Dear Sir/Madam,

We are pleased to invite you to participate in the **RFQ for Design, Supply, Erection, Testing & Commissioning of Boiler Package of Capacity 5 TPH F&A 100 Deg C along with accessories on Turnkey Basis Katraj, Pune** issued by **Katraj Dairy**. Please find the key details below:

RFQ Overview:

- **Project Name:** Design, Supply, Erection, Testing & Commissioning of Boiler Package of Capacity 5 TPH F&A 100 Deg C along with accessories on Turnkey Basis Katraj, Pune.
- **Tender Start Date:** 13-01-2026, 03:00 PM
- **Tender Closing Date & Time**: 23-01-2026, 05:00 PM

Vendor Registration & Participation Process:

Interested vendors must send an email to **services@ncdfiemarket.com at least 2 days before the bid closing date** with the following details:

- **Company Name:**
- **Contact Person Name:**
- **Mobile Number:**
- **Email ID:**
- **NCDFI Registration Status (Yes/No):**
- **Registration Link - https://registration.ncdfiemarket.com/**

The **NCDFI team** will provide necessary guidance for vendor registration and bidding procedures.

Participation Fee Payment:

To participate in this tender, vendors are required to deposit a **non-refundable participation fee of ₹11,800/- (Rupees Eleven Thousand Eight Hundred Only), inclusive of GST**, into their own ICICI Escrow Account, the details of which will be provided by NCDFI eMarket after successful vendor registration.

After making the payment, vendors must send an email to **services@ncdfiemarket.com** with the payment receipt and the following details:

Vendor Name	Amount Paid (₹)	Bank Name	UTR No. & Date
[Your Company Name]	₹11,800/- (Rupees Eleven Thousand Eight Hundred Only)	[Bank Name]	[UTR Number & Date]

Deadline for Auction-Related Queries

Bidders are requested to submit their queries, if any, related to the auction through email on or before 20 January 2026.

EMD Payment Instructions:

As per tender conditions, an **Earnest Money Deposit (EMD) of ₹2,00,000/-** must be paid via **NEFT/RTGS** to the Pune Zilla Sahakari Dudh Utpadak Sangh Maryadit bank account.

- **Beneficiary Name:** Pune Zilla Sahakari Dudh Utpadak Sangh Maryadit
- **Bank Name & Branch:** Bank of Maharashtra
- **Account Number:** 20087944574
- **RTGS/IFSC Code:** MAHB0000100
- **Last Date to Submit EMD:** 23-01-2026 4 PM.

After transferring the EMD, vendors must upload the transaction details on the **NCDFI eMarket Portal** along with their techno-commercial bid and also inform Katraj Dairy via email at **katrajproject@gmail.com, services@ncdfiemarket.com**.

Format for e-mail confirmation about the transaction made through NEFT/RTGS for EMD:

Bidder Name	IFB Reference	Amount Paid (₹) (In Number & Words)	Bank Name	UTR No. & Date
[Your Company Name]				[UTR Number & Date]

⚠ **Important:** The bid will only be considered valid if the EMD payment is received in the Katraj Dairy account before 23-01-2026 4 PM.

For Further Assistance, Contact:

- **Shri Dhruv Patel:** +91 9978603418
- **Shri Vivek Suthar:** +91 9978601585

We look forward to your participation.

With regards,

NCDFI eMarket Team

KATRAJ DAIRY

Pune Zillha Sahakari Dudh Utpadak Sangh Maryadit
Reg. No. D-12
Dtd. 07/03/1960
Katraj Dairy, Pune-411046.

COMMERCIAL TENDER DOCUMENT FOR DESIGN, SUPPLY, ERECTION, TESTING & COMMISSIONING OF BOILER PACKAGE OF CAPACITY 5 TPH F&A 100 DEG C ALONG WITH ACCESSORIES ON TURNKEY BASIS KATRAJ, PUNE.

OWNER
KATRAJ DAIRY
PUNE ZILLHA SAHAKARI DUDH UTPADAK SANGH LIMITED
(HEREAFTER CALLED AS SANGH)

KATRAJ DAIRY

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PART A
COMMERCIAL TENDER DOCUMENT

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Section I
Introduction

KATRAJ DAIRY

PUNE ZILLHA SAHAKARI DUDH UTPADAK SANGH LTD. (SANGH)

SITE ADDRESS
KATRAJ DAIRY PLANT,
OPP. RAJIV GANDHI UDYAN,
PUNE-SATARA ROAD,
KATRAJ,
DIST – PUNE – 411046

Katraj dairy, Pune invites quotes from reputed suppliers for the following:

Tender document	
Tender Document No. : _____	Revision No : R0
Name of Project	Design, Supply, Erection, Testing & Commissioning of capacity 5 TPH F&A 100 Deg C along with accessories on turnkey basis at Katraj dairy, Pune
Duration (months) of Project	3 Months including Steam slow firing, Final firing and ready for steam production. (All durations mentioned shall be considered from start date i.e. from the date of issue of LOI)
Date of downloading of tender document	From: ----------
Date and time for tender clarification	----------
Last Date & Time of Quote Submission	_____

- Suppliers are advised to Visit the plant premises before quoting.
- **The Katraj dairy reserves the right to accept or reject any / all Quote, partly or fully at any time prior to the award of the contract, without assigning any reasons thereof.**

POINTS TO BE NOTED BY BIDDER:

1. Period of Validity of Quote
Quotes shall remain valid for 90 days after the last date of submission of the quotes prescribed by the Purchaser.

2. Submission of Quote
The Quotes shall be submitted in the name of Katraj dairy, Pune, as per mentioned in tender documents.

3. Turn-key Contract
All the Suppliers should quote for the design, supply, installation, testing and commissioning of equipment as detailed in this Tender document on turn-key basis within the scope specified in the technical specification.

4. Completion period of the project
Suppliers should consider the completion of project time as mentioned in above table from the date of LOI issued. Steam Generation commenced at the end of this period mentioned.

5. Geo tagging
The bidder or their representative shall visit and inspect the actual work site for geo-tagging. Geo-tagged photographs taken from the tender publishing date and up to the Prebid meeting date during work hours, along with a signed self-declaration and endorsement by the respective deputy director shall be uploaded in Envelope no-1 at the time of online tender submission. If the bidder fails or refuses to carry out the geo-tagging, the tender inviting authority reserves the right to disqualify the bid.

Section II
Instructions To Supplier/Suppliers

Contents

1. Cost of TENDER

1.1 The Supplier/Supplier shall bear all costs associated with the preparation and submission of its Quote and the Katraj Dairy, hereinafter referred to as "the Purchaser", will in no case be responsible or liable for those costs, regardless of the conduct or outcome of the tender process.

2. Contents of TENDER Document

2.1 The goods required, tender procedures and contract terms are prescribed in the tender document. The contents of the tender document are organized in sections as given in the table contents at the beginning of this document.

2.2 The supplier/supplier is expected to examine all instructions, forms, terms and specifications in the tender document. Failure to furnish all information required as per the tender document or submission of a quote not substantially responsive to the tender document in every respect will be at the supplier/supplier's risk and may result in the rejection of its quote.

3. Clarification of TENDER Document

3.1 A prospective supplier/supplier requiring any clarification on the tender document may notify the purchaser in writing by email at the purchaser's mailing address indicated in the invitation for quote or visit the plant at the address mentioned during office working hours. The purchaser will respond in writing (email) to any request for clarification on the tender document which it receives. Written copies of the purchaser's response will be sent to all prospective supplier/suppliers, which have received the tender documents. However, the supplier/suppliers cannot consider delay in receipt of clarifications, as a cause for requesting extension in the due date of submission of the quote. Suppliers are allowed only once to provide all their clarifications / queries. Multiple submission of queries / clarifications shall not be considered.

Techno-Commercial Contact Emails:
katrajproject@gmail.com
md.katrajmilk@gmail.com

To be sent to all above emails.

4. Amendment of TENDER Document

4.1 At any time prior to the deadline for submission of quote, the purchaser may, for any reason, whether at its own initiative or in response to a clarification requested by a prospective supplier/supplier, modify the tender document by amendment.

4.2 The amendment will be notified online to all prospective Supplier/Suppliers, which have received the Tender Documents and will be binding on them. The amendment will be attached to the Tender document sold subsequently.

4.3 In order to afford prospective Supplier/Suppliers reasonable time, in which to take the amendment into account in preparing their Quote, the Purchaser may, at its discretion, extend the deadline for the submission of Quote.

5. Meeting

Clarifications shall be emailed to the all the Suppliers after any of the meeting are conducted. Unless replied by the client on queries, this Tender document shall be considered as final.

6. Language of Quote

6.1 The Quote prepared by the Supplier/Supplier and all correspondence and documents relating to the Quote exchanged by the Supplier/Supplier and the Purchaser shall be written in the English **language.** Any printed literature furnished by the Supplier/Supplier may be written in another language so long as **accompanied by an English translation** of its pertinent passages in which case, for the purposes of interpretation of the Quote, the English translation shall govern.

7. Documents Comprising the Quote

7.1 The Quote prepared by the Supplier/Supplier shall comprise the following Components:

- A Quote form / Cover letter and a Price Schedule completed in accordance with Clauses 9, 10 & 11.
- Documentary evidence established in accordance with Clause 12 that the Supplier/Supplier is qualified to perform the contract if its Quote is accepted.
- Documentary evidence established in accordance with Clause 13 that the goods and ancillary services to be supplied by the Supplier/Supplier conform to the Tender Document.
- A statement of deviation and exception to the provision of Tender documents.

- All information asked in the Part B – Technical Tender - Section – II, Sub section 11 of the Tender document must be provided along with the Quote. Failure to provide the details as per these sections may cause Quote to be rejected.

8. Quote Form

The Supplier/Supplier shall complete the Quote Form and appropriate Price Schedule furnished in the Tender Document, indicating for the goods to be supplied, a brief description of the goods, their **country of origin**, quantity and prices. **Note prices to be indicated in the price Quote section only.**

9. Quote Prices

9.1 The Supplier/Supplier shall indicate on the appropriate Price Schedule online document the total Quote prices of the goods it proposes to supply, install and commission under the contract. To this end, the Supplier/Suppliers are allowed the option to submit Quote for anyone or more packs specified in the "Schedule of Requirement" and to offer discounts for combined packs. However, Supplier/Suppliers must submit a Quote for the complete requirement of goods and services specified under each pack, failing which, such Quote will not be taken into account for evaluation & comparison and will not be considered for award.

10. Price Adjustment – Not Applicable

11. Quote Currency

Prices shall be quoted in Indian Rupees only for the goods and services, which the Bidder/Supplier will supply if a contract is awarded against this Tender. For imported items, Value shall be provided in either US dollars or Euro only (Multi-currencies). For such imported items separate order shall be raised in Foreign currency and shall be paid also in foreign currency. The price quoted in foreign currency shall be final and shall not be subjected to any price adjustment. During the bid the respective Indian Rupees amount shall be mentioned for imported items. A list of such imported items shall be mentioned in the bid very clearly along with their individual item foreign rates. Any other currency if to be used, then prior permission from the client shall be taken.

12. Documents Establishing Supplier/Supplier's Experience and Pre-Qualifications

12.1 Pursuant to Clause 7 the Supplier/Supplier shall furnish, as part of its Quote, documents / information in the format attached to the Tender Document.

- The documentary evidence of the Supplier/Supplier's qualifications to perform the Contract if its Quote is accepted, shall establish to the Purchaser's satisfaction
- That in the case of a Supplier/Supplier offering to supply goods and services under the Contract which the Supplier/Supplier did not manufacture or otherwise produce, the Supplier/Supplier has been duly authorized by the goods' manufacturer or producer to supply the goods. The Quote shall include manufacturer's authorization form given in the Tender documents.
- Details of experience and past performance of the Supplier/Supplier on equipment offered and those of similar nature and those of similar nature within the past 5 years and details of current contracts in hand and other commitments.
- Qualification and experience of key personnel for successful execution of the contract.
- Reports on financial standing of the Supplier/Supplier such as profit and loss statements, balance sheets and, auditor's report of the past three years, bankers' certificates etc.
- Information regarding any current litigation in which the Supplier/Supplier is involved
- All information asked in the Part B – Technical Tender - Section – II, Sub section 11 of the TENDER document must be provided along with the Quote. Failure to provide the details as per these sections may cause Quote to be rejected.

12.2 Supplier/Suppliers who meet the criteria given above are subject to be disqualified if they have made untrue or false representations in the forms, statements and attachments submitted in proof of the qualification requirements or have record of poor performance such as abandoning the work, not properly completing the contract, inordinate delays in completion or financial failures etc.

13. Documents Establishing Goods' Conformity to TENDER Document

13.1 Pursuant to **Clause 7** the Supplier/Supplier shall furnish, as part of its Quote, documents establishing the conformity to the Tender Document of all goods and services, which the Supplier/Supplier proposes to supply under the Contract.

- A **clause-by-clause commentary on the Purchaser's Technical Specifications** demonstrating the goods and services' substantial responsiveness to those specifications.

13.2 The purposes of the commentary to be furnished pursuant to above, the Supplier/Supplier shall note that standards for workmanship, material and equipment, and references to brand names or catalogue numbers designated by the Purchaser in its Technical Specifications are intended to be **descriptive only and not restrictive**. The Supplier/Supplier may substitute alternative standards, brand names and/or catalogue numbers in its Quote, provided that it demonstrates to the Purchaser's satisfaction that the substitutions are substantially equivalent or superior to those designated in the Technical Specifications.

14. NOT USED

15. Period of Validity of Quote

15.1 Quote shall remain valid for 90 days after the last date of submission of the Quote prescribed by the Purchaser, pursuant to Clause 18. A Quote valid for a shorter period may be rejected by the purchaser as non-responsive.

15.2 In exceptional circumstance, the Purchaser may prior to expiry of the initial validity period, solicit the Supplier/Suppliers' consent to an extension of the period of validity. The request and the responses thereto shall be made in writing (or by email). A Supplier/Supplier granting the request will not be required nor permitted to modify its Quote.

16. Format and Signing of Quote

16.1 The Supplier/Supplier shall prepare soft / hard copies of the Quote, clearly marking each area appropriately. Supplier may suitably attach documents in the PDF form or Word/Excel form accordingly in the required areas.

16.2 The Quote shall be dully signed and sealed by the Supplier/Supplier or a person or persons duly authorized to bind the Supplier/Supplier to the Contract. Written power-of-attorney must accompany the Quote to indicate the authorization. The person or persons signing the Quote shall sign and seal all documents of the Quote.

16.3 The Quote shall contain no errors or corrections for the documents attached.

17. NOT USED

18. Deadline for Submission of Quote

18.1 The Purchaser at the address specified must receive Quote not later than the time specified for receipt of the Quote. However the Quote can be submitted by email also.

18.2 The Purchaser may, at its discretion, extend this deadline for the submission of Quote by amending the TENDER Document in accordance with Clause 4 above in which case all rights and obligations of the Purchaser and Supplier/Suppliers previously subject to the deadline will thereafter be subject to the deadline as extended.

19. NOT USED

20. Modification and Withdrawal of Quote

20.1 The Supplier/Supplier may not modify or withdraw its Quote after the Quote's submission.

20.2 No Quote may be modified subsequent to the deadline for submission of Quote.

20.3 No Quote may be withdrawn in the interval between the deadline for submission of Quote and the expiration of the period of Quote validity specified by the Supplier/Supplier on the Quote Form.

21. NOT USED

22. Clarification of Quote

To assist in the examination, evaluation and comparison of Quote the Purchaser may, at its discretion, ask the Supplier/Suppliers for a clarification of its Quote. The request for clarification and the response shall be in writing/email and no change in the price or substance of the Quote shall be sought, offered or permitted.

23. Preliminary Examination

23.1 The Purchaser will examine the Quote 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.
- Whether the Quote 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 price shall be corrected. If the Supplier/Supplier does not accept the correction of the errors, its Quote will be rejected. If there is a discrepancy between words and figures, the amount in words will prevail.

23.3 Prior to the detailed evaluation, pursuant to Clause22, the Purchaser will determine the substantial responsiveness of each Quote to the TENDER Document. For purposes of these clauses, a substantially responsive Quote is one, which conforms to all the terms and conditions of the TENDER Document without material deviations. The Purchaser's determination of a Quote's responsiveness is to be based on the contents of the Quote itself without recourse to extrinsic evidence.

23.4 If the prices of certain components/sub assemblies/spare parts are not included, the Purchaser will load the offer with the cost of these in evaluation if goods/equipment/plant is functional. If the Purchaser considers that without these the goods/equipment is not functional, then the Quote will be treated as incomplete and non-responsive.

23.5 To facilitate loading incomplete Quote, the highest cost of such components offered by other Supplier/Suppliers or the estimated cost of such components in the opinion of the Purchaser **or** other Purchases similarly made based on past experience shall be considered for loading incomplete Quote.

23.6 Since the Quote is invited for the complete job of design, supply, installation and commissioning of the equipment/plant, the incomplete or part Quote submitted by any Supplier/Supplier may not be considered for evaluation and may be liable for rejection.

23.7 A Quote determined as not substantially responsive will be rejected by the Purchaser and may not subsequently be made responsive by the Supplier/Supplier by correction of the nonconformity.

23.8 The Purchaser may waive any minor informality or nonconformity or irregularity in a Quote, which does not constitute a material deviation, provided such waiver, does not prejudice or affect the relative ranking of the Supplier/Supplier.

24. Evaluation and Comparison of Quote

24.1 The Purchaser will evaluate and compare the Quote previously determined to be substantially responsive, pursuant to Clause 23. No Quote will be considered if the complete requirement covered under this work is not included in the Quote. However, the discounts offered by the Supplier/Suppliers, if any, will be taken into account in the evaluation of Quote so as to determine the Quote offering the lowest evaluated cost for the Purchaser in deciding award of contract/s.

24.2 The Purchaser's evaluation of a Quote will include and take into account, in the case of goods manufactured in India or goods of foreign origin already located in India, sales and other similar taxes, which will be payable on the goods if a contract is awarded to the Supplier/Supplier. Also, applicable taxes and duties payable by the Purchaser will be added to the Quote price for evaluation by the Supplier in the price Quote area.

24.3 The comparison shall be of free delivery at site basis including unloading and inclusive of all taxes (sales, GST, works contract etc.) and duties (customs, countervailing, excise etc.) of the goods offered from within India, such price to include all costs as well as duties and taxes paid or payable on components & raw material incorporated in the goods as well as taxes & duties payable on finished goods and the installation and commissioning costs as per the provisions in the technical specification.

24.4 The Purchaser's evaluation of a Quote will take into account, in addition to the Quote price and the price of incidental services, the following factors, in the manner and to the extent indicated in this Clause 23 and in the Technical Specifications:

- Type of Technology offered by the Supplier.
- Heat transfer area and heat balance of the system offered.
- Impact of the Design offered by the Supplier on the Civil building.
- Utility and product losses day consumptions provided.
- Production cost shall be calculated by the purchaser based on the data provided by the Supplier for their offered system. If it is found that any Supplier/Supplier for any reason indicates impractical or impossible

data to arrive Production cost guarantees, such data shall be corrected and all the calculations shall be based on the data furnished by the highest Supplier/Supplier for the purpose of comparison.

- Product losses and CIP consumptions shall also be a part of production cost.
- Based on the production cost, the comparison of production cost for full capacity production of 365 days a year, for 10 years shall be done between all Suppliers. This is done so as to know the cost of production impact on the purchaser with respect to individual Supplier's technology performance. Cost loading shall be done accordingly.
- Cost of inland transportation, insurance and other costs within India incidental to delivery of the goods to their final destination and applicable excise duty payable by the Purchaser however the price for the same is to be included in the Quote price.
- Delivery schedule offered in the Quote.
- The cost of components and service:
- The availability of spare parts and after-sales services for the equipment offered in the Quote.
- Deviation in payment schedule from that specified in the Special Conditions of Contract
- The quality and adaptability of the equipment offered.
- The performance and productivity of the equipment offered.
- Any Other technical parameters as required by the purchaser.

