **BIDDER's** responsibility to ensure that the work is carried out in accordance with the specification.

### **Examination methods of welds**

#### **IBR system – Carbon steel – pressure less than 17 kg/Sq.Cm(g) and Temperature less than 218 ° C**

Edge preparation DPT 10% Butt welding

- for size over NB 100 RT 10% made by each welder subject to a minimum of 2 joints per welder

- for size NB 100 and below RT 5% made by each welder subject to a minimum of 2 joints per welder Branch Welding

- for branch size over NB 100 DPT 10 % or MPT 10%

- for branch size NB 100 and less DPT 5 % or MPT 5% Fillet, Socket, Attachment and Seal Welds

DPT 10% or MPT 10%

Non - IBR system - For carbon steel the NDE requirement shall be as per ASME B 31.3.

**NDE Requirement for austenitic stainless steel piping:**

Edge preparation DPT 10%

Butt welding RT as per ASME B 31.3

**Legend:**

**RT : Radiographic Examination**

**UT : Ultrasonic Examination**

**DPT : Dye Penetrant Examination**

**MPT : Magnetic Particle Examination**

**Note:** Prior to commencement, all Non-destructive examination shall be performed in accordance with written procedure to meet ASME / IBR and shall be acceptable to the **PURCHASER / CONSULTANT**.

**Penalty Clause**

Penalty, where NDT carried out is less than 100%, shall be as follows:

For every weld found defective an additional penalty joint will be marked for NDT

If the defects of any welder increased above 10%, then for every defective joint two (2) additional penalty joints (one joint on each side of the repair joint) will be marked for NDT.

If the defect of any welder exceeds 20%, then all welding joints shall be subjected to 100% NDT.

Selection shall be shift-wise. The cost of any such penalty works or additional NDT shall be fully born by the **BIDDER**.

In addition, at the discretion of the **PURCHASER** and the **CONSULTANT** and where requested by them, the **BIDDER** shall perform radiography and other tests of the joints of any other piping.

Where access holes for radiography have been provided in the piping, the **BIDDER** shall employ the single wall thickness radiography. The access holes shall be plugged and seal welded only after the radiograph is found acceptable and before to carryout stress relieving. If required necessary pre-heating to be carried out for seal welding.

Where no access holes for radiography are provided in the piping, the **BIDDER** shall employ the double wall double image technique with elliptical projection or double wall single image or single wall single image technique.

The **BIDDER** shall ensure that isotopes of sufficient strength and quality are used in order that the radiographs taken are of proper density, contrast and visibility.

Access hole plug welding shall be examined by liquid penetrant or magnetic particle test methods.

### **Qualification and Certification of Non-Destructive Examination Personnel**

Organisation performing code required, Non-destructive examination should be personnel competent and knowledgeable to the degree specified by the ASME and IBR.

### **Acceptance and Standards**

The acceptance level of faults for visual, magnetic particle, liquid penetration, ultrasonic and radiographic test methods and examination shall conform to the requirement of ASME and IBR.

### **Repair Welding**

All defects in welds requiring repair shall be removed by flame or arc gouging, grinding, or machining. The major repairs may involve:

- i. Cutting through the weld
- ii. Cutting out the length of pipe containing the weld, or
- iii. Removing the weld metal down to the root depending upon the magnitude of the defect.

After removing the defect, the welds shall be examined by same non-destructive testing methods as specified for the original weld and the same acceptance criteria shall hold good.

All repair welds shall be made using the same or other specified welding procedures as those used in making the original welds including preheating and stress relieving as originally required.