24.5 Pursuant to above of Clause 23, the following evaluation methods will be followed:

- Inland Transportation, ex-factory/ Insurance and Incidentals: For the goods offered, the Supplier/Suppliers must quote inclusive for inland transportation, insurance and other incidentals for delivery of goods to the project site as stated in Clause 11.
- Delivery Schedule: The Purchaser desires to have delivery of the goods covered under the invitation, at the time specified in the Schedule of Requirements. The estimated time of arrival of the goods at the project site/ destination should be calculated for each Quote after allowing for reasonable transportation time.
- Supplier/Suppliers shall state their Quote price for the payment schedule outlined in the Special Conditions of Contract. Quote will be evaluated on the basis of this base price.
- The goods/ plant offered shall have the guaranteed performance with regard to the rated capacity and operating parameters specified in the technical specifications related to Process performance and consumption guarantees.

24.6 If it is found that any Supplier/Supplier for any reason indicates impractical or impossible data to arrive performance guarantees, such data shall be corrected and all the calculations shall be based on the data furnished by the highest Supplier/Supplier for the purpose of comparison.

24.7 All information asked in the Part B- Technical TENDER Section II, Sub section 11 of the TENDER document must be provided along with the Quote. Failure to provide the details as per these sections may cause Quote to be rejected. Based on the data received under these sections the Quote shall be evaluated.

25. NOT USED

26. Post-qualification

26.1 In the absence of pre-qualification, the Purchaser will determine to its satisfaction whether the Supplier/Suppliers selected as having submitted the lowest evaluated responsive Quote is qualified to satisfactorily perform the Contract.

26.2 The determination will take into account the Supplier/Supplier's financial, technical and production capabilities. It will be based upon an examination of the documentary evidence of the Supplier/Supplier's qualifications submitted by the Supplier/Supplier, pursuant to Clause 12 as well as such other information as the Purchaser deems necessary and appropriate including details of experience and records of past performance.

26.3 An affirmative determination will be a prerequisite for award of the Contract to the Supplier/Supplier. A negative determination will result in rejection of the Supplier/Supplier's Quote, in which event; the Purchaser will proceed to the next lowest evaluated Quote to make a similar determination of that Supplier/Supplier's capabilities to perform satisfactorily.

26.4 Subject to Clause 26, the Purchaser will award the contract to the successful Supplier/Supplier whose Quote has been determined to be substantially responsive and has been determined as the lowest evaluated Quote provided further that the Supplier/Supplier is determined to be qualified to perform the contract satisfactorily as per Clause 22, 23 and 24.

27. Right to Vary Quantities at the Time of Award

The Purchaser reserves the right at the time of award of Contract to increase or decrease by any quantity of goods and services specified in the Schedule of Requirements without any change in unit rates as specified in the price break – up or other terms and conditions.

28. Right to Accept any Quote and to Reject Any or All Quote

The Purchaser reserves the right to accept or reject any Quote, and to annul the Tender process and reject all Quote at any time prior to award of Contract, without thereby incurring any liability to the affected Supplier/Suppliers or any obligation to inform the affected Supplier/Suppliers of the grounds for the Purchaser's action.

29. Notification of Award

29.1 Prior to expiration of the period of Quote validity, the Purchaser may notify the successful Supplier/Suppliers in writing by registered letter or by email to be confirmed in writing by registered letter, that its Quote has been accepted.

29.2 The notification of award will constitute the formation of the Contract.

29.3 Upon the successful Supplier/Supplier's acceptance of the Purchase Order and signing of the contract agreement, the Purchaser will promptly notify each unsuccessful Supplier/Supplier and will discharge its Quote security.

30. Signing of Contract

30.1 At the same time as the Purchaser notifies the successful Supplier/Supplier that its Quote has been accepted, the Purchaser will send the Supplier/Supplier the Contract Form /Purchase Order incorporating all agreements between the parties.

30.2 Within 30 days of receipt of the Contract, the successful Supplier/Supplier shall return the duplicate copy of the Order duly signed and sealed in token of acceptance of the order to the Purchaser.

31. Advance Bank Guarantee (ABG)

Within 30 days of the receipt of the notification of award, the successful Supplier/Supplier shall furnish the ABG equivalent to the advance to be paid to the Supplier. The ABG shall be valid for the complete project period of 3 months + 2 months and shall be returned when the ABG equivalent value items are supplied by the successful Supplier. ABG shall be in the form of Advance Bank Guarantee Form provided in the TENDER Document or another form acceptable to the Purchaser.

32. Performance bank Guarantee (PBG)

The Performance Bank Guarantee (PBG) shall be in the amount of 10% of the Contract price valid up to sixty days after the date of completion of performance obligations including warranty obligations. Performance and warrantee period shall be 12 months from the date of Acceptance Certificate (Acceptance of plant by purchaser after successful commissioning).

PBG shall be in the form of Performance Bank Guarantee Form provided in the TENDER Document or another form acceptable to the Purchaser.

33. Turn-key Contract

All the Supplier/Suppliers should quote for the design, supply, installation, testing and commissioning of equipment as detailed in this TENDER document on turn-key basis within the scope specified in the technical specification. The Purchaser shall, however, be at liberty to award the contract for the part or whole of the work.

34. Break-up prices

All the Supplier/Suppliers shall furnish the cost separately for the supply and installation/commissioning along with detailed cost break-up (item-wise), which will be applicable for progressive payments on getting approval of Quote price / work order. Items and works for which no break-up price is furnished by the Supplier/Supplier will not be paid for by the Purchaser when supplied/executed and shall be deemed covered by other break-up

prices. Such break up cost should be based on ex-works cost and percentage of ex-works cost should be indicated separately for packing and forwarding, transportation, insurance and other incidental charges, erection, and commissioning on percentage basis for each item.

35. Delivery Schedule of items

Supplier/Suppliers should submit a detailed item wise delivery schedule keeping in view the completion period of the contract. Such items shall be grouped under monthly delivery schedule with total value of such items. This will facilitate for ensuring the cash flow requirement for the project.

Check List of Quote Submission

Following listed documents have to be furnished to claim the eligibility:

Sl. No.	Particulars	Status
1	Prescribed EMD amount equivalent to Rs. 2,00,000/- shall be submitted through following manner: Note: The EMD shall be in Indian currency only	Document to be furnished.
2	The Bidder should be a manufacturer to the type specified in the schedule of requirements which shall be in successful operation for at least One years as on the date of bid opening.	Proof of document to be furnished.
3	The tenderer shall Satisfactorily completed at least One contract in India, as a prime contractor, for similar capacity boiler package along with its accessories on turnkey basis in any one of the last 3 financial years ending up-to 2024-25.	Bidder shall furnish documentary evidence in support of the satisfactory completion of the contract. Completion Certificate to be submitted.
5	The prime contractor shall have an annual turnover of a minimum of Rs. 2 Crores during past three financial years ending up to 2024-25.	Document to be furnished.
6	Reports on financial standing of the bidder such as profit and loss statements, balance sheets and auditors report of the past three years, bankers certificates etc..	Document to be furnished.
7	GST registration certificate& PAN No details to be Attached.	Document to be furnished.
8	The manufacturer should have presence in India with after sale service network, inventory of spares and service engineers.	Document to be furnished.
9	The Bidder shall furnish the detailed technical specifications of Boiler package of capacity 5TPH F&A 100 Deg C as compliance report against our technical specifications.	Document to be furnished.
10	Completion period for above said project – 3 months from the date of issue of Purchase order or advance paid whichever is later.	To be confirmed by bidder

Technical Quote

1 Quote Form on your letterhead dully filled, signed and sealed by the authorized signatory.
2 Manufacturers' Authorization Form in case the items are specialized and proprietary
3 Technical Deviation Statement form
4 Commercial terms Deviation Statement form
5 Technical Details as asked in the Part B – Technical TENDER - Section V. Sub section 11
6 Other documents as asked in the TENDER

Price Quote

1 Price Quote dully filled, signed and sealed by the authorized signatory.

Section III
General Conditions of Contract

Contents

1. Definitions

1.1 In this Contract, the following terms shall be interpreted as indicated:

1.2 "The Contract" means the agreement entered between the Purchaser and the Supplier/Supplier, including all attachments and appendices thereto and all documents incorporated by reference therein.

1.3 "The **Contract Price**" means the **price payable** to the Supplier/Supplier under the Contract for the full and proper performance of its contractual obligations.

1.4 "The **Goods**" means all of the equipment, machinery, and/or other materials, which the Supplier/Supplier is required to supply to the Purchaser under the Contract.

1.5 "**Services**" means services ancillary to the supply of the Goods, such as transportation and insurance, and any other incidental services, such as installation, commissioning, provision of technical assistance, training and other such obligations of the Supplier/Supplier covered under the Contract.

1.6 "The **Purchaser**" means the Organization purchasing the Goods and services and would include the term "**Owner**".

1.7 "The **Supplier/Supplier**" means the individual or firm supplying the Goods and services under this Contract would include also the terms "**contractor**" or "**Supplier/Supplier**".

1.8 **Engineer-in-charge** means the Engineer designated as such or other Engineer appointed from time to time by the Purchaser and notified in writing to the Supplier/Supplier to act as Engineer-in-charge for the purposes of contract.

2. Price Basis :

a) Supply :

The total price quoted for supply shall be on CIF Katraj dairy; Pune (Maharashtra) site basis is inclusive of:

- Packing & Forwarding
- Sea Freight
- Total Import duty as applicable at present to be considered on the imported items including clearance charges and transportation till the site.
- GST as applicable to be included.
- Transit Insurance & Transportation to be included.
- Insurance till the completion of the project.
- Any other applicable taxes and duties or cost factors to be included.

b) Erection and Commissioning:

The total price quoted for services of Erection and commissioning shall be inclusive of:

- Erection & Commissioning charges.
- GST – as applicable as per prevailing law and to be included.
- Any other applicable taxes and duties or cost factor to be included.
- Storage Cum Erection Insurance to be included.

Both prices shall include Octroi/ Entry Tax/Works Contract Tax or any other Government levies, which shall be extra, at actual if applicable.

Notes to Price Basis:

(i) Any additional liability due to introduction of any new tax or any increase in tax/duty rates/ Govt. levies or expansion of tax net to new services/equipment during the project execution shall be extra to the Purchaser's account.

3. Exchange Rate

Exchange rates variation is not applicable.

4. Time overruns due to Delay in the Project

i. Any delay on the part of the Purchaser and/or any third party retained by Purchaser shall entitle the Supplier to extension of such time period as informed by Purchaser.

5. Limitation of Liability

Notwithstanding any other provision of the Contract but except only to the extent the exclusion or limitation of Supplier's liability is prohibited by applicable law (in which circumstances Supplier's liability shall only be limited to the extent permitted by applicable law),

(i) Supplier shall under no circumstances, whether by reason of breach of this Contract, negligence, strict liability, indemnity or otherwise, shall be liable for any loss of profit, loss of business, loss of use (including plant downtime or delays), loss of or damage to product (including feed feedstock, utilities and raw materials), loss of production, loss of revenues or loss of contracts, contractual liability or liquidated damages payable by Purchaser to any third or for any costs or losses associated with resulting business changes (including recall costs), or for any special, indirect, punitive, exemplary, incidental or consequential costs, losses or damages of any description, howsoever caused.

(ii) Supplier's maximum aggregate liability arising out of or relating in any way to this Contract including without limitation any delay, performance, breach or termination, shall be limited to an amount equal to 10% of the contract price This includes liquidated damages, if any, towards delay, liquidated damages, if any, towards equipment performance and costs and expenses incurred by Supplier for repair and/or replacement of equipment which have defects which the Supplier is responsible to repair and / or replace according to the Contract.

Any claims by the Purchaser under the Contract shall be made no later than 30 days after the expiry of the warranty period set out in Clause 18 & 19 or shall be forever waived.

6. Statutory Variation :

Variation is considered in case of statutory levies / taxes and the same shall be to the account of the Purchaser. Any change in tax due to implementation of GST, etc. shall also be to the account of the Purchaser.

7. Price Break-up for Invoice:

The item wise price break–up for invoicing shall be furnished before finalization of the order. Complete tax breakup including other components breakup such as import duty, clearance charges etc shall be submitted.

8. Insurance :

i. The marine/transit insurance shall cover an amount equal to 110% of value of the equipment from on "All Risks" basis including War Risks and Strike clauses valid for a period not less than 1 month after the date of arrival of equipment at final destination. This shall be covered by Supplier through their Marine Policy.

ii. The Insurance charges shall be paid by the Supplier towards all risks during storage, erection, testing and commissioning.

9. Payment Terms

9.1 **For Supply of Items:**

9.1.1 10 % advance on supply value shall be payable against advance bank guarantee (ABG) of equivalent amount. ABG shall be submitted within 20 days of notification of award of contract. ABG shall be valid till the completion of the contract. The ABG shall be returned on completion of delivery of the supply.

9.1.2 70 % of supply price progressively on pro-rata basis against delivery of material at site (Based on the approved price break–up to be furnished before finalization of order).

Following 3 sets of documents shall be submitted for payment release:

- Invoice
- Packing list
- Dispatch documents
- Site receipt note with Katraj dairy personnel approval

9.1.3 10 % of the supply price progressively on pro-rata basis against successful erection of the supplied equipment at site.

9.1.4 Final payment of 10 % shall be paid against submission of performance bank Guarantee (PBG) of equivalent amount valid till 12 months from the date of Acceptance Certificate (Supplier will submit the PBG accordingly so that 10% is retained by purchaser either by the way of Retention payment or PBG value)

9.2 **For Erection, Testing & Commissioning:**

9.2.1 90 % of erection, testing & commissioning price progressively on pro-rata basis against progress of work at site (Based on the approved price break–up to be furnished before finalization of order and joint measurement/work sheet made by Katraj dairy and supplier).

9.2.2 Final payment of 10 % shall be paid against submission of performance bank Guarantee (PBG) of equivalent amount valid till 12 months from the date of Acceptance Certificate (Supplier will submit the PBG accordingly so that 10% is retained by purchaser either by the way of Retention payment or PBG value).

10. Not used

11. Erection, Pre Commissioning Testing, Commissioning, Acceptance Test, Acceptance Certificate and Process Warranties:

"Erection" means installation of equipment as per installation drawing such as layouts, etc.
"Pre-commissioning Testing" means the mechanical trials and water trials to be conducted on the Plant by the Supplier. Pursuant to the completion of the "Pre- commissioning testing", Supplier shall notify Purchaser of its readiness to commence the "Commissioning".
"Commissioning" means conducting product trials and stabilizing plant operations. The raw materials /prerequisite services shall be made available within maximum 30 days after completion of Pre-commissioning Testing to commence the product trials or else Plant shall be deemed as commissioned and any Process Warranties given discharged. Upon completion of commissioning, Supplier shall notify the Purchaser
of its readiness for commencing the "Acceptance Tests"

"Acceptance Tests" means conducting "Sectional Performance tests" &"Plant Performance Tests" as defined by the Supplier with support from the Purchaser in respect of utilities, man power, raw materials consumables and personnel. Acceptance Tests shall commence not later than 90 days of Commissioning.

"Acceptance Certificate "means the certificate issued by the Purchaser to the Supplier when Process **Warranties** are discharged or deemed discharged.

"Process Warranties" means the process warranties given by the Supplier in respect of the Plant.

12. Effective Date:

"Effective Date" shall be reckoned from the date of clear technical and commercially PO / Contract with the condition that advance shall be released within 1 week of submission of Advance bank guarantee.

13. Milestone

The Supplier shall meet the following milestone date:

Completion of Pre-Commissioning testing including product trials: **By end of 3 Months from Effective date**

- *Submission of Preliminary P&Ids, Equipment GA Drawing and Layout drawings within 25 days from effective date. Foundations of all equipment shall be provided within 40 days from the effective date.*

14. Not Applicable

15. Late performance and liquidated damage:

In case of delay in completion of Pre-commissioning set out in Clause 13 caused solely due to the Seller's negligent non–fulfilment of any of its obligations under this Contract (and not any other cause including an event entitling the Supplier to extension of time according to the Contract), the Purchaser shall have the right to claim liquidated damages for such delay, at one-half of one percent (0.5%) of the total contract price, per full week of delay, subject to a cap of ten per cent (10%) of the Total contract Price.

Risk of loss and damage to the equipment shall pass to the Purchaser upon completion of Acceptance Tests or commencement of commercial production whichever is earlier if plant performance is acceptable to the client. Supplier may deliver the equipment from multiple locations, including different countries. Partial shipments are permitted.

Supplier shall be entitled to an extension of time to the extent of:

i) Delays from Purchaser in fulfilling obligations such as finalization of scope, approval of drawings, inspection, dispatch clearance, civil work, supply of raw materials, utilities for erection / commissioning etc.,

ii) Delays for which Purchaser or third parties are responsible.

iii) Instructions of Purchaser, including its project manager or other representatives, other than by reason of Supplier's default.

iv) Exceptional adverse climatic conditions or other forces of nature that an experienced supplier could not be reasonably expected to take adequate preventative precautions.

v) Site or other conditions that could not be reasonably foreseen by Supplier based on information made available to Supplier prior to the signature of the Contract or unforeseeable shortages in the availability of goods or personnel caused by epidemic or governmental actions.

vi) Any other cause is giving an entitlement to an extension of time if allowed by purchaser.

The liquidated damages shall constitute full and complete satisfaction of any claim of Purchaser against Supplier arising from or in connection with late completion of Pre-Commissioning. No other claims for late performance or delivery under this Contract shall be allowed.

16. Termination and Remedies:

Either Party may terminate the Contract by giving written notice thereof to the other Party only if

(a) The Either Party fails to perform any material obligation under this Contract (other than any payment obligation) and has not taken action to commence to cure the failure within 30 days of written notice of such failure or does not diligently pursue such cure thereafter,

(b) The either Party becomes bankrupt, insolvent or otherwise unable to pay its bills when due.

Termination and suspension

Termination:

The Purchaser may at any time on breach of this Contract by the Supplier/ Contractor, give them a written notice of such breach. If the Contractor does not commence appropriate measure(s) within a period of 10 days after issuance of such notice to remedy that breach, then the Purchaser may terminate this Contract at any time thereafter stating therein the date of termination. The Contractor shall then be liable to the Purchaser in accordance with the Contract. The Purchaser reserves the right to terminate the Contract at any time by giving a notice. without assigning any reason whatsoever. The Contractor shall stop the performance of the Contract from the date of termination and hand over all the drawings, documents, plant and equipment including all the rights of work to the Purchaser. No consequential damages shall be payable by the Purchaser to the Contractor in the event of such termination.

Suspension:

The Purchaser may suspend the work in whole or in part at any time by giving Contractor notice in writing to such effect stating the nature, the date and the anticipated duration of such suspension. On receiving the notice of suspension, the Contractor shall stop all such work, which the Purchaser has directed to be suspended with immediate effect. The Contractor shall continue to perform other work in terms of the Contract, which the Purchaser has not suspended. The Contractor shall resume the suspended work as expeditiously as possible after receipt of such withdrawal of suspension notice. During suspension, the Contractor shall not be entitled for any claim whatsoever arising out of any loss or damage or idle labour caused by such period of suspension

17. Mechanical Warranties

Supplier warrants to the Purchaser that the equipment is free from defects in material, design and workmanship for the warranty period of 12 months from the date of Acceptance Certificate (Acceptance of plant by purchaser after successful commissioning). However, for bought out items sourced from various suppliers, where the standard warranty period of the Original equipment manufacturer (OEM) is lower than the above, then warranty of the OEM shall be applicable. The Supplier's warranties are subject to the following conditions:

(a) The equipment is operated and maintained in accordance with good engineering practice and Supplier's instructions as to maintenance and operation, whether given orally or included in Supplier's operation and maintenance manuals or instruction sheets;

(b) the product processed by the equipment has the feed characteristics set forth in the Contract;

(c) The equipment has not been modified without the prior written approval of Supplier;

(d) Purchaser gives prompt written notice to Supplier specifying all alleged defects in the equipment; though in any event not later than 10 days after the end of the warranty period; and

(e) Purchaser preserves and turns over to Supplier and permits reasonable inspection by Supplier of all allegedly defective equipment and relevant operational and maintenance data.