All repair welds shall meet the requirement of the codes and standards specified and shall be acceptable to the **PURCHASER / CONSULTANT**

## APPENDIX - V

### ELECTRICAL SYSTEM REQUIREMENTS FOR MOTOR SELECTION

A. Supply	
Voltage	415 +/- 10% V
Frequency	50 +/- 5% Hz
Fault Level	50 Ka For 1 Second
Comb. Variation	+/- 10%
Phases	3
Wires	4
B. Site	
Ambient For Design	50 <sup>o</sup> c
Area Classification	Dusty
C. Motor	
Type	3 Phase Squirrel Cage Induction Motors To Is 325
Enclosure	Tefc For All Motors
Protection	Ip – 55
Method Of Starting	All Boiler Fans, Fuel Feeders & Feed Water Pumps Will Be With Vfd. All Motors Above 22 Kw Will Have Star Delta Starters.
No. Of Starts	One Hot Successive / Two Cold Successive / Three Equally Spread Per Hour.
Min. Voltage Permissible For Starting	85% Rated Voltage
Class Of Insulation	F Temp Rise Limited To B
Accessories	Thermistors To Be Provided For Motors Above 50 Kw, Rtd's & Btd's To Be Provided. Acvfd Motor Winding Shall Be Vpi Treated & Two Coat Enameled.
Sp. Heater	Required For 30 Kw & Above Motors (Supply 240 V 1 Ph)
Terminal Box	Separate Tb To Be Provided For Sp Heater, Thermistor & For Power. Power Tb Shall Be Suitable For Rotating In Steps Of 90 Degrees.
Cable Entry	Bottom /Side
Direction Of Rotation	Bi-Directional
Performance/ Construction	As Per Is-325 & Ie-2 As Per Is 12615

Cable Gland	Double Compression Type, Brass With Nickle / Cadmium Plating
Lugs	Crimping Type, Tinned Copper

## APPENDIX - VI

### SPECIFICATION FOR INSULATION

#### 1.1 Scope

- a. Insulating materials for all types as specified/required.
- b. Finishing materials of all types including cement, protective coating, and sheeting as specified / required.
- c. Angles, irons, clamps, lugs, etc. for supporting insulation on pipes, ducts, furnace, valves & fittings and equipment.
- d. Wire mesh, lacing/binding wires, bands, straps, screws, etc. as required.
- e. Weather hoods.
- f. Refractory, insulating and red brick works with suitable bonding material.
- g. Any other material as may be required for making the refractory and insulation work complete.

#### 1.2 Codes and Standards

The supply and application of thermal insulation to piping systems and equipment covered under this Specification shall comply with all currently applicable regulations and safety codes in the locality where the thermal insulation will be applied. The insulating materials shall also conform to the latest editions of the codes and standards listed below.

Nothing in this specification shall be construed to relieve the **SUPPLIER** of this responsibility.

IS:737 : "Specification for wrought aluminium and aluminium alloys sheet and strip (For General Engineering Purpose)

IS:3346 : Method of determination of thermal conductivity of thermal insulation material.

IS:10556 : Code of practice for storage and handling of insulating materials.

IS:14164 : Industrial application and finishing of thermal insulating materials at temperatures above 80°C and up to 700 Deg. C

American Society for Testing and Materials

IS:8183 : "Specification for Bonded Mineral Wool"

IS 3150 : "Hexagonal wire netting for general purpose".

IS 3144 : "Methods of test for Mineral Wool Thermal Insulation Material"

### **1.3 General Design Requirements**

All exposed portions of the plant which operate at temperatures of 60°C and above during normal operation shall be thermally insulated so that the temperature on the outer surface of the cladding shall not exceed by more than 20°C above ambient, based on an ambient temperature indicated in site data.

The specified insulation thicknesses shall not include the thicknesses of wire netting, finishing cement or any other finishing or weatherproofing application.

Removable insulation arrangement shall be provided for manholes and hand holes.

Insulation shall not fill the contours of the expansion bellows.

Personnel Protection

Piping and equipment that are not insulated but having a surface temperature exceeding 50 Deg.C shall be insulated for personnel protection.