Supplier's warranty does not cover any loss, damage or defect due to (i) any equipment furnished or designed by Purchaser or any third party (other than a subcontractor of Supplier), including non-original parts, (ii) any defects arising from corrosion, abrasion, use of unsuitable lubricants or (iii) any defects caused by errors or omissions on the part of the Purchaser or its subcontractors and vendors. Supplier's obligation under any warranty is strictly and exclusively limited to furnishing, in Supplier's discretion, repairs or replacements for parts determined to be defective and covered by Supplier's warranty on inspection by an authorized representative of Supplier. Supplier assumes no responsibility and shall have no liability for any repairs or replacements undertaken by Purchaser without Supplier's prior written authorization.

18. Process Warranties

i. Subject to the terms and conditions of the Quote submitted and this Clause 17, the Supplier gives the Process Warranties subject to fulfilment of each and all of the following conditions :

(i) compliance by Purchaser with its responsibilities under this Contract, including compliance by Purchaser's personnel and third parties with Supplier's instructions and manuals during and prior to the performance of the acceptance tests;

(ii) A steady and constant stream of feed, materials and utilities as stipulated in the Contract;

(iii) Adequate performance of upstream and downstream equipment required for the operation of the equipment according to the Contract;

(iv) The equipment, services, designs, specifications and other information provided by Purchaser (or its other contractors or representatives) to Supplier being free of defects;

(v) The furnishing of trained, qualified and sufficient personnel as required by Supplier during the Acceptance Tests;

(vi) The equipment has not been modified without the prior written approval of Supplier;

(vii) Supplier is given access to all operating and maintenance records and data.

ii. Purchaser shall issue an Acceptance Certificate when the Plant (or section thereof) is deemed accepted according to (iii) below and shall state in such certificate the date when acceptance was achieved. Purchaser may not refuse to issue an Acceptance Certificate due to the existence of defects that do not adversely affect the safe and efficient operation of the equipment for its intended purpose. Any such defects shall be noted on the acceptance certificate and shall be remedied by Supplier as soon as practicable. Supplier may apply by written notice to Purchaser's project manager for an Acceptance Certificate when the equipment has passed the Acceptance Tests or Supplier's obligations in respect thereof have been discharged. If Purchaser fails to sign the certificate within 14 days, Purchaser shall be nonetheless deemed to have issued the certificate effective the date of acceptance as per (iii) and without any conditions or qualifications.

iii. The Process Warranties, and Supplier's obligations in respect of the Acceptance Tests, shall be deemed fully discharged on the earliest of the following:

a. if the Plant (or section thereof) has on average performed as warranted during the Acceptance Tests;
b. the Supplier has paid any liquidated damages that may be due according to clause no 15 (v) below;
c. the equipment is taken into commercial use by Purchaser prior to completion of any Acceptance Tests; or
d. the Supplier has been prevented from completing the tests within 3 months from completion of the pre commissioning or 12 months from the signing of the Contract, whichever is earliest.

iv. If during the Acceptance Tests the Plant (or section thereof) shall fail to perform as warranted, Supplier shall as soon as possible investigate the reasons for such failure and shall inform Purchaser of the results of its investigation. Purchaser shall fully co-operate with

Supplier in such investigation and shall give Supplier all access, data and documentation required by Supplier to determine the cause of the failure.

v. If it is determined that the failure of the Plant (or section thereof) to pass the Acceptance Tests was due to reasons solely attributable to the fault of Supplier, Supplier shall, without delay and at its own cost, undertake all reasonable actions to remedy the cause of the failure, and, unless the deficiency was insignificant, the relevant Acceptance Test shall be repeated. If the Plant (or section thereof) fails again during any subsequent Acceptance Tests due to sole fault of Supplier, the foregoing procedures shall be repeated until the Process Warranties are met.

vi. *The Liquidated Damages for Process Warranties will be mutually discussed and finalized However, the maximum aggregate Liquidated damages payable (not as a Penalty) on account of Process Warranty shall not exceed 10% of the total contract price*

vii. If it is determined that the failure of the equipment to pass the Acceptance Test was due to reasons which were not solely the Supplier's fault, the equipment shall be deemed to have performed as warranted in respect of such tests, the Supplier's obligations in respect of the Acceptance Tests shall be deemed discharged and the Purchaser shall reimburse Supplier its costs of investigation and remediation.

19. Warranty disclaimer

The warranties given in Clause 17 and 18 are the only warranties and/or guarantees given by Supplier in respect of its equipment and services; accordingly, Supplier disclaims any other warranty and guarantee that might be expressly and/or implied herein (including any implied warranty of merchantability or fitness for an intended purpose).Except as stipulated above Clause 17 and 18, the Supplier shall not be liable for any defect, non-conformity or inadequacy in the equipment or any part thereof. This applies to any loss or damage the defect may cause, including without limitation any loss or damage stated in Clause 5.

20. Force Majeure

i. The terms and conditions mutually agreed upon in respect of this quotation shall be subject to 'Force Majeure'. Neither Supplier nor Purchaser shall be considered in default in the performance of its obligations hereunder, if such performance is prevented or delayed because of war, hostilities, revolution, civil commotion, strike, accident at works, break-down of machinery, embargo, tempest, default by sub-suppliers, lockout, epidemic, accident, fire, cyclone, flood or because of any law, order, proclamation, regulation or ordinance of any Government or of any sub-division thereof or because of any Act of God or any other cause whether of similar or dissimilar nature beyond the reasonable control of the party affected.

ii. The party affected may notify the other within 15 days of the occurrence of the contingencies and of the obligation, performance of which is thereby delayed.

iii. Should one or both the parties be prevented from fulfilling their obligations by a state of Force Majeure lasting continuously for a period of three (3) months, the two parties should consult with each other regarding the future implementation of the contract.

iv. If contract needs to be cancelled by the Purchaser on account of Force Majure clause, then Suppliers shall be suitably compensated for the progress made in design/ supply/ installation/ etc. and commitments made for supplies/services.

21. Arbitration

In the event of any dispute or differences arising from or in connection with this Contract, the same shall be resolved amicably in good faith, failing which the dispute or differences shall be referred to Arbitration. Each party shall nominate one arbitrator and the two arbitrators so nominated shall nominate a third presiding arbitrator. The arbitration shall be governed by the Indian Arbitration

and Conciliation Act, 1996 as amended from time to time. The arbitrators shall give reasoned award.

The venue of Arbitration shall be Pune. It is clarified that pending reference to arbitration, the parties shall comply with their respective obligations under the contract and the supplies/work shall not be stopped unless dispute is of such a nature that it is not possible to continue with the work.

22. Governing Laws & Regulations

This Contract shall be construed in accordance with and governed by the laws of India and in the event of any dispute, the courts in Pune, India shall have exclusive jurisdiction.

23. Inspection:

Inspection and clearance of the items being supplied shall be carried out by Supplier's quality assurance department. There is no provision included for third party inspection in Suppliers scope, the same, if applicable shall be extra to the Purchaser's account.

As per mutually agreed Inspection plan & the selected list of indigenous items, the supplier shall invite Purchaser / Consultant from Purchaser's side for inspection and preliminary testing. The Purchaser will arrange to complete such inspection as may be necessary along with clearance within a reasonable time from the date of intimation by the supplier.

For imported items, however, the supplier shall do the inspection at his cost and submit the necessary test certificate wherever possible.

24. Excess Material:

Any excess material brought to the site for completion of the job will be the property of the Supplier and can be taken back by the Supplier and/or its agent at any time of convenience with prior approval of the Purchaser. This clause is applicable only on lot items as approved by the purchaser in writing only.

25. Not applicable

26. Information and documents. (Confidentiality and Intellectual Property Rights)

All drawings, specifications and other documentation and information of any kind (whether orally disclosed, written, computer generated or otherwise) furnished directly or indirectly to Purchaser by either Supplier (or any of its subcontractors or vendors) shall remain the proprietary and confidential property of Supplier (or its subcontractors or vendors), and shall be used by Purchaser only with respect to the work covered by the Contract and shall not be used by Purchaser in connection with any other project. Such proprietary and confidential information and data shall not be shown or otherwise made available to any third party at any time without Supplier's prior written consent. Purchaser shall not allow any reverse engineering of the equipment without Supplier's prior written consent. Any such proprietary and confidential information that Purchaser determines must be disclosed to its employees shall only be disclosed to its employees on a need-to-know basis for the operation, maintenance, and repair of the equipment. The intellectual property in the equipment, document or other information given or made available to Purchaser under the Contract shall remain the exclusive property of Supplier (or its subcontractors and/or vendors). Nothing in this Contract shall require Supplier to provide Purchaser with any of its shop or manufacturer drawings, proprietary calculations or other confidential details of its technology, including manufacturing processes and equipment processes. The same is applicable to supplier also in vise versa case.

27. Health and Safety Requirements

The plant will be designed to ensure safe plant operation in compliance with the Contract.

28. Change orders

All change orders shall be agreed in writing by an authorized representative of both parties before Supplier has any obligation to perform.

29. Laws and regulations

The equipment and services purchased from Supplier shall comply with all applicable directives, laws, rules, regulations, codes and standards in effect in India on the date of the Contract and expressly listed in its offer.

30. Validity

The quoted total price is valid for 90 days from the date of opening of QUOTE as per TENDER.

Special Conditions of Contract
Section IV

Contents

The following Special Conditions of Contract shall supplement the General Conditions of Contract. Whenever there is a conflict, the provisions herein shall **prevail over** those in the General Conditions of Contract. The corresponding clause number of the General Conditions is indicated in parentheses:

1. Definitions (Clause 1)

1.1 The Purchaser is Katraj dairy, Pune and would include the term "Owner"

1.2 The Supplier/Supplier is (Name of Supplier/Supplier).

1.3 Equivalency of Standards and Codes (Clause 4)

1.4 Wherever reference is made in the contract to the respective standards and codes in accordance with which goods and materials are to be furnished, and work is to be performed or tested, the provisions of the latest current edition or revision of the relevant standards and codes in effect shall apply, unless otherwise expressly set forth in the Contract. Where such standards and codes are national in character, or relate to a particular country or region, other authoritative standards which ensure an equal or higher quality than the standards and codes specified will be accepted subject to the Purchaser's prior review and written approval. Differences between the standards specified and the proposed alternative standards must be fully described in writing by the Supplier/Supplier and submitted to the Purchaser at least 30 days prior to the date when the Supplier/Supplier desires the Purchaser's approval. In the event the Purchaser determines that such proposed deviations do not ensure equal or higher quality, the Supplier/Supplier shall comply with the standards set forth in the documents.

2 NOT USED

3. Inspection and Tests

3.1 The inspection of the Goods shall be carried out to check whether the Goods are in conformity with the technical specifications attached to the purchase order form and shall be in line with the inspection/test procedures laid down in the Schedule of Specifications and the Contract conditions.

4. Delivery and Documents

4.1 **For imported goods:** Upon shipment, the Supplier/Supplier shall notify the Purchaser and the Insurance Company by email/fax/ink the full details of the shipment including purchase order number, description of goods, quantity, the vessel, the bill of lading number and date, port of loading, date of shipment, port of discharge, etc. The Supplier/Supplier shall mail the following documents to the Purchaser, with a copy to the Insurance Company:

4.2 **For imported goods:** Original and three copies of:

- The **Supplier's invoice** showing purchase order no., Goods description, quantity, unit price, total amount;
- The negotiable, clean, on-board bill of lading marked freight prepaid and three copies of non-negotiable bill of lading;
- Packing list identifying contents of each package;
- Insurance certificate;
- Manufacturer's/Supplier/Supplier's guarantee certificate;
- Inspection certificate, issued by the nominated inspection agency and the Supplier/Supplier's factory inspection report; and
- Certificate for Country of origin.
- The Supplier's certificate certifying that the defects pointed out during inspection have been rectified.

4.3 The Purchaser shall receive the above documents at least one week before arrival of the Goods at the port and, if not received, the Supplier/Supplier will be responsible for any consequent expenses.

4.4 **For Domestic Goods:** Original and three copies of:

- The Supplier's invoice showing purchase order no., Goods' description, quantity, unit price, total amount;
- Delivery note/packing list/lorry receipt;

- Manufacturer's/Supplier/Supplier's guarantee certificate;
- Inspection Certificate issued by the nominated inspection agency, and the Supplier's/Supplier's factory inspection report;
- GST invoice / GST Weigh Bill Challan / Excise gate pass/ Octroi receipts, wherever applicable, duly sealed indicating payments made; and
- Any other document evidencing payment of statutory levies.
- Single MCE insurance policy shall cover the entire project.

4.5 Note: The nomenclature used for the item description in the invoice/s, packing list/s and delivery note/s etc. should be identical to that used in the purchase order/contract. The dispatch particulars including name of transporter, LR Number and date should also be mentioned in the invoice/s.

5. Insurance

5.1 The marine/transit insurance shall cover an amount equal to 110% of the FOR destination value of the goods from "warehouse to warehouse" on "All Risks" basis including War Risks and Strike clauses valid for a period not less than 3 months after the date of arrival of Goods at final destination.

5.2 The Insurance charges shall be paid by successful Supplier/Supplier towards all risks during storage, erection, testing, commissioning and up to acceptance of the plant.

6. Incidental services

6.1 The incidental services shall be provided as per the requirements outlined in the Schedule of Specifications and as covered under Clause 3.13. The cost shall be included in the contract price, if provided for in the scope of the Contract.

7. Spare Parts

7.1 Supplier/Suppliers shall carry sufficient inventories to assure ex-stock supply of consumable spares such as gaskets, plugs, washers, belts, etc. Other spare parts and components shall be supplied as promptly as possible but in any case within three months of placement of order. Also Supplier shall provide all spares required for running the plant successfully for the period of 6 months after the completion of warrantee period.

8. Resolution of Disputes

8.1 Shall be as per GCC clause no. 21

9. Notices

For the purpose of all the notices, the following shall be the address of the Purchaser and Supplier.

Purchaser
PUNE ZILLA SAHAKARI DUDH UTPADAK SANGH MARYADIT
KATRAJ DAIRY,
OPP. RAJIV GANDHI UDYAN,
PUNE-SATARA ROAD,
PUNE, MAHARASHTRA-411046

SITE ADDRESS
PUNE ZILLA SAHAKARI DUDH UTPADAK SANGH MARYADIT
KATRAJ DAIRY,
OPP. RAJIV GANDHI UDYAN,
PUNE-SATARA ROAD,
PUNE, MAHARASHTRA-411046

Supplier

Suppliers to provide details.

TECHNICAL TENDER DOCUMENT OF DESIGN, SUPPLY, ERECTION, TESTING & COMMISSIONING OF BOILER PACKAGE OF CAPACITY 5 TPH F&A 100 DEG C ALONG WITH ACCESSORIES ON TURNKEY BASIS KATRAJ, PUNE.

OWNER
KATRAJ DAIRY
PUNE ZILLHA SAHAKARI DUDH UTPADAK SANGH LIMITED
(HEREAFTER CALLED AS SANGH)

MAIN TABLE OF CONTENTS

TECHNICAL TENDER DOCUMENT

Special Conditions of Contract
for
General Erection & Commissioning
Section I - Part I

Contents

1. Sufficiency of TENDER

1.1 The Supplier/Suppliers by quoting shall be deemed to have satisfied himself as to all the conditions and circumstances affecting the Contract Price, as to the possibility of executing the works as shown and described in the Contract, as to the general circumstances at the site of the works, as to the general labour position at site and to have determined the prices accordingly.

2. Programme of Installation & Commissioning

2.1 As soon as practicable after the acceptance of the bid, the Supplier/Suppliers shall submit to the Purchaser for his approval a comprehensive programmed in the form of bar chart showing the sequence of order in which the Supplier/Suppliers proposes to carry out the works including the design, manufacture, delivery to site, erection and commissioning thereof. After submission to and approval by the Purchaser of such programmed, the Supplier/Suppliers shall adhere to the sequence of order and method stated therein. The submission to and approval by the Purchaser of such programmed shall not relieve the Supplier/Suppliers of any of his duties or responsibilities under the Contract. The programmed approved by the Purchaser shall form the basis of evaluating the pace of all works to be performed by the Supplier/Suppliers. The Supplier/Suppliers shall update the PERT Network every month, submit it to the Purchaser and shall inform the Purchaser the progress on all the activities falling on schedule for the next reporting date.

3. Preparation of Drawings for Approval

3.1 The Supplier/Suppliers should visit the site to acquaint himself in respect of existing site conditions and to know the details/information required for understanding the nature and type of civil construction works involved in the project. The Supplier/Suppliers shall submit to the Purchaser for approval:

- Within the time given in the specification or in the program, such drawings, samples, patterns and models as may be called for therein, and in numbers therein required.
- During the progress of works and within such reasonable times as the Purchaser may require such drawings of the general arrangement and details of the works as the Purchaser may require.
- During the progress of works and before the start of the erection activities, Supplier to submit the intelligent 3D for entire plant in the freeware software format for the approval to the Purchaser/Consultant. The 3D shall be of intelligent format in Aveva PDMS software only and shall be made in consultation and help of consultant for proper planning and execution.

3.2 Wherever necessary, the Supplier/Suppliers would be provided with a set of architectural drawings for the buildings where the erection works would be carried out and also the equipment details/ drawings of various equipment's handed over to the Supplier/Suppliers by the Purchaser.

3.3 The specifications/ conditions concerning the submission of drawings by the Supplier/Suppliers are detailed as under:

3.4 Supplier/Suppliers shall furnish a list of all necessary drawings, which the Supplier/Suppliers shall submit for approval, identifying each drawing by a serial number and descriptive title and expected date of submission. A brief list of drawings

is given in Table 1. This list shall be revised and extended if necessary, during the progress of work depending on the nature of the contract also.

3.5 The Purchaser shall signify his approval or disapproval of all drawings or such drawings that would affect progress of the contract as per the agreed programmed.

3.6 The purchaser shall issue, within four weeks of time in all circumstances, any drawing requested by the Supplier/Suppliers and required to be provided by us. If the Supplier/Suppliers suffers delay and/ or incurs costs due to delay on purchaser's part in this regard, then the Purchaser shall take such delay into account in determining any extension of time to which the Supplier/Suppliers is entitled under Clause 15 hereof and the Supplier/Suppliers shall be paid the amount of such cost as shall be reasonable.

3.7 P&I Drawings, Plant Layout and GA Drawings submitted for approval shall be signed by responsible representative of Supplier/Suppliers and shall be to any one of the following sizes in accordance with Indian Standards: " **A0, A1, A2, A3 and A4**".

3.8 All drawings shall show the following particulars in the lower right hand corner in addition to Supplier/Suppliers's name:

- Name of the Purchaser
- Project Title
- Title of drawing
- Scale
- Date of drawing
- Drawing number
- Space for drawing number
- Drawing Revision Number

3.9 In addition to the information provided on drawings, each drawing shall carry a revision number, date of revision and brief description of revision carried out. Whenever any revision is carried out, correspondingly revision number must be updated.

3.10 All dimensions on drawings shall be in metric units.

3.11 Drawings (**three sets**) submitted by the Supplier/Suppliers for approval will be checked, reviewed by the Purchaser, and comments, if any, on the same will be conveyed to the Supplier/Suppliers. It is the responsibility of the Supplier/Suppliers to incorporate correctly all the comments conveyed by the Purchaser on the Supplier/Suppliers 's drawings. The drawings, which are approved with comments, are to be re-submitted to the Purchaser for purpose of records. Such drawings will not be checked / reviewed by the Purchaser to verify whether the Supplier/Suppliers has incorporated all the comments. If the Supplier/Suppliers is unable to incorporate any comments in the revised drawings, Supplier/Suppliers shall clearly state in his forwarding letter such non-compliance along with the valid reasons.

3.12 Drawings prepared by the Supplier/Suppliers and approved by the Purchaser shall be considered as a part of the specifications. However, the examination of the drawings by the Purchaser shall not relieve the Supplier/Suppliers of his responsibility for

engineering design, workmanship, and quality of materials, warranty obligations and satisfactory performance on installation covered under the contract.

3.13 If at any time before completion of the work, changes are made necessitating revision of approved drawings, the Supplier/Suppliers shall make such revisions and proceed in the same routine as for the original approval.

3.14 Date of submission: In the event, the drawings submitted for approval require many revisions amounting to redrawing of the same, and then the date of submission of the revised drawings would be considered as the date of submission for approval.

3.15 The Supplier/Suppliers shall furnish to the Purchaser before the works are taken over, Operating and Maintenance instructions together with Drawings of the works as completed, in sufficient detail to enable the Purchaser to maintain, dismantle, reassemble and adjust all parts of the works. Unless otherwise agreed, the works shall not be considered completed for the purposes of taking over until such instructions and drawings have been supplied to the Purchaser.

APROVAL PROCEDURE (SUPPLIER TO FOLLOW THE BELOW CHART STRICTLY)

a) Supplier to provide all Final detailed equipment Layout, Point Load layout, Foundation details of each equipments, P&IDs, PFDs and other system related documents for approval to Consultant / CLIENT. Approval from Consultant / CLIENT is must without which the plant shall not be accepted.

b) In case, post approval, changes are done in documents / scheme / P&IDs, then immediately copy of such changes shall be provided for approval to the Consultant / CLIENT with a detail list of changes done (same shall be marked in documents / schemes / P&IDs / Drawings). Approval from Consultant/CLIENT is must without which the plant shall not be accepted.

c) All drawings of each and every equipment shall be presented for approval to the consultant/CLIENT. Post approval only, ordering / manufacturing shall be done.

d) All order technical specifications of each and every item of this pack shall be approved by consultant/CLIENT first. Post approval only, ordering shall be done.

e) All makes shall be approved by Consultant / CLIENT. Post approval only items shall be procured and supplied.

f) All Automation scheme shall and SCADA logics to be presented for Approval of Consultant/CLIENT.

g) SCADA screens and entire plant logic scheme shall be as per Consultant / CLIENT requirements only.

4. Superintendence, Team And Conduct

4.1 The Supplier/Suppliers shall employ one or more competent representatives, whose name or names shall have previously been communicated in writing to the Purchaser by the Supplier/Suppliers, to superintend the carrying out of the works on the site. The said representative or if more than one shall be employed, then one of such representatives shall be present on the site during all times, and any orders or instructions which the Purchaser may give to the said representative of the Supplier/Suppliers shall be deemed to have given to the Supplier/Suppliers. The said representative shall have full technical capabilities and complete administrative and financial powers to expeditiously and efficiently execute the work under the contract.

4.2 The Supplier/Suppliers shall, execute the works with due care and diligence within the time for completion and employ Supplier/Suppliers's team comprising qualified and experienced engineers together with adequate skilled, semi-skilled and unskilled workmen in the site for carrying out the works. The Supplier/Suppliers shall ensure adequate workforce to keep the required pace at all times as per the schedule of completion. Supplier/Suppliers shall also ensure availability of competent engineers during commissioning/start up, trial runs, Operation of the plant/equipment till handing over of the plant.

4.3 The Supplier/Suppliers shall furnish the details of qualifications and experience of their senior supervisors and engineers assigned to the work site, including their experience in supervising erection and commissioning of plant and equipment of comparable capacity.

4.4 When the Supplier/Suppliers or Supplier/Suppliers 's representative is not present on any part of the work where it may be desired to give directions in the event of emergencies, orders may be given by the Purchaser and shall be received and observed by the supervisors or foremen who may have charge of the particular part of the work in reference to which orders are given. Any such instructions, directions or notices given by the Purchaser shall be deemed given to the Supplier/Suppliers.

4.5 The Supplier/Suppliers shall furnish to the Purchaser a fortnightly labour force report showing by classifications the number of employees engaged in the work. The Supplier/Suppliers 's employment records shall include any reasonable information as may be required by the Purchaser. The Supplier/Suppliers should also display necessary information as may be required by statutory regulations.

4.6 None of the Supplier/Suppliers 's supervisors, engineers, or laborers may be withdrawn from the work without notice to the Purchaser and further no such withdrawals shall be made if in the opinion of the Purchaser, it will adversely affect the required pace of progress and/or the successful completion of the work.

4.7 **The Purchaser shall be at liberty to object to any representative or person, skilled, semi-skilled or unskilled worker employed by the Supplier/Suppliers in the execution of or otherwise about the works who shall, in the opinion of the Purchaser, misconduct himself or be incompetent, or negligent or unsuitable, and the Supplier/Suppliers shall remove the person so objected to, upon receipt of notice in writing from the Purchaser and shall provide in that place a competent representative at Supplier/Suppliers 's own expense within a reasonable time.**

4.8 In the execution of the works no persons other than the Supplier/Suppliers, sub-Supplier/Suppliers and their employees shall be allowed on the site except by the written permission of the Purchaser.

5. Purchaser's Instructions

5.1 The Purchaser may, in his absolute discretion, issue from time to time drawings and/ or instructions, directions and clarifications, which are collectively referred to as Purchaser's instructions in regard to:

- Any additional drawing and clarifications to exhibit or illustrate details.
- Variations or modifications of the design, quality or quantity of work or the additions or omissions or substitution of any work.

- Any discrepancy in the drawings or between the schedule of quantities and/or specifications.
- Removal from the site of any material brought there by the Supplier/Suppliers, which are unacceptable to the Purchaser and the substitution of any other material thereof.
- Removal and/or re-execution of any work erected by the Supplier/Suppliers, which are unacceptable to the Purchaser.
- Dismissal from the work of any persons employed there upon who shall in the opinion of the Purchaser, misconduct him, or be incompetent or negligent.
- Opening up for inspection of any work covered up.
- Amending and making good of any defects.

6. Right Of The Purchaser

1.1 6.1 Right to direct works

- The Purchaser shall have the right to direct the manner in which all works under this contract shall be conducted, in so far as it may be necessary to secure the safe and proper progress and specified quality of the works. All work shall be done and all materials shall be furnished to the satisfaction and approval of the Purchaser.
- Whenever in the opinion of the Purchaser, the Supplier/Suppliers has made marked departures from the schedule of completion or when circumstances or requirement force such a departure from the said schedule, the Purchaser, in order to ensure compliance with the schedule, shall direct the order, pace and method of conducting the work, which shall be adhered to by the Supplier/Suppliers.
- If in the judgment of the Purchaser, it becomes necessary at any time to accelerate the overall pace of the plant erection work, the Supplier/Suppliers, when directed by Purchaser, shall cease work at any particular point and transfer Supplier/Suppliers 's men to such other point or points and execute such works, as may be directed by the Purchaser and at the discretion of the Purchaser.

1.2 6.2 Right to order modifications of methods and equipment

- If at any time the Supplier/Suppliers 's methods, materials or equipment appear to the Purchaser to be unsafe, inefficient or inadequate for securing the safety of workmen or the public, the quality of work or the rate of progress required, the Purchaser may direct the Supplier/Suppliers to ensure safety, and increase their efficiency and adequacy and the Supplier/Suppliers shall promptly comply with such directives. If at any time the Supplier/Suppliers 's working force and equipment are inadequate in the opinion of the Purchaser, for securing the necessary progress as stipulated, the Supplier/Suppliers shall if so directed, increase the working force and equipment to such an extent as to give reasonable assurance of compliance with the schedule of completion. The absence of such demands from the Purchaser shall not relieve the Supplier/Suppliers of Supplier/Suppliers 's obligations to secure the quality, the safe conducting of the work and the rate of progress required by the contract. The Supplier/Suppliers alone shall be and remain liable and responsible for the safety, efficiency and adequacy of Supplier/Suppliers 's methods, materials, working force and equipment, irrespective of whether or not the Supplier/Suppliers makes any changes as a result of any order or orders received from the Purchaser.

1.3 6.3 Right to inspect the work

- The Purchaser's representative shall be given full assistance in the form of the necessary tools, instruments, equipment and qualified operators to facilitate inspection.

- The Purchaser reserves the right to call for the original test certificates for all the materials used in the erection work. Vendor shall inform \ invite the purchaser for all stage wise inspection of all equipments as deemed necessary and provide all necessary documents such as QA/QC reports, testing certificates, material certificates, etc all for records.
- In the event the Purchaser's inspection reveals poor quality of work/materials, the Purchaser shall be at liberty to specify additional inspection procedures if required, to ascertain Supplier/Suppliers 's compliance with the specifications of erection work.
- Even though inspection is carried out by the Purchaser or Purchaser's representatives, such inspection shall not, however, relieve the Supplier/Suppliers of any or all responsibilities as per the contract, nor prejudice any claim, right or privilege which the Purchaser may have because of the use of defective or unsatisfactory materials or bad workmanship.

7. Supplier/Suppliers 's Functions

7.1 The Supplier/Suppliers shall provide everything necessary for proper execution of the works, according to the drawings, schedule of quantities and specifications taken together whether the same may or may not be particularly shown or described therein, provided that the same can reasonably be inferred there from and if the Supplier/Suppliers finds any discrepancy therein, Supplier/Suppliers shall immediately refer the same to the Purchaser whose decision shall be final and binding on the Supplier/Suppliers.

7.2 The Supplier/Suppliers shall proceed with the work to be performed under this contract in the best and workman like manner by engaging qualified and efficient workers and finish the work in strict conformance with the drawings and specifications and any changes/modifications thereof made by the Purchaser.

8. Variations

8.1 The Purchaser shall make any variation of the form, quality or quantity of the Works or any part thereof that may, in his opinion, be necessary and for that purpose, or if for any other reason it shall, in his opinion be desirable, he shall have power to order the Supplier/Suppliers to do and the Supplier/Suppliers shall do any of the following:

- Increase or decrease the quantity of any work included in the contract,
- Omit any such work,
- Change the character or quality or kind of any such work,
- Change the levels, lines, position and dimensions of any part of the works
- Execute additional work of any kind necessary for the completion of the works and no such variation shall in any way vitiate or invalidate the contract, but the value, if any, of all such variations shall be taken into account in ascertaining the amount of the Contract price.

8.2 The Supplier/Suppliers shall make no such variations without an order in writing of the Purchaser. Provided that no order in writing shall be required for increase or decrease in the quantity of any work where such increase or decrease is not the result of an order given under this clause, but is the result of the quantities exceeding or being less than those stated in the Contract/Bill of Quantities. Provided also that if for any reason the Purchaser shall consider it desirable to give any such order verbally, the Supplier/Suppliers shall comply with such order and any confirmation in writing of such verbal order given by the Purchaser, whether before or after the carrying out of the order, shall be deemed to be an order in writing within the meaning of this clause.

Provided further that if the Supplier/Suppliers shall within seven days confirm in writing to the Purchaser and the Purchaser shall not contradict such confirmation in writing within 14 days, it shall be deemed to be an order in writing by the Purchaser.

8.3 All extra or additional work done or work omitted by order of the Purchaser shall be valued at the rates and prices set out in the contract if in the opinion of the Purchaser, the same shall be applicable. If the contract does not contain any rates or prices applicable to the extra or additional work, then suitable rates or prices shall be agreed upon between the Purchaser and the Supplier/Suppliers. Any Extra Work, carried out by the Supplier/Suppliers which is not part of this TENDER would be at mutually agreed cost (Landed cost + 15% service charge).

8.4 Provided that if the nature or amount of any omission or addition relative to the nature or amount of the whole of the works or to any part thereof shall be such that, in the opinion of the Purchaser, the rate or price contained in the contract for any item of the works is, by reason of such omission or addition, rendered unreasonable or inapplicable, then a suitable rate or price shall be agreed upon between the Purchaser and the Supplier/Suppliers. In the event of disagreement the Purchaser shall fix such other rate or price as shall, in his opinion, be reasonable and proper having regard to the circumstances.

8.5 Provided also that no increase or decrease mentioned above or variation of rate or price shall be made unless, as soon after the date of the order as is practicable and, in the case of extra or additional work, before the commencement of the work or as soon thereafter as is practicable, notice shall have been given in writing:

- By the Supplier/Suppliers to the Purchaser of his intention to claim extra payment or a varied rate or price, or
- By the Purchaser to the Supplier/Suppliers of his intention to vary a rate or price

8.6 If, on certified completion of the whole of the works, it shall be found that a reduction or increase greater than 15 per cent of the sum named in the Letter of Acceptance results from the aggregate effect of all Variation Orders but not from any other cause, the amount of the contract price shall be adjusted by such sum as may be greed between the Supplier/Suppliers and the Purchaser or, failing agreement, fixed by the Purchaser having regard to all material and relevant factors, including the Supplier/Suppliers 's site and general overhead costs of the contract.

8.7 The Supplier/Suppliers shall send to the Purchaser's representative once in every month an account giving particulars, as full and detailed as possible, of all claims for any additional payment to which the Supplier/Suppliers may consider himself entitled and of all extra or additional work ordered by the Purchaser which he has executed during the preceding month.

8.8 No final or interim claim for payment for any such work or expense will be considered which has not been included in such particulars. Provided always that the Purchaser shall be entitled to authorize payment to be made for any such work or expense, notwithstanding the Supplier/Suppliers 's failure to comply with this condition, if the Supplier/Suppliers has, at the earliest practicable opportunity, notified the Purchaser in writing that he intends to make a claim for such work.

8.9 The work shall be carried out as approved by the Purchaser or his authorized representative/s from time to time, keeping in view the overall schedule of completion of the project. The Supplier/Suppliers 's job schedule must not disturb or interfere with Purchaser's or the other Supplier/Suppliers 's schedules of day-to-day work. The Purchaser will provide all reasonable assistance for carrying out the jobs. The Supplier / Suppliers shall carry their own tools and tackles for equipment installation, all the tools and tackles should be industrial type and well maintained should be certified by purchaser's team before taking in to site. Lifting appliances, gears, cranes, hoists, winches, buckets, derricks, wire ropes & other slings, tools, tackles, gondola etc - Tests & Examination by Competent Person and required proper records / documents. All the tests need to done as per latest Building and other construction / erection act applicable.

8.10 Night work will be permitted only with prior approval of the Purchaser. The Purchaser may also direct the Supplier/Suppliers to operate extra shifts over and above normal day shift to ensure completion of contract as per schedule. Adequate lighting wherever required should be provided by the Supplier/Suppliers at no extra cost. The Supplier/Suppliers should employ qualified electricians and wire-men for these facilities. In case of Supplier/Suppliers 's failure to provide these facilities and personnel, the Purchaser has the right to arrange such facilities and personnel and to charge the cost thereof to the Supplier/Suppliers.

8.11 In order to enable the Purchaser to arrange for insurance of all items received at the site including the items of supply covered under this contract, the Supplier/Suppliers shall furnish necessary details of all the equipment immediately on its receipt at site, to the Purchaser. Any default on the part of the Supplier/Suppliers due to which any item does not get covered under the insurance of the Purchaser; the cost of such equipment shall be charged to the Supplier/Suppliers.

8.12 The Purchaser shall not be liable for or in respect of any damages or compensation payable at law in respect or in consequence of any accident or injury to any workman or other person in the employment of the Supplier/Suppliers or any sub-Supplier/Suppliers, save and except an accident or injury resulting from any act or default of the Purchaser, his agents, or servants. The Supplier/Suppliers shall indemnify and keep indemnified the Purchaser against all such damages and compensation, save and except as aforesaid and against all claims, proceedings, costs, charges and expenses whatsoever in respect thereof or in relation thereto.

Purchaser shall be liable for and shall indemnify Supplier/Suppliers against all losses, expenses or claims in respect of loss of or damage to any physical property or of death or personal injury whenever occurring, to the extent caused by any negligence or breach of statutory duty of purchaser or its employees, contractors or agents.

8.13 The Supplier/Suppliers shall ensure against such liability with an insurer approved by the Purchaser, which approval shall not be unreasonably withheld, and shall continue such insurance during the whole of the time that any persons are employed by him on the works shall, when required, produce to the Purchaser or Purchaser's representative such policy of insurance and the receipt for payment of the current premium. Provided always that, in respect of any persons employed by any sub-Supplier/Suppliers, the Supplier/Suppliers 's obligations to ensure as aforesaid under

this sub-clause shall be satisfied if the sub-Supplier/Suppliers shall have insured against the liability in respect of such persons in such manner that the Purchaser is indemnified under the policy, but the Supplier/Suppliers shall require such sub-Supplier/Suppliers to produce to the Purchaser or Purchaser's representative, when required such policy of insurance and the receipt for the payment of the current premium.

8.14 Whenever proper execution of the work under the contract depends on the jobs carried out by some other Supplier/Suppliers, the Supplier/Suppliers should inspect all such erection and installation jobs and report to the Purchaser regarding any defects or discrepancies. The Supplier/Suppliers 's failure to do so shall constitute as acceptance of the other Supplier/Suppliers 's installation/jobs as fit and proper for reception of Supplier/Suppliers 's works except those defects which may develop after execution. Supplier/Suppliers should also report any discrepancy between the executed work and the drawings. The Supplier/Suppliers shall extend all necessary help/cooperation to other Supplier/Suppliers working at the site in the interest of the work.

8.15 Supplier/Suppliers shall carryout final adjustments of foundations, levelling and dressing of foundation surfaces, bedding and grouting of anchor bolts, bed plates etc. required for seating of equipment in proper position. The Supplier/Suppliers shall be responsible for the reference lines and proper alignment of the equipment. However, all civil works like making cut-outs in walls, floors and ceilings for pipelines shall be done by the purchaser. Adjustment & levelling are to be carried out by the Supplier/Suppliers at no extra cost. The Purchaser shall arrange the necessary refilling/repairs of these cut-outs and pockets. The Supplier/Suppliers should arrange for laying the supports, cut-outs, grouting of bolts, etc. When the civil works are in progress, so as to avoid refilling/repair works. The Purchaser at Supplier/Suppliers 's costs shall make the damages occurring to civil and other works good. For fixing of piping/equipment supports on wall/beams/roof floor etc., preferably anchor bolts shall be used by the Supplier/Suppliers. Drilling of holes for fixing anchor bolts & supply of anchor bolts is in the scope of Supplier/Suppliers without any extra cost.

8.16 The Supplier/Suppliers shall keep a check on deliveries of the equipment covered in the scope of erection work and shall advise the Purchaser well in advance regarding possible hold-up in Supplier/Suppliers 's work due to the likely delay in delivery of such equipment/components to enable him to take remedial actions.

9. Duties of the Supplier/Suppliers Vis-à-Vis the Purchaser

9.1 The equipment and the items, if any, to be supplied by the Purchaser for erection, testing and commissioning shall be as listed in the contract.

9.2 Besides the utilities/ services as specified in battery limits, Purchaser shall also provide the following assistance/ facilities to the Supplier/Suppliers for carrying out the installation work:

- Plant building ready for installation of equipment/items.
- Necessary temporary water for carrying out the installation shall be supplied at only one point within the project site by the Purchaser free of charge. All necessary

distribution tapings from this point onwards shall be the Supplier/Suppliers responsibility.

- Necessary temporary power for carrying out the installation shall be arranged by the Supplier/Suppliers at Supplier/Suppliers 's own cost. The Purchaser on written request by the Supplier/Suppliers will issue the necessary authorization letter.

9.4 The details of temporary water and power requirements shall be furnished one month in advance by the Supplier/Suppliers to enable the Purchaser to make timely arrangement.

9.5 If the Supplier/Suppliers suffers delay and/or incurs costs from failure on the part of the purchaser to give possession of the civil works in accordance with the mutually agreed schedule, the purchaser shall determine:

- Any extension of time to which the Supplier/Suppliers is entitled due to delay caused by Purchaser.
- Any extension of time to which the Supplier/Suppliers is entitled under **clause 20 of GCC** (General Conditions of Contract).

10. Supply Of Tools, Tackles And Materials

10.1 The Supplier/Suppliers shall, at his own expense, provide all the necessary equipment, tools and tackles, haulage power, consumables necessary for effective execution and completion of the works during erection and commissioning.