### **1.4 Insulation of Equipment and Piping**

#### 1.4 Material Specifications

##### 1.4.1 Insulating Materials

Compressed Resin bonded mineral wool mattress insulating material is specified in Table 1, it shall be of the required grade. The application density of insulation for temperature up to and including 400 Deg. C shall be 100 Kg/Cu. m. The application density for temperatures above 400 Deg.C shall be 120 Kg/Cu.m.

##### 1.4.1 Sheeting Material

The sheeting material for all insulated piping and equipment shall be aluminium conforming to codes specified in Table 1. The thickness of aluminium sheeting to be used shall be as follows:

- a. Pipes of 450 mm (18 in.) and above, over outside diameter of insulation - 1.219 mm (18 SWG)
- b. Pipes of 150 mm (6 in.) and above, over outside diameter of insulation but less than 450 mm (18 in) - 0.914 mm (20 SWG)
- c. Pipes less than 150 mm (6 in) over outside diameter of insulation - 0.711 mm (22 SWG)
- d. Flues and ducts, not less than 22 SWG

#### 1.4 Piping

1.4.2 All vertical pipes shall be provided with suitable insulation supports to prevent the insulation from collapsing due to its own weight. Any welding required shall be done by the **SUPPLIER** with the prior permission of the **PURCHASER**/Engineer and only under his direct supervision. Where welding is not permitted, suitable clamped supports shall be used by the **SUPPLIER**. The insulation shall be applied starting from bottom to top.

1.4.2 The insulation shall be formed to fit the pipe and applied with edges pulled together tightly at the longitudinal joint and secured by lacing wire. The insulation shall be turned to bring this joint to the lower side. Adjacent length shall be butted closely and aced together with lacing wire. For insulation thickness of more than 75 mm, where application will be in two or more layers, each layer of mattress shall be backed up with wire netting chosen from 20 SWG galvanised steel wire and having hexagonal opening of 25 mm size. If the interface temperature is 400 Deg.C or more, the wire netting shall be from 20 SWG stainless steel wire and having hexagonal opening of 25 mm size.

1.4.2 The ends of all wire loops shall be firmly twisted together with pliers, bent over and carefully pressed into the surface of the insulation.

1.4.2 All insulation shall be protected by an outer covering of aluminium steel sheeting. All insulation sheeting joints shall be sealed and made effectively weather and water-proof. Extreme care shall be taken during the designing and installation of the insulation and the outer sheeting keeping in mind that the boiler will be installed outdoors. All flat surfaces shall be adequately sloped to prevent pools of water collecting. The sheeting shall be protected internally with 2 coats of bitumastic paint. The jackets shall be installed with the longitudinal lap joints at 45 Deg.C below the horizontal for horizontal pipes and the joints sealed with bitumastic paint.



On vertical pipes the jacketing shall be applied working from bottom up. Each section of jacketing shall have a minimum lap of 50 mm longitudinally and circumferentially. Each circumferential joint shall be made weather-proof by securing with an aluminium/galvanised steel strap and sealing with bitumastic paint. Longitudinal lap joints shall be fixed with zinc plated screws on approximately 150 mm centres.

#### 1.4 Valves and Fittings

1.4.3 All valves, fittings and specialities shall be covered with the same type and thickness of insulation as specified for the adjoining pipe, with the special provisions and/or exceptions as listed below.

1.4.3 All valves and flanges shall be completely insulated with removable type of boxes fabricated from aluminium sheets of same thicknesses as used on adjoining pipes. Pipe insulation adjoining flanges shall be beveled back to permit removal of the bolts and nuts. The insulation shall be applied after the finish has been applied over insulation on the adjacent piping.

1.4.3 Flanges on lines covered with the minimum thickness of insulation (lower temperature range) shall not be insulated. Flanges on all other lines shall be covered with provisions for making the insulation removable and replaceable.

1.4.3 Unions shall not be insulated.

1.4.3 Non Metallic Expansion Joints shall not be insulated.

1.4.3 Safety valves, traps and safety valve discharge lines shall not be insulated. However, trap discharge lines shall be insulated for personnel protection.