11. Protection Of Plant

11.1 The Purchaser shall not be responsible or held liable for any damage to person or property consequent upon the use, misuse or failure of any erection tools and equipment used by the Supplier/Suppliers or any of Supplier/Suppliers 's Sub-Supplier/Suppliers even though such tools and equipment may be furnished, rented or loaned to the Supplier/Suppliers or any of Supplier/Suppliers 's Sub-Supplier/Suppliers. The acceptance and/or use of any such tools and equipment by the Supplier/Suppliers or Supplier/Suppliers 's Sub-Supplier/Suppliers shall be construed to mean that the Supplier/Suppliers accepts all responsibility for and agrees to indemnify and save the Purchaser from any and all claims for said damages resulting from the said use, misuse or failure of such tools and equipments. All the material supplied by Supplier/ Suppliers need to take good care and secured until entire system handed over to purchaser. In case of any theft or damage of material, purchaser shall not be liable for any settlements of claims by supplier and supplier needs to replace such material to complete the said works.

11.2 The Supplier/Suppliers and Supplier/Suppliers 's Sub-Supplier/Suppliers shall be responsible, during the works, for protection of work, which has been completed by other Supplier/Suppliers. Necessary care must be taken to see that the Supplier/Suppliers 's men cause no damage to the same during the course of execution of the work.

11.3 All other works completed or in progress as well as machinery and equipment that are liable to be damaged by the Supplier/Suppliers 's work shall be protected by the Supplier/Suppliers and protection shall remain and be maintained until the Purchaser directs its removal.

11.4 The Supplier/Suppliers shall effectively protect from the effects of weather and from damages or defacement and shall cover appropriately, wherever required, all the works for their complete protection.

11.5 The Supplier/Suppliers shall carry out the work without damage to any work and property adjacent to the area of Supplier/Suppliers 's work to whomsoever it may belong and without interference with the operation of existing machines or equipment.

11.6 Adequate lighting, guarding and watching at and near all the storage handling, fabrication, pre-assembly and erection sites for properly carrying out the work and for safety and security shall be provided by the Supplier/Suppliers at Supplier/Suppliers 's cost. The Supplier/Suppliers should adequately light the work area during night time also. The Supplier/Suppliers should balso engage adequate electricians/wiremen, helper etc to carry out and maintain these lighting facilities. If the Supplier/Suppliers fails in this regard, the Purchaser may provide lighting facilities as he may deem necessary and charge the cost thereof to the Supplier/Suppliers.

11.7 The Supplier/Suppliers shall take full responsibility for the care of the works or any section or portions thereof until the date stated in the taking over certificate issued in respect thereof and in case any damage or loss shall happen to any portion of the works not taken over as aforesaid, from any cause whatsoever, the same shall be made good by and at the sole cost of the Supplier/Suppliers and to the satisfaction of the Purchaser. The Supplier/Suppliers shall also be liable for any loss of or damage to the works occasioned by the Supplier/Suppliers or the Supplier/Suppliers 's Sub-Supplier/Suppliers in the course of any operations carried out by the Supplier/Suppliers or by the Supplier/Suppliers 's Sub-Supplier/Suppliers for the purpose of completing any outstanding work or complying with the Supplier/Suppliers 's obligations.

12. Unloading, Transportation And Inspection

12.1 The Supplier/Suppliers shall be required to unload all the materials/equipment from the carriers, those received at site after Supplier/Suppliers's team arrives at site. Supplier/Suppliers shall not be paid extra payment for unloading of the equipment. No extra payment shall be done for piping done by Supplier/Suppliers for the equipment being supplied by the Supplier/Suppliers for provided by purchaser. The Supplier/Suppliers shall plan in advance, based on the information received from the Purchaser, Supplier/Suppliers's requirement of various tools, tackles, jacks, cranes, sleepers etc. required to unload the material/equipment promptly and efficiently. The Supplier/Suppliers shall ensure that adequate and all measures necessary to avoid any damage whatsoever to the equipment at the time of unloading are taken.

12.2 Any demurrage/detention charges incurred due to the delay in unloading the material/equipment and releasing the carriers shall be charged to the Supplier/Suppliers's account.

12.3 The Supplier/Suppliers shall be responsible for the reception on site of all plant and Supplier/Suppliers's equipment delivered for the purposes of the contract.

12.4 The Supplier/Suppliers shall safely transport/shift the unloaded materials/equipment by the Supplier/Suppliers to the storage area.

12.5 All the materials/equipment received by the Purchaser prior to arrival of the Supplier/Suppliers at site shall be handed over to the Supplier/Suppliers and there upon the Supplier/Suppliers shall inspect the same and furnish the receipt to the Purchaser. The manner in which the inspection shall be carried out is enumerated below:

12.6 The materials/equipment would be carefully unpacked by opening the wooden cases/other modes of pickings as the case may be.

12.7 Detailed inventory of various items would be prepared clearly listing out the shortages, breakage/damages after checking the contents with respect to the Supplier/Suppliers's packing list, the Purchaser's purchase order and approved equipment drawings. The Supplier/Suppliers shall also check each & every equipment for any shortage/shortcoming that may eventually create difficulty at the time of installation or commissioning.

12.8 All the information and observations by the Supplier/Suppliers shall be furnished in the form of 'INSPECTION REPORT' to the Purchaser with specific mention/suggestions which in the opinion of the Supplier/Suppliers should be given due consideration and immediate necessary actions, to enable the Purchaser to arrange repair or replacement well in time and avoid delays due to non-availability of equipment and parts at the time of their actual need.

12.9 The inspection for all the equipment handed over to the Supplier/Suppliers shall be completed within three week's period.

12.10 The protection, safety and security of the materials so taken over from the Purchaser shall be the responsibility of the Supplier/Suppliers, until they are handed over to the Purchaser after erection, commissioning and testing as per the terms of the Contract.

13. Storage Of Equipment

13.1 The Supplier/Suppliers shall be responsible for the proper storage and maintenance of all materials/equipment under Supplier/Suppliers's custody. However purchaser to provide with covered lockable area which can be used by Supplier/Suppliers as storage area for small costly items. Supplier/Suppliers shall take all required steps to carry out frequent inspection of equipment/materials stored as well as erected equipment until the same are taken over by the Purchaser. The following procedure shall apply for the same. Purchaser shall be able to provide lockable area in the main constructed building itself post 5th month of the mechanical order date. However any delay in providing lockable store by purchaser shall not be liable for any extra payment or extension of time of the contract to be given to the supplier. The store provided is for supplier costly and smaller material only. Supplier shall arrange for its office on its own.

13.2 The Supplier/Suppliers's inspector shall ,check stored and installed equipment/materials to observe signs of corrosion, damage to protective coating to parts, open ends in pipes, vessels and equipment, insulation resistance of electrical equipment etc. The Supplier/Suppliers shall immediately arrange a coat of protective

painting whenever required. A record of all observations made on equipment, defects noticed shall be promptly communicated to the Purchaser and Purchaser's advice taken regarding the repairs/rectification. The Supplier/Suppliers shall there upon carry out such repairs/ rectification at Supplier/Suppliers's own cost. In case the Supplier/Suppliers is not competent to carry out such repairs/ rectification, the Purchaser reserves the right to get this done by other competent agencies at the Supplier/Suppliers's responsibility and risk and the entire cost for the same shall be recovered from the Supplier/Suppliers's bills.

13.3 The Supplier/Suppliers's inspector shall also inspect and provide lubrication to the assembled equipment. The shafts of such equipment shall be periodically rotated to prevent rusting as well as to check freeness of the same.

13.4 The Inspector shall check for any signs of moisture or rusting in any equipment.

13.5 If the commissioning of equipment is delayed after installation of the equipment, the Supplier/Suppliers shall carry out all protective measures suggested by the Purchaser during such period.

13.6 Adequate security measures shall be taken by the Supplier/Suppliers to prevent theft and loss of materials handed over to the Supplier/Suppliers by the Purchaser. The Supplier/Suppliers shall carry out periodical inventory checks of the materials received, stored and installed by the Supplier/Suppliers and any loss noticed shall be immediately reported to the Purchaser. The Supplier/Suppliers shall maintain a proper record of these inventories. The Supplier/Suppliers should not sell, assign, mortgage, hypothecate or remove equipment or materials which has been installed or which may be necessary for completion of the work without the written consent of the Purchaser.

13.7 Suitable grease recommended for protection of surfaces against rusting (refined from petroleum oil with lanolin minimum (70 ^{0}C) and water in traces) shall be applied over all equipment as required once in every six months.

13.8 All equipment shall be stored inside a closed shed or in the open depending upon whether they are of indoor or outdoor design. The space heaters where provided into the electrical equipment shall be kept connected with power supply irrespective of their type of storage. Where space heaters are not provided adequate heating with bulb is recommended. For transformers heating of oil shall be done by giving 440 V supply and short-circuiting the LT terminals. Frequent checks on insulation resistance are essential for all electrical equipment and record of the inspection reports and mugger readings shall be maintained equipment wise. Such records shall be presented to the Purchaser whenever demanded.

13.9 All the necessary items/goods required for the Supplier/Suppliers as described above shall arrange protection and such cost shall be included in the Contract price.

14. Approvals

14.1 The Supplier/Suppliers shall obtain the necessary approvals of the Boiler Inspector, Electrical Inspector, Weights & Measures Inspector, Explosive Inspector and any other state and local authorities as may be required and the cost of obtaining such approvals shall be included in the contract price.

14.2 The Supplier/Suppliers will furnish all the necessary details, drawings, and submission of application and proofreads to the Purchaser for verification/ signature. The Supplier/Suppliers on behalf of the Purchaser shall submit the necessary application duly filled-in, together with the prescribed fees to the appropriate authorities. However all the actual statutory prescribed fees paid by the Supplier/Suppliers shall be reimbursed by the Purchaser upon production of the receipt/vouchers.

14.3 The supplier shall arrange for approval from concerned statutory authority on behalf of the Client and the statutory fees shall be reimbursed by the Client at actuals on production of receipts.

14.4 Supplier/Suppliers shall provide all necessary documents/details to the Purchaser for obtaining the necessary approval of Factory Inspector and related area.

15. Review & Co-Ordination of Erection Work

15.1 The Supplier/Suppliers shall depute **senior and competent personnel** to attend the site co-ordination meetings that would generally be held at **the site every month or at such frequency as the purchaser may decide from time to time**. The Supplier/Suppliers shall take necessary action to implement the decisions arrived at such meetings and shall also update the erection schedule.

16. Extension of Time for Completion

Should the amount of **extra** or **additional work** of any kind or any cause of delay referred to in these conditions, or exceptional adverse climatic conditions, or other special circumstances of any kind whatsoever which may occur, other than through a default of the Supplier/Suppliers, be such as fairly to entitle the Supplier/Suppliers to an extension of time for the completion of the works, the Purchaser shall determine the amount of such extension and shall notify the Supplier/Suppliers accordingly. Provided that the Purchaser is not bound to take into account any extra or additional work or other special circumstances unless the Supplier/Suppliers has within **twenty eight days** after such work has been commenced, or such circumstances have arisen, or as soon thereafter as is practicable, submitted to the Purchaser full and detailed particulars of any **extension of time** to which he may consider himself entitled in order that such submission may be investigated at the time.

Table 1
List of Drawings required Submission but not limited too

SN	Drawings
1	GA drawings for All equipment / items to be supplied.
2	Plant Detail Layout Drawings.
3	Detail P&IDs.
4	Histograms for each utility along with the timing/Process Schedule diagram.
5	General Piping layout drawing for the new piping being done in 3D and 2D format. 3D should include the entire plant detailing. 3D shall be fully Intelligent and shall be provided in Aveva PDMS/E3D format only. Also 3D shall be checked and approved by consultant / client.
6	Electrical cable, conduit/ cable tray layout, Single line Diagrams
7	Automation Architecture, including Philosophy of Control and written Automation logic of plant.
8	Instrumentation cable, Single line Diagrams, Local panels, instrument locations, Instrumentation routes, etc to be provided

Section I – Part II
Special Conditions of Contract
for
Mechanical Works

Contents

1 Scope

General installation i.e. positioning and installing all the production, miscellaneous and service equipment as per approved layout drawings and as per the contract.

1.1 Supply and installation of structural platforms and tables.

1.2 Supply and installation of all service and product piping including ancillary items.

1.3 Insulation and cladding of piping, equipment including supply of materials.

1.4 Interconnections of services and Electrical with equipment.

1.5 Guide line for expansion work.

1.6 Clean up of work site.

1.7 Supply of all cleaning chemicals and lubricants.

1.8 Testing, commissioning and start-up.

1.9 Painting including supply of paints as approved by the Purchaser.

1.10 Training of personnel.

1.11 Detailed specifications are given in the subsequent clauses.

2. General Installation

2.1 Positioning of Equipment

- The work involves preparation of access for moving of the plant and equipment including their fittings from the work site godown or from the place within the site where they have been unloaded, to the place of erection, de-crating and placing on the foundation wherever required. The Purchaser shall arrange all the civil foundations as per the manufacturer/Supplier/Suppliers's drawings. The Supplier/Suppliers shall place the equipment and carry out final adjustment of the foundations including alignment and dressing of foundation surface, embedding and grouting of anchor bolts and bedplates. The Supplier/Suppliers shall be responsible for obtaining correct reference lines for the purpose of fixing the alignment of various equipments from master benchmarks provided. Tolerances shall be as specified in equipment manufacturer's drawings or as stipulated by the Purchaser's Engineer. No equipment shall be permanently bolted down to foundations or structure until the Supplier/Suppliers has checked the alignment and witnessed by the Purchaser. The Supplier/Suppliers shall carry out minor alterations in the anchor bolts, pockets etc., at no extra cost and set the equipment properly as per approved layout, drawings and manufacturer's instructions. The Supplier/Suppliers shall supply all the necessary foundation/anchor bolts and bedplates if required without extra cost if these have not been provided with main equipment.

- The Supplier/Suppliers shall supply, fix and maintain, at his own cost, during the erection work, all the necessary cantering, scaffolding, staging required not only for proper execution and protection of the said work but also for protection of the

surrounding plant and equipment. The Supplier/Suppliers shall take out and remove any or all such cantering, scaffolding, staging planking etc., as occasion shall require or when ordered to do so and shall fully reinstate and make good all things disturbed during execution of the work, to the satisfaction of the Purchaser. The Supplier/Suppliers shall be paid no additional amount for the above.

2.2 Structural Platforms and Tables

- **Structural platforms shall be required to provide access for various equipment. Tables shall be required for handling products. These platforms and tables shall be fabricated keeping stability and other functional as well as aesthetic requirements into consideration as approved by the Purchaser.**

3. Service Piping Installation

3.1 General Guidelines

- All piping systems shall comply with the **latest editions of standards as applicable.**

3.2 Scope of Supply

- The Supplier/Suppliers shall supply all piping materials like pipes, fittings, flanges, measuring instruments and all other items as shown in the P&I diagram/specifications and schedule of quantities. All the pipes & fittings and insulation material etc. should be of class and make as approved by the Purchaser. The Supplier/Suppliers, for the class and make of all materials, must obtain prior approval of the Purchaser. The Supplier/Suppliers should furnish the details of makes selected by him, in comparison to the makes provided in the list in TENDER.

3.3 Scope of Piping Erection

- The scope of erection for piping, includes all system covered in the flow diagrams and specifications. The Supplier/Suppliers's work commences/ terminates at the pipe connections with valves or flanges as specified in flow diagrams/ battery limits.
- The Supplier/Suppliers shall also install necessary piping and any specialties furnished with or for equipment such as relief valves, built-in-bypass, primary elements for flow measurements, control valves and on-line metering equipment.
- The Supplier/Suppliers shall perform necessary internal machining of pipes for installing orifices, flow nozzles, control valves etc. The Supplier/Suppliers shall install all pipes, valves and specialties being procured from other sources.

3.4 Testing of Piping

- The Supplier/Suppliers shall test sample piping systems including valves and specialties and instruments as required.
- All piping shall be **internally cleaned and flushed** by the Supplier/Suppliers after erection in a manner suited to the service.
- For **hydrostatic testing and water flushing**, the Supplier/Suppliers shall furnish necessary pumps, equipment, instruments and piping etc, if required.

3.5 Other Guidelines

- **Colour code** shall be used to identify pipe material. The Supplier/Suppliers shall be able to identify on request all random piping prior to field fabrication.
- The Supplier/Suppliers shall be responsible for the **quality of welding** done by them and shall conduct tests to determine the suitability of the welding procedure by him.
- All piping supports, guides, anchors, hangers, rollers with structural framework shall be supplied and erected by the Supplier/Suppliers. The kinds of pipe supports like CI clamps, wooden saddles, roller supports and support framework shall be as per the design approved by the Purchaser prior to taking up the work.
- All piping shall be suspended, guided and anchored with due regard to general requirements and to avoid interference with other pipes, hangers, electrical conduits and their supports, structural members and equipment and to accommodate insulation and conform to buildings structural limitations. It is the responsibility to the piping Supplier/Suppliers to avoid all interference while locating hangers and supports.
- Anchors and/or guides for pipelines or for other purposes shall be furnished, when specified, for holding the pipeline in position for alignment. Hangers shall be designed fabricated and assembled in such a manner that any movement of the support pipes cannot disengage them.
- All piping shall be **wire brushed** and **purged** with **air blast** to remove all rust, mill scale from inner surface. The method of cleaning shall be such that no material is left on the inner or on outer surfaces, which will affect the serviceability of the pipes.
- Effective precautions such as capping and sealing shall be taken to protect all pipe ends against ingress of dirt and damage during transit or storage. The outside of the steel pipes (black) shall be painted with two coats of **red oxide paint** or as directed by the Purchaser.

4. Special Instructions and Specifications

4.1 Steam Piping

- Steam piping work can be classified into **two categories**:
  - **High-pressure** steam piping when the working pressure of steam is **more** than **3.5 kg/cm²**.
  - **Low-pressure** steam piping when the working pressure of steam is **up to 3.5 kg/cm²**.
- All the pipes and fittings used for high pressure steam piping work should conform to **IBR** and they should be IBR certified and also to be **identified with number and mark** showing that they are tested by the Boiler Inspector and supported with duly **authentic certificates** to this effect. ALL HIGH PRESSURE STEAM PIPES SHALL BE **SEAMLESS** TYPE, with required **SCHEDULE of pipe.**

- The high-pressure steam piping work should also include fabrication and installation of **pressure reducing stations** strictly conforming to **IBR**.
- For low pressure, prevailing laws as per IBR/ISO shall be followed.

4.2 Other Piping

- ALL THE PIPING FOR CHILLED WATER,/GLYCOL,/AMMONIA, RO,SOFT AND RAW WATER, H.P. AND L.P. STEAM, AIR AND LSHS PIPING SHALL GENERALLY BE OF **WELDED CONSTRUCTION**. Whenever welding is done for pipes of smaller size special care should be exercised to avoid clogging of flow area with the welding material.

5. Insulation of Piping and Equipment

5.1 Cold Insulation of Chilled Water/Glycol /Ammonia Pipeline

- All the chilled water, glycol & ammonia pipelines shall be insulated by **PUF** pipe sections. The insulation shall be carried out in the **following manner**:
- Before starting insulation work all pipelines shall be **tested** as specified.
- The surface of the pipes to be insulated should be properly **cleaned**.
- **Hot bitumen** of **85/40** or **85/25** conforming to **IS 702** should be applied uniformly **@ 1.5 kg/m²** on the surface of the pipes.
- A similar layer of **bitumen** should be applied on the **inner surface** and on the **edges** of the **insulation sections**.
- The sections should then be stuck to the coated pipes with **joints staggered**. Adjacent sections should be tightly pressed together. All **joints** should be properly **sealed** with bitumen.
- A thick **vapour seal** with **hot bitumen @ 2.5 kg/m²** should be applied uniformly on the outer surfaces of the pipe sections and allowed to dry.
- The **thickness** of insulation shall be as required.
- Alternatively Armaflex insulation materials can be used for cold insulation of piping and equipment. Armaflex insulation materials shall have silver colour outer film so as to protect the Armaflex and to give the metal-look surface.
- The outer silver colour metal-look surface shall effectively protect the insulation material against mechanical impact. It shall be able to recover from blows, and shall leave no dents in the surface. Shall be suitable for both indoor and outdoor applications. Shall be UV and weather proof. Shall have high Puncture and tear resistance
- For all drop down lines and valves in the plant – T-fit special insulation shall be used. Details of the specifications shall be approved during the detail engineering stage.

5.2 Insulation of Chilled Water Tank

- The surfaces shall be **cleaned** with the help of brushes to remove any loose particles.

- A coat of **bitumen** of **85/40** or **85/25** conforming to **IS 702@1.0 kg/m²** shall be applied over the **flooring** and **walkathon sheets** shall be press-laid to act as a **vapour barrier.**
- Bitumen shall then be applied on the walkathon sheets and one side and edges of the insulation slabs to ensure total rate of **2.00 kg/m²** between contacting surfaces. The slabs shall then be fixed in position, making sure that there shall be **no joints between slabs.**
- For **double layers** insulation bitumen shall again be applied on all contacting surfaces to ensure a total rate of **1.5 kg/m²** between contacting surfaces.
- A coat of bitumen at **1.5 kg/m²** shall be applied over the insulation surfaces.
- Alternatively Armaflex insulation of suitable color is also acceptable provided it is dully cladded with aluminum sheets. Armaflex insulation thickness guarantee to be provided from supplier.

5.3 Hot Insulation of Steam, Condensate & Hot Water Pipe Lines

- All the steam and hot water pipelines shall be insulated with **mineral wool** or equivalent of specified thickness. The insulation shall be carried out in the **following manner** and should be supplied in the form of properly required sizes.
- **Clean** the surfaces to be insulated. Apply **a coatof red oxide primer** and fix glass wool/mineral wool of specified thickness, tightly to the pipes, **butting all joints** and **tie with lacing wire.**
- It should then be covered with GI wire netting of 20 mm x 24 SWG.
- In case the insulation does not have the desired insulation properties, the entire insulation will have to be **redone** at the **Supplier/Suppliers's cost** to give the desired results.
- In case of **condensate return piping** all the steps mentioned above shall be executed except that **thickness** of the insulation shall be minimum **25 mm.**

5.4 Aluminium Cladding / Armaflex Cladding

- The chilled water, glycol, ammonia, water, steam & hot water lines after insulations shall be **covered** by Aluminium/ Armaflex **cladding.**
- Aluminium cladding will be done with 22 gauge aluminium sheet with proper grooves and overlaps and screwed in position with 12 mm self-tapping parker screws.
- Armaflex insulation materials shall have silver colour outer film so as to protect the Armaflex and to give the metal-look surface. The outer silver colour metal-look surface shall effectively protect the insulation material against mechanical impact. It shall be able to recover from blows, and shall leave no dents in the surface. Shall be suitable for both indoor and outdoor applications. Shall be UV and weather proof. Shall have high Puncture and tear resistance. Shall have required thickness of cladding material.

6.0 Interconnections of Services

6.1 The Supplier/Suppliers shall lay service piping and provide connections with the equipment complying strictly with the equipment manufacturers' instructions. The Supplier/Suppliers shall also carry out all the interconnecting service piping with the various items of plant/system. The work shall be complete with **capillary piping** if required and **connections with instruments and controls** supplied with the equipment.

6.2 The Supplier/Suppliers shall also carry out **electrical connections** for equipment with the control panels including equipment lighting as per the wiring diagrams of the equipment Supplier/Supplierss. Connection shall be made for small electrically operated devices on equipment installed as accessories to, or assembled with equipment. Connections regarding instruments, float switches, limit switches, pressure switches, thermostats and other miscellaneous equipment shall be done as per manufacturers' drawings & instructions.

7.0 Guidelines For Expansion Work

7.1 Shutdowns

Plant shutdown shall be required for making tapings/ interconnections of the new equipment/ piping, to be installed under expansion, with the pending new equipment/piping in case of delay. These shut downs should be planned carefully well in advance to enable the Purchaser to take suitable actions for minimum shutdown period. The details of shut downs, the numbers and duration should be worked out and intimated to the Purchaser for approval. The Supplier/Suppliers should ensure completion of all the necessary works well within the allowed time so that no inconvenience is caused in regular operation and working of the existing plant.

7.2 Cleanliness

Wherever the Supplier/Suppliers is required to work in existing plant area he should take due care and extra precautions to ensure absolute cleanliness and minimum hindrance for proper working of the existing plant.

7.3 Change over

The programmers for change over from existing plant system to new plant system should be prepared by the Supplier/Suppliers and should be got approved by the Purchaser.

7.4 Modifications and rectification of existing plant and equipment and any other Extra Work not specified in the Original Contract.

During expansion work, the Supplier/Suppliers shall be required to carry out modifications, repairs/replacement of the existing equipment or any other extra work. The alterations/modifications not specified in the contract/order or any other Extra Work, will be carried out by the Supplier/Suppliers at mutually agreed cost (Landed cost + service charge).

7.5 Clean Up of Works Site

All soils, filth or other matters of an offensive nature taken out of any trench, drain or other places shall not be deposited on the surfaces, but shall at once be carted away by the Supplier/Suppliers from the site of work for proper disposal.

The Supplier/Suppliers shall not store or place the equipment, materials or erection tools on the drive ways and passages and shall take care that his work in no way restricts or impedes traffic or passage of men and materials during erection, the Supplier/Suppliers shall without any additional payment, at all time keep the working and storage area used by him free from accumulation of dust or combustible materials, waste materials rubbish packing, wooden planks to avoid fire hazards and hindrance to other works.

If the Supplier/Suppliers fails to comply with these requirements in spite of written instructions from the Purchaser, the Purchaser will proceed to clear these areas and the expenses incurred by the Purchaser in this regard shall be payable by the Supplier/Suppliers. Before completion of the work, the Supplier/Suppliers shall remove or dispose off in a satisfactory manner all scaffolding, temporary structures, waste and debris and leave the promises in a condition satisfactory to the Purchaser. Any packing materials received with the equipment shall remain as the property of the Purchaser and may be used by the Supplier/Suppliers on payment of standard charges to the Purchaser and with prior approval of the Purchaser. At the completion of his work and before final payment, the Supplier/Suppliers shall remove and shall restore the site to neat workman like conditions at his cost.

8.0 Cleaning Chemicals and Lubricants

8.1 The necessary quantities of cleaning chemicals, lubricants etc., required for the installation, commissioning, testing and start-up of all the equipment till handing over are to be supplied the Supplier/Suppliers and nothing extra would be paid for these.

MSDS & SOP need to share with Purchaser before using the chemicals & Lubricants. Makes details need to share with Purchaser before getting in to site

9.0 Testing, Commissioning and Start-up

9.1 The Supplier/Suppliers shall operate, maintain and give satisfactory trial run of the plant for the design product satisfactorily for a maximum period of one week or as mutually agreed by Supplier/Suppliers/purchaser/Purchaser of the plant at the rated output. The Supplier/Suppliers should carry out all rectification of damages/defects and routine troubleshooting during commissioning with the help of purchaser's staff.

9.2 During this period, Supplier/Suppliers shall incorporate/execute necessary minor modifications during the trial period for maximizing operational efficiency. The Supplier/Suppliers should also execute minor modifications as may be suggested by the manufacturer/Purchaser, if required. The Supplier/Suppliers shall suggest recommended log sheet proofread for recording necessary operating data and pass it on to the Purchaser in proof of satisfactory rated output and performance of the equipment/plant.

The Supplier / Suppliers need to full fill 100 % IQ,OQ,PQ before handing over the system to Purchaser

9.3 The **commissioning** shall also **include,** for all the equipments, the **following**:

- Field disassembly and assembly

- Clean out of lubrication system including chemical cleaning wherever required.
- Circulation of lubricant to check flow.
- Clean out and check out of all the service lines
- Check out and commissioning of instruments, equipment and plants, filtering of transformer and other oils so that if deteriorated, they shall attain the required properties/standards, specified tests in this regard must be carried out by approved authorities and their satisfactory reports submitted to the Purchaser before start-up.
- Recharging or make-up filling of lubricant oil up to the desired level in the lubrication system of individual machine.
- Operation in empty condition to check general operation details wherever required and wherever possible.
- Closed loop dynamic testing with water wherever required.
- Operation under load and gradual load increase to attain maximum rated output.

10.0 Trouble shooting during the trial period

10.1 The Supplier/Suppliers shall demonstrate proper working of all mechanical and electrical controls; safety and protective device, in presence of the Purchaser's engineer and the same should be duly recorded.

10.2 After conducting testing, in case a particular equipment is not working properly or not giving rated output the Supplier/Suppliers will furnish a detailed report to the Purchaser stating therein the detailed account on the performance of the equipment with possible reasons for improper or not working of the same.

10.3 The Purchaser after receipt of report from the Supplier/Suppliers would take up the matter with the manufacturers and if required would invite the representative of original manufacturers. In case the Purchaser considers that the non-performance of equipment is only due to inexperience of the Supplier/Suppliers, then the charges incurred for the manufacturer's representative visit would be debited to the Supplier/Suppliers's account.

10.4 Further, before the commencement of testing or commissioning, the Purchaser reserves the right to invite the **original manufacturer's representative** at the cost of the Supplier/Suppliers for start-up help, assist and guide the Supplier/Suppliers during commissioning in the following cases:

- The Supplier/Suppliers has **no previous experience** of commissioning and start-up of the similar equipment.
- The Purchaser is of the opinion that the **Supplier/Suppliers is not capable** to commission and start-up of certain specific equipment.

10.5 However, in either of the cases the manufacturer's representatives would be called with prior information to the Supplier/Suppliers and the Supplier/Suppliers will have to extend all co-operation to such representatives in good spirit and in the interest of the work.

10.6 After satisfactory commissioning and start-up the Supplier/Suppliers shall keep his representatives under whose **supervision** the **Purchaser's staff shall be operating and**

maintaining the plant and equipment for a **minimum period of one month**. The Supplier/Suppliers's representatives should be present at all times during the running and operation of plant and equipment. During this period the Supplier/Suppliers shall ensure proper working of complete plant and equipment and attend any works required to be done and shall also take complete responsibility for proper operation and maintenance of the complete plant and equipment.

11.0 Painting

11.1 All the equipment/ machineries like motors, pumps, HT/ LT panel, transformer, switch boards, starters, junction boxes, isolators, storage tanks, supporting structures, pipe supports and MS/ GI pipes and all exposed and visible iron parts included in the scope of erection/ commissioning shall be given **double coat of paint** of **approved shade** over a **double coat of anticorrosive primer** wherever necessary irrespective of the condition of original paint of equipment/ machineries/ structures/ supports. All surfaces wherever required must be properly **cleaned from scale, dirt and grease** prior to painting. **Spray painting** must preferably be used on all the equipment/ machineries and wherever practicable. Suitable and necessary **cleaning/ wiping** of sight/ dial glasses, other non-metallic parts, flooring, walls and other surfaces which have been spoiled by paint during painting must also be carried out by the Supplier/Suppliers.

11.2 **Lettering and other markings**, including capacity and flow direction markings, shall also be carried out by the Supplier/Suppliers on the tanks, pipe lines, starters, motors, isolators and wherever else necessary, as directed and as per the standard practice of installation. **ISI colour codes** and colour charts as mentioned in Table 3& Table 2must be adhered to.

11.3 Supply of all paints and all other materials required is included in the scope of supply of the Supplier/Suppliers under this contract/order.

12.0Training of Personnel

12.1 The Supplier/Suppliers for operating the plant as may be deputed by the Purchaser shall train necessary staff. The personnel will be associated for the training during the installation; testing, commissioning and start-up period and the training tenure shall be extended for a minimum period of one month from the date of commissioning and start-up.

13.0Code of Practice for Painting Service Pipe Lines

13.1 On Non-insulated Pipe Line & Insulated Pipeline without Aluminium Cladding

- 13.1.1 Ground colour to be applied throughout the length of the pipeline.
- 13.1.2 Colour bands to be applied near every valve and branch connection as well as in every room near the entry.
- 13.1.3 The 1st band should be 4" wide and the second band should be 1" wide.
- 13.1.4 On the 1st band a white arrow to be put to indicate the direction of flow.
- 13.1.5 The arrows should be put on the bottom of the pipelines so that the same are visible from below in case of horizontal bank of pipes and on sides in case of vertical bank of pipes.

- 13.1.6 The valves should be painted with the same colour as the ground colour of the pipeline.

13.2 On Insulated Pipeline with Aluminium Cladding

- 13.2.1 Ground colour to be applied in a length of 500 mm of the pipe all round near every valve and branch connections as well as in every room near the entry. The complete length of the pipeline should not be painted.
- 13.2.2 **Colour bands** should be applied in the **middle** of every ground colour strip. The **1st**
- **Colour** band should be **4"** wide and the **second** band should be **1"** wide.
- 13.2.3 On the **1st band** a **white arro** is to be put to indicate the **direction of flow** of the fluid.
- 13.2.4 The **arrows** should be put on the **bottom** of the pipelines, so that the same are visible from below in case of **horizontal** bank of pipes and on **sides** in case of **vertical** bank of pipes.
- 13.2.5 The valves should be painted with the same colour as the ground colour.
- 13.2.6 The ground colours and the colours of the 1st and 2nd colour bands have been indicated on the enclosed list for the pipelines carrying various types of fluids and gases. The list also indicates the shade nos. of the colours to be used. In case the exact shade is not available, the nearest possible shade in the same colour may be selected.
- 13.2.7 Only **synthetic enamel paint** should be used for the painting and band markings on the Pipelines and it should be ensured that the finish should be **glossy**.
- 13.2.8 Where no colour bands have been recommended, only the ground colour is to be applied as per the above procedure. If only one colour band is recommended the same should be 4" wide and applied on the ground colour. In case of 2 nos. colour bands, the 1st band should be 4" wide and second band 1" wide and should be applied on the ground colour.
- 13.2.9 To avoid mixing of colours, it is recommended to apply the bands only after the ground colour paint is dry and subsequently to apply the arrow only after the 1st band paint is dry.

Table 1
Painting of Equipment & Structural Work

SN	Item	Painting Shade
1	All Milk Storage Tanks if with outer MS	Pale Cream Shade no. 352 of ISI or approval from Consultant
2	All M.S. platforms/pipe supports/ pipe bridges and any other structures	Dark admiral gray shade No.632 of ISI or approval from Consultant
3	Water Pumps, Geared Motor of tanks and vats.	Original colour
4	HT & LT panels	Original colour
5	LT distribution switchboards	Dark admiral gray
6	Coal / pellets / briquets Handling Equipment	Black
7	Boiler Chimney, Chimney & Generator Exhaust	Aluminium Paint
8	Refrigeration Compressor, air Compressor	Original colour
9	Air Handling Units of Cold Store, Deep Freeze, Butter Packing, Machine room & Laboratory including Ducting	Aluminium Paint
10	Can Washer	Original colour
11	Refrigeration Plant Receiver	Dark Red
12	Atmospheric Condensers	Bitumen Paint
13	Milk Weigh Scale	Original colour
14	All SS items	Original colour

Table 2
Colour Code For Pipelines as per BIS 2379-1963
Final approval to be taken from Consultant.

SN	Services	Ground Colour	First Band	Second Band
1	Cooling Water	Sea Green 217	French Blue 166	-
2	Boiler Feed Water		-	-
3	Condensate		Light Brown 410	-
4	Hot Water		Light Brown 410	-
5	Drinking Water		French Blue 166	Signal Red 37
6	Treated Water		Light Orange 557	-
7	Cold Water		French Blue 166	Canary Yellow
8	Untreated Water		White	
9	Compressed Air	Sky Blue 101		
10	Vacuum		Black	
11	Steam	Silver Grey 628		
12	Diesel	Light Brown 410	Brilliant 221	
13	Lubricating Oil		Light Grey 631	
14	Drainage	Black		
15	Ammonia	Signal Red 537		

Table 3
Testing Pressures for Various Pipelines

Sr No	Name	Test Pressure kg/cm²	Test medium	Duration of Test (Hour)	Allowable pressure Drop (kg/cm²)
1	H.P.Steam pipe lines	27	Water	½	0
2	L.P.Steam pipe lines	8	Water	½	0
3	Water pipe lines Soft, Raw, Chilled and Glycol	8	Water	½	0
4	LSHS	16	Water	½	0
5	SS pipes for dairy	6	Water	½	0
6	Air	12	Air	8	0.1
7	Ammonia pipe lines				
7a	Suction	16	N2	24	0.2
7b	Discharge	24	N2	24	0.2
7c	Vacuum Test of Ammonia Lines	Absolute Zero	Vacuum	48	NIL
8	Molasses pipe lines	16	Water	1/2	0

Engineer-in-charge shall provide water at available supply point from which the Supplier shall connect temporary piping for testing water.

Section I – Part III
Special Conditions Of Contract
for
Electrical Works

Contents

1. Scope

1.1 The intent of this specification is to define the requirements for the installation, testing and commissioning of the electrical system like high-tension switchyard with accessories and equipment, transformers, HT. Panels, oil circuit breakers, LT. panels and power control centres, distribution boards, capacitor banks & panels, power & control cables, remote push button stations, motors, earthing network, etc. Requirement of a particular project shall be as specified in schedule of quantities/approved drawings or as per the battery limits fixed in the contract.

2. Standards

2.1 The work shall be carried out in the best workmanship in conformity with this specification, the relevant specification/codes of practice of the Bureau of Indian Standards, approved drawings and the instructions issued by the Engineer-in-charge or his authorized representative, from time to time. Some of the relevant Bureau of Indian Standards is listed in Table 1.

2.2 In addition to these standards, all works shall also confirm to the requirements of the followings:

- Indian Electricity Act and Rules framed there under.
- Fire Insurance Regulations.
- Regulations lay down by the Chief Electrical Inspector of the State/State Electricity Board.
- Regulations lay down by the Factory Inspector of the State.
- Any other regulations lay down by the local authorities.
- Installation & operating manuals of original manufacturers of equipment.

3. Equipment and Accessories Specifications

3.1 This defines specifications and requirements mainly for the equipment and accessories which are generally supplied by the erection agency and do not cover the specification of main electrical equipment such as Transformers, HT and LT panels, switchboards and motors etc which may be supplied by the Owner.

3.2 All materials, fittings and appliances to be supplied by the Supplier/Suppliers shall be of best quality and shall conform to the specification given hereunder. The equipment shall be manufactured in accordance with current Bureau of Indian Standard Specifications wherever they exist or with the BS or NEMA specifications, if no such BIS are available. In the absence of any specification, the materials shall be as approved by the Owner or his authorized representative.

3.3 All similar materials and removable parts shall be uniform and interchangeable with one another.

3.4 You must furnish makes of bought out items.

4. Power Cables (HT)

4.1 Specifications as per Section V Sub-Section 6

5. Power Cables (LT)

5.1 Specifications as per Section V Sub-Section 6

6. Control Cables

6.1 Specifications as per Section V Sub-Section 6

7. Cable Trays

7.1 Specifications as per Section V Sub-Section 6

8. Cable Glands

8.1 These shall be provided at both ends of armoured/ Unarmoured electrical cables. Cable glands to be manufactured as per performance requirements of BS 6121 amended as on date, with BRASS material accurately machined and NICKEL finish. Single compression cable glands to be complete with checkout, gland body, 3 nose metal washers, and outer seal rubber ring and compression nut. Double compression glands to be complete with checkout, gland body, neoprene outer ring, Armour clamping cone, Armour clamping ring, Armour clamping nut, neoprene outer ring, skid washer & outer seal nut. Sample of cable gland to be got approved from the Site In charge before supply For instruments MOC of cable gland shall be polyamide.

9. Cable Connectors

9.1 Cable connectors, lugs/sockets, shall be of copper/Aluminium alloy, suitably tinned, soldering less, crimping type. These shall be suitable for the cable being connected and type of function (such as power, control or connection to instruments, etc.)

10. Cable Route Markers

10.1 These shall be galvanized Cast Iron plate with marking (LT/HT) diameter 150 mm with 600 mm long 25x25 mm MS. angle riveted/bolted with this plate. Sample to be got approved before use.