1.4.3 Nozzles and other connections on tanks, heaters and other equipment shall be insulated in the same manner as the pipes.

1.4.3 Valves shall be insulated up to and including their bonnet flange.

1.4.3 Pipe hanger clamps shall be covered with insulation along with the pipe. When pipe hangers pass through insulation on piping outdoor, a metal hook placed with waterproof sealing material shall be supplied and installed. Care shall be taken to ensure that the upper bolts of hangers clamps are not insulated.

#### 1.4 Equipment

1.4.4 Mineral wool blanket insulation to the specified thickness shall be provided. The supplier shall tack weld suitable 9 SWG wire lugs atleast 25 mm longer than the required length to support the insulation in place. These lugs shall be bent and secured with the metal fabric of the blanket, after the insulation has been applied.

Where welding is not permitted, clamps of mild steel flats with bolts, nuts and lugs welded over the flat shall be used. The lugs shall be spaced at approximately 300 mm centres. Spacer rings, at 1000 mm shall be provided for fixing aluminium sheets. All blanket joints shall be butted tightly and the blankets shall be secured with 10 mm wide 25 SWG galvanised bands. After banding, all blanket edges shall be laced tightly.

1.4.4 All equipment shall have a smooth sheet aluminium jacket, applied in a manner similar to that specified for piping. All vertical and horizontal sheets shall be overlapped at a minimum of 50 mm. The longitudinal lapped joints of adjoining sections of sheets shall be secured with zinc plated screws. On all vessels over 2.5 metre diameter, the jacketing shall be further secured by circumferential bands at approximately one more centres. Each sheet joint shall be sealed with bitumastic paint. The roof sections shall overlap the side walls to prevent water seepage between insulation and the vessel wall. Side wall sheets shall be securely banded at inter-sections of the side wall and roof sections.

1.4.4 All equipment and vessel manholes, hatches, bolted or screwed cover plates, flanged ends, etc. shall have removable box type insulation, with same thickness of insulation as for adjacent surfaces. Insulation adjoining such equipment or vessel openings shall be tapered towards these openings to permit removal of bolts, screws, heads, covers or plates with no damage to adjacent surface insulation or cover.

The insulation applied to equipment shall be reinforced with 25 mm (1 inch) 20 SWG galvanised wire netting with hexagonal mesh. One course of wire netting shall be applied to the surface of the equipment, with an additional course per 40 mm of thickness. All irregularities of the surface shall be filled and leveled over with insulating cement. Mineral wool blankets as specified shall be applied over the dry cement surface and secured with annealed wire lacings.

**TABLE 1 - RECOMMENDED MINIMUM THICKNESS FOR  
THERMAL INSULATION (MINERAL WOOL)**

NOMINAL DIA IN MM	OPERATING TEMPERATURE (°C)								
	100	150	200	250	300	350	400	450	520
15	25	25	40	40	50	60	75	90	100
20	25	25	40	50	60	60	90	90	115
25	25	25	40	50	60	60	90	100	115
40	25	40	40	50	60	65	90	115	150
50	25	40	40	60	75	75	100	115	150
65	25	40	40	60	75	75	100	115	150
80	40	40	50	60	75	90	100	125	150
100	40	40	50	60	75	90	115	125	150
150	40	50	50	75	75	100	115	150	175
200	40	50	60	75	75	100	125	150	175
250	40	50	60	75	75	115	125	150	175
300	40	60	60	75	80	115	150	175	200
350	50	60	65	75	80	115	150	175	200
400	50	60	75	75	85	115	150	175	200
450	50	60	75	90	90	115	150	175	200
	100	150	200	250	300	350	400	450	520
500	50	60	75	90	90	115	150	175	200
550	60	60	75	90	90	115	150	175	200
600	60	65	80	95	95	115	150	175	200
ABOVE 600 and for flat surfaces	60	65	80	95	95	115	150	175	200