11. Cable Indicators

11.1 Individual symbols / numbers printed on yellow strips of glossy PVC should be used for cable indicator.

12. Pipes for Cables

12.1 For lying of cables under floor, G.I. class 'A' pipes shall be used. MS. conduits are not acceptable for this purpose. For laying cable in air whereas cable trays are not being used, MS `B' class pipe shall be used. Size of pipe shall depend upon the overall outer diameter of cable to be drawn through pipe. To determine the size of pipe, assume that 40% area of pipe shall be free after drawing of cable. In dairy's process area wherever required SS-304 pipe, 1.6 mm thick shall be used.

13. Motor Isolators

13.1 These shall be in Aluminium cast housing, completely dust, vermin and weather proof (IP 55), suitable for 30/25 A, 415 volts, 50 Hz with rotary type switch complete with cable gland for incoming and outgoing cables. For dairy's process area SS-304 motor isolator shall be used. Final finish of housing to be buffer mirror for SS and

powder coated gray for Aluminium housing. Sample to be got approved before supply.

14. Control Junction Box

14.1 These shall be in Aluminium cast housing, completely dust, vermin and weather proof (IP 55). For dairy's process area SS-304 junction box shall be used. Final finish of housing to be buffer mirror for SS and powder coated gray for Aluminum housing. Sample to be got approved before use.

15. Remote Push Button Stations

15.1 These shall be used for remote OFF for motors, away from MCC. These shall be suitable for surface/structure mounting in Cast Aluminium housing having IP-55 class of protection i.e. completely weather proof. For dairy's process area SS-304 push button shall be used. Final finish of housing to be buffer mirror for SS and powder coated gray for Aluminum housing. Sample to be got approved before supply.

15.2 Riveted type bi-colour plastic nameplate to be provided for each feeder.

15.3 For outdoor installation suitable canopy to be provided.

16. Erection of Equipment

16.1 The cases containing the equipment (being supplied by the purchaser shall be handed over to the Supplier/Suppliers. The Supplier/Suppliers shall make his own arrangements for safe transportation of all the items to the erection site and also carry out complete loading/unloading during transportation. Equipment shall not be removed from packing cases unless the floor has been made ready for installing them. The cases shall be opened in presence of the Engineer-in-charge or his authorized representative. These empty packing cases shall be returned to the storage space identified by engineer in charge and any document if found with the equipment shall be handed over to the Engineer-in- charge. Any damage or shortage noticed shall be reported to the Engineer-in-charge in writing immediately after opening of packing cases.

17. Not Relevant in this TENDER

18. Not Relevant in this TENDER

19. Erection and Testing of Motors

19.1 Erection and coupling of motors with machines will be done under the mechanical erection. However, earthing, cable termination, testing and commissioning are covered under this section. Before starting, the alignment and coupling of motors with machines and the insulation resistance of the motors will be measured and recorded by the Supplier/Suppliers. The direction of the rotation of the motor shall also be checked before the driven equipment is finally coupled. Motor bearings are to be checked and rectified including supply and changing of grease if required, checking of fans coupling with bodies etc. The Supplier/Suppliers shall take adequate precaution and care while executing the work. For all damage due to negligence etc. the Supplier/Suppliers shall be responsible to replace/repair at his own cost.

19.2 Before connecting power cables to motors the insulation resistance of all motor windings shall be measured. Measurement shall be repeated after power cable terminations are completed and before first charging.

19.3 **Motors** shall be **operationally tested** together with the **starting gear** and **auxiliary apparatus** such as push button stations, the contractors, level and pressure controls, signal and alarm apparatus, power and control circuits etc.

19.4 Check the anti-condensation heater and its circuit (if installed).

19.5 Check the setting of the thermal overload protection / single phase prevent or. Testing of these devices is to be done wherever required as per the instructions of the Engineer-in-charge.

19.6 **Run** all **motors uncoupled** for **a maximum period of 4 hours** before the driven equipment is placed in regular service. Fill up Test Certificate as per Table 3.

19.7 All outdoor-installed motors must be shrouded with cover made out of 14 gauge GI sheet with lifting hook and louvers as approved by Consultant/Client.

20. Installation of Cable Network

20.1 Cable network shall include power, control and lighting cables which shall be laid in underground trenches, home pipes, open trenches, cable trays, GI pipes, or on building structure surfaces as detailed in the relevant drawings, cable schedules or as per the Engineer-in-charge's instructions. Supply and installation of cable trays, GI pipes/ conduits, cable gland sockets at both ends, isolators, junction boxes, remote push buttons stations, etc shall be under the scope of the Supplier/Suppliers. For selection of cable size please refer to Table 5.

21. General Requirements for Handling of Cables

21.1 Before laying cables, these shall be tested for physical damage, continuity absence of cross phasing, insulation resistance to earth and between conductors. Insulation resistance tests shall be carried out with 500/1000 volt Mugger.

21.2 The cables shall be supplied at site, wound on wooden drum as far as possible. For smaller length and sizes, cables in properly coiled form can be accepted. The cables shall lie by mounting the drum of the cable on drum carriage. Where the carriage is not available, the drum shall be mounted on a properly supported axle, and the cable laid out from the top of the drum. In no case the cable will be rolled on, as it produces kinks, which may damage the conductor.

21.3 Sharp bending and kinking of cables shall be avoided. The bending radius for PVC insulated and sheath armoured cable shall not be less than 10 D Where `D' is overall diameter of the cable.

21.4 While drawing cables through GI pipes, conduits, RCC pipe, ensure that size of pipe is such that, after drawing cables, 40 % area is free. After drawing cable, the end of pipe shall be sealed with cotton/bituminous compound.

21.5 High voltage (11 kV and above), medium voltage (230 V and above) and other control cables shall be separated from each other by adequate spacing or running through independent pipes/trays.

21.6 Armoured cables shall never be concealed in walls/floors/roads without GI pipes, conduits RCC pipes.

21.7 Joints in the cable throughout its length of lying shall be avoided as far as possible and if unavoidable, prior approval of site engineer shall be taken. If allowed, proper straight through epoxy resin type joint shall be made, without any additional cost.

21.8 A minimum loop of 3 M shall be provided on both ends of the cable, or after every 50 M of uncounted length of cable and on both ends of straight through cable joint. This additional length shall be used for fresh termination in future. Cable for this loop shall be paid for supply and lying.

21.9 Cable shall be neatly arranged in the trenches/trays in such a manner so that crises crossing are avoided and final take off to the motor/switchgear is facilitated. Arrangement of cables within the trenches/trays shall be the responsibility of the Supplier/Suppliers.

21.10 All cable routes shall be carefully measured and cable cut to the required lengths and undue wastage of cables to be avoided. The routes indicated in the drawings are indicative only and the same may be rechecked with the Engineer-in-charge before cutting of cables. While selecting cable routes, interference with structures, foundations, pipeline, future expansion of buildings, etc. should be avoided.

21.11 All temporary ends of cables must be protected against dirt and moisture to prevent damage to the insulation. For this purpose, ends of all PVC insulated cables shall be taped with an approved PVC or rubber insulating tape. Use of friction type or other fabric type tape is not permitted. Lead sheathed cables shall be plumbed with lead alloy.

21.12 Wherever cable rises from underground/concrete trenches to motors/switchgears/push buttons, these shall be taken in G.I./MS pipes of suitable size, for mechanical protection unto 300 mm distance of concerned cable gland or as instructed by the Engineer-in-charge.

21.13 Where cables pass through foundation/walls of other underground structures, the necessary ducts or openings will be provided in advance for the same. However, should it become necessary to cut holes in existing foundations or structures the electrical Supplier/Suppliers shall determine their location and obtain approval of the Engineer-in-charge before cutting is done.

22. Laying of Cables (Underground System)

22.1 Cables shall be so laid in ground that these will not interfere with other underground structures. All water pipes, sewage lines or other structures, which become exposed by excavation, shall be properly supported and protection from injury until the filling has been rammed solidly in places under and around them. Any telephone or other cables coming in the way are to be properly shielded diverted as directed by the Owner.

22.2 Cables shall be laid at minimum depth of 750 mm in case of LT & 1200 mm in case of HT, from ground level. Excavation will be generally in ordinary alluvial soil. The width of the trench shall be sufficient for lying of required number of cables.

22.3 Sand bedding 75 mm thick shall be made below and above the cables. A layer of bricks (full size) shall be laid on the edge, above sand bedding on the sides of cables and a flat brick to cover cable completely. More than one cable can be laid in the same trench by providing a brick on edge between two cables. However the relating location of cables in trench shall be maintained till termination. The surface of the ground after back filling the earth shall be made good so as to conform in all respects to the surrounded ground and to the entire satisfaction to the Engineer-in-charge.

22.4 For all underground cables, route markers should be used

22.5 Separate cable route markers should be used for LT, HT and telephone cables.

22.6 Route markers should be grounded in ground with 1:2:4 cement concrete pedestal size 230 x 230 x 300 mm.

22.7 Cable markers should be installed at an interval not exceeding 50 M along the straight routes of cables at a distance of 0.5 M away from centre of cable with the arrow marked on the cable markers plate indicating the location of cable. Cable markers should also be used to identify change in direction of cable route and for location of every joint in underground cable.

22.8 RCC Hume pipe for crossing road in cable laying shall be provided by Owner. No deduction shall be made for cable lying in home pipe for not providing bricks, sand and excavation. RCC home pipe at the ends shall be sealed by bituminous compound after laying and testing of cable by electrical Supplier/Suppliers without any extra charge.

23. Laying of Cables under Floors

23.1 GI class a pipe shall be used for lying of outgoing cables under floors from distribution boards to motors, isolators/junction boxes of motors, starter of motors and push button stations. Preferably one cable shall be drawn through one pipe. Size of pipe shall be such that after drawing of cable 40 % area is free. If length of pipe is more than 30 M, free area may be increased to 50 %.

23.2 Use of elbows is not allowed at all and number of bends shall be kept minimum. Instead of using bends with sockets, pipe-bending machine shall be used for making long smooth bends at site.

23.3 Ends of pipe shall be sealed temporarily while laying with cotton/ jute/ rubber stopper etc to avoid entry of building material.

23.4 Exact location of equipment motor/ isolator/ push buttons etc shall be ascertained prior to lying of pipe.

24. Laying of Cable in Masonry Trenches

24.1 Masonry/ concrete trenches for lying of cable shall be provided by Owner. However steel members such as MS angles/ flats etc shall be provided & grouted by electrical Supplier/Suppliers to support the cables without any extra charge. Cables shall be clamped to these supports with Aluminium saddles/ clamps. More than one tier of cables can be provided in the same trench if the number of cables is more. If required cable trays can also be provided in trenches.

24.2 Entry of cables in trenches shall be sealed with bituminous MASTIC compound to stop entry of water in trenches.

25. Laying of Cables in Cable Trays

25.1 Cable trays and supporting steel members such as MS angle/ channel/ flats etc shall be provided and fixed by the Supplier/Suppliers.

25.2 Cables shall be fixed in cable trays in single tier formation and cables shall be clamped with Aluminium flat clamps and galvanized bolts/unit.

25.3 Earthing flat/ wire can also be laid in cable tray along with cables.

25.4 After lying of cables minimum 20 % area shall be spare.

26. Laying of Cables on Building Surface/ Structure

26.1 Such type of cable lying shall be avoided as far as possible and will be allowed only for individual cables or small group of cables, which run along structure.

26.2 Cables shall be rigidly supported on structural steel/masonry using individual cast/malleable iron galvanized saddles and these supports shall be approximately 400 to 500 mm for cables unto 25 mm overall diameter and maximum 1000 mm for cables larger than 25 mm. Unsightly sagging of cables shall be revenged. Only/GI clamps with GI bolts/nuts shall be used.

26.3 If drilling of steel structure must be resorted to, approval must be secured from the Engineer-in-charge and steel must be drilled where the minimum weakening of the structure will result.

27. Termination & Jointing of Cables

27.1 Use of Glands: All PVC cable unto 1.1 kV grade, armoured or Unarmoured shall be terminated at the equipment/junction box/ isolators/push buttons/control accessories, etc. by means of suitable size single/double compression type cable glands. Armour of cable shall be connected to earth point. The Supplier/Suppliers shall drill holes for fixing glands wherever necessary. Wherever threaded cable gland is to be screwed into threaded opening of different size, suitable galvanized threaded reducing bushing shall be used for approved type.

27.2 In case of termination of cables at the bottom of the panel over a cable trench having no access from the bottom, a close fit holes should be drilled in the bottom plate for all the cables in one line, then bottom plate should be split in two parts along the centre line of holes. After installation of bottom plate and cables with glands, it shall be sealed with cold sealing compound.

27.3 Use of Lugs/ Sockets: All cable leads shall be terminated at the equipment terminals, by means of crimped type solder less connectors unless the terminals at the equipment ends are suitable for direct connecting without lugs/sockets.

27.4 The following is the recommended procedure for crimped joints and the same shall be followed:

- Strip off the insulation of the cable end with every precaution, not to severe or damage any strand. All insulation to be removed from the stripped portion of the conductor and ends of the insulation should be clean and square.

- The cable should be kept clean as far as possible before assembling it with the terminal/socket. For preventing the ingress of moisture and possibility of re-oxidation after crimping of the aluminium conductors, the socket should be fitted with corrosion inhibiting compound. This compound should also be applied over the stripped portion of the conductor and the palm surface of socket.
- Correct size and type of socket/ ferrule/ lug should be selected depending on size of conductor and type of connection to be made. Make the crimped joint by suitable crimping tool. If after crimping the conductor in socket/ lug, some portion of the conductor remains without insulation the same should be covered sufficiently with PVC tape.

28. Dressing of Cable inside the Equipment

28.1 After fixing of cable glands, the individual cores of cable shall be dressed and taken along the cableways (if provided) or shall be fixed to the panels with polyethylene straps. Cable shall be dressed in such a manner that small loop of each core is available inside the panel.

28.2 For motors of 20 HP and above, terminal box if found not suitable for proper dressing of Aluminium cables, the Supplier/Suppliers shall modify the same without any additional cost. Cables inside the equipment shall be measured and paid for.

29. Identification of Cables/ Wires/ Cores

29.1 Power cables shall be identified with red, yellow & blue PVC tapes for trip circuits identification, additional red ferrules shall be used only in the particular cores of control cable at the termination points in the switchgear/control panels and control switches.

29.2 In case of control cables all cores shall be identified at both ends by their wire numbers by means of PVC ferrules or self-sticking cable markers, wire numbers shall be as per schematic/connection drawing. For power circuit also wire numbers shall be provided if required as per the drawings of switchgear manufacturer.

30. Cable between Isolators/ Junction box & Motors/ Controls

30.1 Wherever possible Copper cables with glands shall be used between isolator/junction box (installed near motor/controls) and motors/controls. If terminal box of the motor or control switch is not suitable for accepting armoured cable or it is difficult to lay, copper conductor, multi-core, Unarmoured flexible cable in PVC flexible conduit steel (reinforced) with flexible conduit glands shall be used.

31. Testing of Cables

31.1 Before energizing, the insulation resistance of every circuit shall be measured from phase to phase and from phase to ground. This requires 3 measurements if one side is grounded and 6 measurements for 3 phase circuits.

31.2 Where splices or terminations are required in circuits rated above 650 volts, measure insulation resistance of each length of cable before splicing and/or terminating. Report measurements after splices and/or terminations are complete.

31.3 DC High Voltage test shall be made after installation on all 1100 Volts grade cables in which straight through joints have been made and all cables above 1100 V grade.

31.4 For record purposes test data shall include the measured values of leakage current versus time. The DC High Voltage test shall be performed as detailed below:

31.5 Cables shall be installed in final position with the entire straight through joints complete. Terminations shall be kept unfinished so that motors, switchgear, transformer etc are not subjected to test voltage.

31.6 The test voltage and duration shall be as per relevant codes and practices of Indian Standards Institution. Fill up the Test Certificate as per Table 4.

32. Earthing Network

32.1 The entire earthing installation shall be done in accordance with the earthing drawings, specification and instructions of the Engineer-in-charge. The entire earthing system shall fully comply with the Indian Electricity Act and Rules framed thereunder. The Supplier/Suppliers shall carry out any changes desired by the electrical inspector or the Owner in order to make the installation conform to the Indian Electricity Rules, at no extra cost. The exact location of the earth pits, earth electrode and conductors and earthing points of the equipments shall be determined at site, in consultation with the Engineer-in-charge. Any change in the methods, routing, size of conductor etc. shall be subject to approval of the owner/engineer-in-charge before execution.

33. Earth Pit with Electrode

33.1 Plate or pipe type earth electrode with earth pit shall be provided for this work unless otherwise advised by the Engineer-in-charge due to typical site conditions. Earthing electrode and pit shall be as per IS: 3043-1966 (code of practices for Earthing). All earth electrodes shall preferably be driven to a sufficient depth to reach permanent moist soil.

33.2 Prior approval of the engineer-in-charge shall be taken for selecting type of earth electrode (pipe or plate).

33.3 Earth pit centre shall be at a minimum distance of 2 m from nearest building, unless otherwise advised. The minimum 3 m distance shall be maintained between centres of 2 earth pits.

34. Earth Bus, Earthing Lead & Earth Wire/ Strip

34.1 All electrical equipment is to be doubly earthed by connecting two-earth strip/ wire conductor from the frame of the equipment to an earthing pit/ main earthing ring. The earthing ring will be connected via links to several earth electrodes. The cable armoured will be earthed through the cable glands. Conductor size for connection to various equipments shall be as specified in the drawing or as instructed by the Engineer-in-charge. However, the length of the branch leads from equipment to earthing grid/ ring shall not be more than 10 to 15 meters.

34.2 All hardware for earthing installation shall be hot dip galvanized. Spring washers shall be used for all earthing connections of equipment having vibrations.

34.3 Size of earthing lead/ wire shall be as specified in schedule of quantities/ drawings. Table 6 may be considered as general guidelines.

34.4 When earthing wire is to be drawn under floor/in underground, Aluminium wire 10 mm dial. With PVC insulation shall be used. Instead of GI wire, PVC insulated copper conductor wires can also be used.

34.5 However, while deciding type & size of earth lead, the resistance between the earthing system and the general mass of the earth shall be as per IS code of practice. The earth loop impedance to any point in the electrical system shall not be in excess of 1.0 ohms in order to ensure satisfactory operation of protective devices.

34.6 G.I. wire/ Aluminium wire shall be connected to the equipment by providing crimping type socket/ lug.

34.7 Wherever earthing strip to be provided in cable tray, it shall be suitably bolted on cable tray and electrically bonded to the cable tray at regular interval.

34.8 Excavating & refilling of earth, necessary for laying underground earth bus loops shall be the responsibility of the Supplier/Suppliers.

34.9 Wherever earth leads/ strips/ wire are laid in cable trenches, these shall be firmly and suitably cleared to the walls/ supporting steel structure on which cable is clamped.

34.10 The neutral of the transformer shall be connected to earth pit independently and earth pit shall have copper earth plate.

34.11 Long runs of GI strip shall be connected at each end with lap type welding to ensure continuity.

35. Erection Procedure Guidelines of Instrumentation & Control System

The erection of Instrumentation & Control System shall be carried out generally conforming to General Technical Standards as described herein. However, the Supplier shall select and adopt methods and procedures for equipment erection to suit the nature of equipment and erection work, involved according to the best modern practice and his own experience.

Shop tests as well as Site tests shall be performed to ensure that all equipment / sub-systems / systems furnished are manufactured and tested conforming to the requirements of the specification and approved Quality Assurance Program.

All assembly and erection procedures adopted by the supplier shall be open for inspection and approval by the Client. Acceptance of erection procedures shall not in any way relieve the supplier of his responsibility for proper erection of the equipment.

Transmitters, converters and pressure & temperature switches shall generally be installed on Instrument Stands made of 2" SS pipes located at convenient points. Level transmitters shall normally be flanged for direct mounting in the tank / equipment.

Temperature / Pressure Stub on equipment and pipelines shall preferably be of same material or higher grade of material

Suitable Root Valves shall be provided with every tap-off point.

Installation of Pressure and Differential Pressure Transmitter shall be as per standard engineering practice incorporating Drain Valves, Isolation Valves, 2/3-Valve Manifold, Syphon etc. as applicable.

For instrument air, SS. Pipe shall be used for air distribution from Battery Limit to the designated point of use. Take-off connections to instruments / actuators shall be with suitable size nipples and shut-off valves. Individual air supply shall be provided by 6 mm OD PU tube through an isolating needle valve and air filter regulator.

Perforated Aluminium Trays (minimum 2 mm thick) shall be utilized for routing of signal tubing / cables in field. All cables / tubes in the supporting trays / channels shall be tagged properly. The loading of the cable trays shall not exceed 60 % of the available space. Proper gap between the electrical trays, as per the voltage level, shall be maintained in the cable tray layout. Tray numbers shall be provided at suitable intervals.

Rigid and flexible conduits along with necessary fittings shall be used for cable laying from instrument to JB or instrument to trays etc.

Table 1
Bureau Indian Standards (BIS)

SN	Description	BIS
1	PVC insulated cables (light duty) for working voltage unto 1100 volts	694-1977 Part I & II
2	PVC insulated cables (heavy duty) for voltage unto 1100 volts	1554-1976 Part I
3	-- Do – for voltage 3.3 kV to 11 kV	1554-1976 Part II
4	Specification for polyethylene insulated PVC sheathed heavy duty electric cables, voltage not exceeding 1100 V	5959-1970 Part I
5	-- Do – voltage 3.3 kV to 11 kV	5959-1970 Part II
6	Guide for marking of insulated conductors	5578-1970
7	Code of practice for installation and maintenance of paper insulated power cables	1255-1967
8	Code of practice for earthing	3043-1966
9	Guide for safety procedures and practices in electrical work	5216-1969
10	Code of practice for installation and maintenance of AC induction motor starters	5214-1969
11	Code of practice for installation and maintenance of induction motors	900-1965
12	Code of practice for installation and maintenance of switchgears	372-1975
13	Code of practice for installation and maintenance of transformers	1886-1967
14	Code of practice for electrical wiring installation, voltage not exceeding 650 V	732 1963
15	Code of practice for electrical wiring installation (system voltage exceeding 650V)	2274-1963
16	Guide for testing three phase induction motor	4029-1967

Table 2
Pro forma for PCC, DB, Motor Control Centres Test

SN	Test	Report
1	Circuit (Breaker/Bidder/Supplier Module Designation/Bus	
2	**Insulation resistance** (Contacts open, breaker Racked in position)	
a.	Between each Phase & Bus **(Mega Ohm)**	
b.	Between each phase and earth **(Mega Ohm)**	
c.	DC and AC control & auxiliary circuits **(Mega Ohm)**	
d.	Between each phase of CT/PT and between CT & PT circuit if any	
3	**CT Checks**	
a.	CT ratio	
b.	CT secondary resistance	
c.	CT polarity check	
4	Check for contact alignment and wipe	
5	Check/test all releases/ relays	
6	Check mechanical interlocks	
7	Check electrical interlocks	
8	Check switchgear/control panel wiring	
9	**Checking breaker/Bidder/Supplier circuits for**	
a.	Closing- local and remote (wherever applicable)	
b.	Tripping-local and remote (wherever applicable)	
10	Opening time of breaker/ contactor	
11	Closing time of breaker/ contactor	

Signature and seal of Engineer-in-charge, SANGH	Signature and seal of Engineer-in-charge of Bidder/Supplier

Table 3
Pro forma for motor testing

SN	Test	Report
1	**Name plate details**	
A	Voltage	
B	HP / KW	
C	Mounting	
D	Current	
E	RPM	
F	Frame size	
G	Make	
H	Sr No	
I	Others	
2	**Insulation test (before cable connection)**	
A	Between Phase and Earth (Mega Ohms)	
B	Between each Phase (Mega Ohms)	
3	**Insulation test (after cable connection)**	
A	Between Phase and Earth (Mega Ohms)	
B	Between each Phase (Mega Ohms)	
4	**No load current**	
A	R Phase Amps	
B	Y Phase Amps	
C	B Phase Amps	
5	**Full load current**	
A	R Phase Amps	

B	Y Phase Amps	
C	B Phase Amps	
6	**Temperature rise after 4 hours run**	
A	On no load degree C	
B	On full load degree C	
C	Ambient temperature during test degree C	
7	**Operation of thermal overload relay**	
A	At normal Full Load current of motor	
B	At twice Full Load current of motor trips in seconds	
Signature and seal of Engineer-in-charge, SANGH		Signature and seal of Engineer-in-charge of Bidder/Supplier

Table 4
Pro forma for Testing Cables

Sr No	Test	Report
1	Date of Test	
2	Drum Number (from which cable is taken)	
3	Cable From -> To	
4	Length of run of this cable (meter)	
5	**Insulation resistance test (In Mega Ohm)**	
A	Voltage of Megger Volts	
B	Between core-1 to earth	
C	Between core-2 to earth	
D	Between core-3 to earth	
E	Between core-1 to core-2	
F	Between Core-2 to Core-3	
G	Between Core-3 to Core-1	
6	**High Voltage Test (Voltage Duration)**	
A	Between Cores and Earth	
B	Between Individual Cores	
Signature and seal of Engineer-in-charge, SANGH		Signature and seal of Engineer-in-charge of Bidder/Supplier

Table 5
Recommended Cables Sizes For Industrial Wiring

3 Ø 415 V Motor HP	Aluminium Conductor mm^2)			
	Rotor Resistance Starter			
	Supply side	Motor Side (2 Cables)		
10	6	6		
15	10	10		
20	16	16		
25, 30	25	25		
40	35	35		
50	50	50		
60	70	70		
75	95	95		
100	120	120		
125	150	150		
150	225	225		
180	300	300		
215	300	300		

For **DOL Starter up to 10 HP** Motor, **4 mm^2** cables should be used.

Table 6
Sizing of Earthing Lead/ Wire

Sr No	ITEM	Size
1	Control switches	G.I. wire 14 SWG
2	Motor unto 10 HP	G.I. wire 8 SWG
3	Motor above 10 HP unto 125 HP	G.I. strip 25 x 3 mm
4	Motor above 125 HP	G.I. strip 25 x 6 mm
5	Switch Board	G.I. strip 25 x 6 mm
6	Power control centre/ LT panel of sub-station	G.I. strip 40 x 6 mm

Section II
Technical Specifications

Sub - Section 1

Introduction

1.1 BACKGROUND

Pune Zillha Sahakari Dudh Utpadak Sangh Limited (PZSDUSL) is a district apex body in Maharastra.

Katraj Dairy was incorporated in 1960 with an intention of providing an organized facility of milk collection for the village-level farmers situated in Pune district. Katraj Dairy started with milk collection of about 30,000 liters per day in the first year of operation and today has steadily grown to over 2.00 lakh (0.20 million) litres per day and has a financial turnover of over Rs.380 crores.

Katraj Dairy has achieved ISO 22000:2018 & 14001:2015 certification from Det Norskey Veritus. The certificate is under upgradation with the latest norms.

Katraj products have been in use in thousands of homes in Pune since 1961. Katraj Milk, Katraj Ghee, Katraj Shrikhand, Katraj Amrakhand, Katraj Lassi, Katraj Jeeratak (buttermilk), Katraj cream have made Katraj a leading food brand in Western Maharashtra. Today Katraj is a symbol of high-quality milk products sold at reasonable prices, the genesis of a vast co-operative network triumph of indigenous technology, the marketing of a farmers' organization.

2 Dairy profile

Katraj Dairy with its 7 chilling plants and 131 BMC spread almost all over the district has an installed milk handling capacity of over 5 lakh liters per day for milk collection. The main plant of Katraj is equipped with a modern Pasteurizer, homogenizer, Cream separator, Ghee processing, Milk Clarifier, Condense Milk Plant, Automatic packing of milk and milk products and other quality testing devices and well-equipped labs. Katraj Dairy has an installed processing capacity of 2 lakh (0.2 million) liters per day.

Katraj dairy manufactures / Distributes milk and milk products like Pasteurized / Homogenized-Cow milk, Toned milk, Double toned milk, Standardized Milk, Full cream milk, Cow & Buffalo Cream and Ghee, Shrikhand, Amrakhand, Malai Paneer, Dahi, Flavoured Milk, Lassi, JeeraTak, Table Butter, Softy Ice cream, Pedha, Khoa, sterilized milk in 200 ml bottle

and hard Ice-cream with different flavours in different pack sizes and Mango, Anjeer & Malai Burfi, Kalakand & Kaju Katali.

All these products are available at Katraj-owned parlors at various locations in Pune City and through appointed distributors and retailing circuits. Very soon, Katraj plans to introduce an online ordering system for its distributors/ retailers and consumers.

This tender document deals with the Boiler package.

The design and layout of the facilities, selection of equipment and services, methodology of plant execution, testing and commissioning shall be carefully planned and executed with the knowledge of normal operational & processing routines of the composite Dairy plant.

The general technical specification of the major components and the ancillary items described in the technical section, its capacities and quantities proposed by the Purchaser are furnished in the **'Basis of Design'** and **'Bill of Quantities (BOQ)'**. These are only for the guidance of the bidders to quote their prices on comparable basis. However, it shall be construed and understood that bidder is familiar / acquainted about the nature and the quantum of work involved and has submitted his offer without deviating the basic configuration of the plant.

The quantity of pipes, fittings, valves, cables, cable trays, earthing, instruments, structural and supports etc. are to be offered based on the actual requirement at site. The bidder shall have to work out the details based on the system offered.

1.2 REQUIREMENTS OF THE PROCESS PLANT:

Plant basis and Utility basis:

Plant operations	24 hours a day
Electricity Charges	Rs. 7.5 /KW unit
Steam Charges	Rs. 2.2 / Kg of Steam
Boiler Fuel	Briquettes/wood/Solid fuel
Chilled water Charges	Rs. 9 / TR unit
Source of Water	Underground Water tank
Building	New building
Raw Milk	Received through Tankers only

1.3 WORKING CONDITIONS:

Site work of every nature has to be planned and executed with the knowledge of site conditions. The design and layout of the new facilities, selection of equipment and services, methodology of project execution, testing and commissioning should all be carefully planned with this point in mind.

1.4 PROJECT TIME SCALE:

The Plant should be completed in time as specified in the IFB of this tender. Product trials to be commenced at the end of this period.

1.5 SITE CONDITIONS:

Altitude above Mean Sea Level(Meters): Approx. 560
Average Ambient Temperature (Deg C) : 29-30 max
Minimum Ambient Temperature (Deg C) : Around 10
Maximum Ambient Temperature (Deg C) : Around 38
Relative Humidity (%) : 85 - 95 Max & 50 Min

1.6 SITE ADDRESS:

The plant shall be installed in Katraj region, Pune, Maharastra.

SUB SECTION 2

Instruction to Bidders

3 INSTRUCTIONS TO BIDDER

1.1 This Sub - Section of the tender defines the way that bidder is required to structure the presentation of the technical section of their bid.

1.2 All technical data required by the tender is to be provided in the format given in this Sub - Section. If no format is given for any specific item the bidder may submit bid in their format

1.3 Any bidder not following the required bid document structure of presenting technical data that is not in the required format is liable to be deemed non- responsive

4 BID STRUCTURE OF TECHNICAL SECTION

2.1 The technical section of the bid is to be structured in the same order as Tender Document. Each statement is to be numbered with the same Sub-section and paragraph number as in the Tender Document. Every page of the technical section of the bid is to be numbered. Section number is also indicated in every page. The general structure, therefore, is to be as follows:

Sub – Section	Subject
1	Introduction
2	Instruction to the Bidders
3	Design Basis
4	Responsibilities
5	Project Management
6	Scope of Supply and Technical Specifications (Tender package)
7	List of Preferred Makes of Major Bought Out Items
8	Battery Limits
9	Deviations from Technical Requirements
10	Optional Items
11	Drawings, data and Documentation Submission
12	Process Performance and Consumption Guarantee
13	Criteria for Technical Evaluation of Bid
14	Bidder meeting
15	Layout Drawings

2.5 The bidder is to cover each requirement of the Tender Document by statements, technical data and descriptive material and, in particular to detail the following section--

5 SUB - SECTION 1 INTRODUCTION

Brief Introduction of the tender is given including the site working conditions.

6 SUB - SECTION 2 INSTRUCTIONS TO THE BIDDER

Instructions are provided but not limited to, to the bidder to provide the technical bid in line with the tender sequence and details.

7 SUB - SECTION 3 DESIGN BASIS

Preamble

The bidder is to describe his technical proposal in details, stating the processes and systems, which he has applied in designing the plant. Also to highlight any special technical innovations that the bidder proposes to include in the plant that will improve the performance, reduce operating cost or improve product quality. The "Preamble" should commence at the start of the process and work logically through the process. Any such highlights should be cross-referenced with the Bid sub-Section and paragraph number to which they apply.

The bidder is required to follow the Basic of Design in the tender and indicate clearly where additional processes or alternative processes of equipment are considered to be necessary or desirable to achieve optimum plant operation efficiency, optimum product quality within the standards specified, and optimum plant operation convenience.

Under the utilities section, the peak and daily loads of each utility has been quantified .

8 SUB – SECTION 4 RESPONSIBILITIES

Responsibilities of the Bidder

The bidder is required to specifically state his acceptance or non-acceptance of each clause in this sub-section. Non acceptance shall be deemed a deviation from the tender and should be mentioned in deviations, Sub - Section 8.

Responsibilities of Client

The bidder is required to state here any additional responsibilities that he consider are to be borne by Client besides those described in the tender.

9 SUB – SECTION 5 PROJECT MANAGEMENT

- **Time Schedule**

The bidder is to state in this subsection the proposed program of implementation from receipt of order to commencement of product trials, to be provided as per Sub - Section 10.

- **Management Team**

  The bidder is to provide detail of the management team in terms of designation, accordance with this Sub - Section of the tender. Also to quantify the support that will be given by foreign collaborators, with designation and man months of attendance in India and at site.

  This bidder is to ensure that the following Sub - Sections are fully detailed and quantify the duration and manpower supplied to each.

- **Commissioning**
- **Product trials**
- **Training**

10 SUB – SECTION 6 SCOPE OF SUPPLY & TECHNICAL SPECIFICATIONS (TENDER PACKAGE)

The bidder is required to follow the sequence of the tender Document and to make a statement on each paragraph. **Do not** leave any item without a clarify statement.

11 SUB – SECTION 7 LIST OF PREFERRED MAKES OF BOUGHT OUT ITMES

Bidder to strictly follow the list of preferred makes of Bought out items and shall select a make for supply out of the list only. Make selected by the bidder other than the said list shall be considered as Deviation from the tender and should be mentioned in deviations. All given makes are preferred however the bidder to get the approval from the consultant/client before placement of order to the sub-vendor during execution.

12 SUB – SECTION 8 BATTERY LIMITS

Battery limits for the plant are mentioned in this sub-Section.

13 SUB – SECTION 9 DEVIATIONS

All technical deviations are to be stated. This is mandatory, and failures to comply with make the bid liable to be deemed non-responsive

14 SUB – SECTION 10 OPTIONAL ITEMS

Items that the bidder includes in this Sub - Section that are considered by evaluation team to be essential to the satisfactory operation of the plant, shall be included in the commercial evaluation of the bid.

15 SUB – SECTION 11 DRAWINGS, DATA & DOCUMENTS SUBMISSION

The list of drawings and technical documents required for technical evaluation is included in this Sub - Section. These include a number of data sheet formats to be completed by the bidder. The completion of this format is mandatory, and failure to comply will make the bid liable to be deemed non-responsive.

SUB SECTION 3
DESIGN BASIS

DESIGN BASIS:

1. GENERAL DATA

1.1 Environmental Data

Site	: Katraj Dairy plant
Site Location	: Katraj,Pune
Altitude above MSL	: 560 m
Max. Ambient Temp., Deg. C	: 38 to 40 Deg C
Min. Ambient Temp., Deg. C	: 10 Deg C
Max. Relative Humidity	: 85 to 90%. Average 50%
Plant Operation	: 24 working hours/day - 365 days

1.2 Electricity

General Voltage	: 415V (3 Phase)± 10%
Frequency	: 50 Hz± 5%

2. IDENTIFICATION

Item	: BOILER AND ITS ACCESSORIES
Capacity	: 5 TONS/HR F&A 100 DEG C
Model	: Supplier to specify
BOILER SETS	: 1 SET (1w)
Application	: To generate steam @ 10.54Kg.cm2 pressure.

3. DESIGN BASIS

GENERAL DESCRIPTION

- Steam generation System: Design, supply, erection, testing & commissioning of Steam generation System & steam piping up to header.
- A New multi-fuel boiler package shall be supplied and installed. The scope shall end at the HP steam header located in the Boiler Room however it shall be scope of the supplier to connect both the boilers to the existing Steam line i.e. existing boiler as well as New boiler system. The HP steam header shall have at least 3 incoming nozzles and 3 outgoing nozzles along with condensate drain and pressure gauge system as per IBR rules. All nozzles on HP steam header shall be supplied with the steam cut off valves.
- Boiler F&A Capacity shall be @ 5 TPH (F&A 100 deg C) & at 10.54 Kg/cm2 outlet pressure

Entire new boiler package and complete steam generation shall be part of this tender scope. 1 No Steam Boilers (1 W) of capacity 1 x 5 TPH (new) (F&A 100 Deg.C) each at 10.54 Kg/cm2 g pressure is to be considered. One no boiler shall be solid fuel boiler as per specifications provided.

High pressure Steam Distribution upto the Main steam header and connecting of existing steam piping to this main steam header as per Good Steam Engineering practices is part of this scope and shall be done fully by the supplier. Necessary steam pressure reducing stations (PRS) for deaeration purpose as per process requirement are to be included in the supplier's scope. The client shall tap the HP steam @ 10.54 Kg/cm2 g pressure from this main steam header and shall bring the HP steam upto new dairy plant building (approximately 140 m). At this point client needs to install the PRS and reduce the pressure to to 3.5 Kg/cm2 g pressure.

Supplier shall supply entire boiler package including necessary PRS, steam traps, pipings, valves, fittings, supports, clamps, insulations, thermodynamic traps and vents, condensate traps, etc all.

The PRSs shall contain steam control valve with Roboter type with pressure monitoring for both HP & LP steam line from Utility PC as well as OS. All steam valves on high/low pressure lines shall be of glandless piston type to avoid leakage.

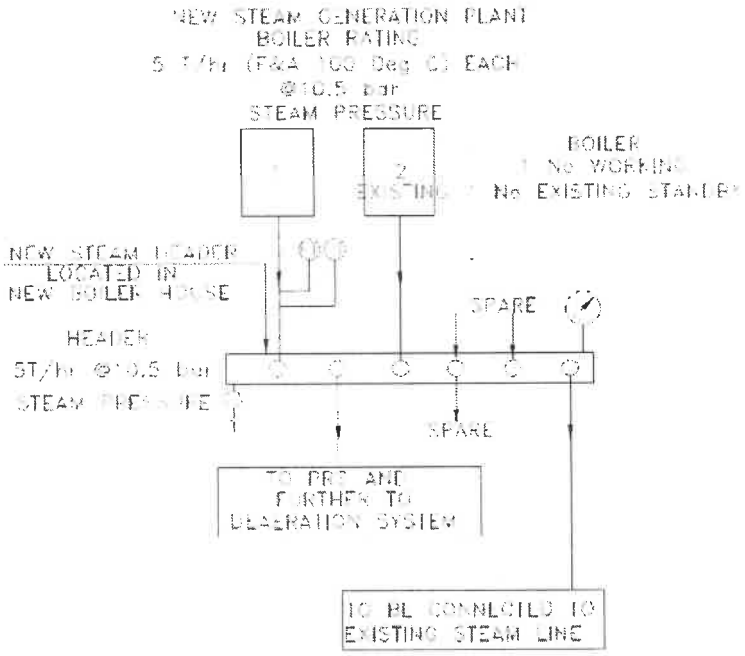
One Vortex steam flow meter shall be installed at each boiler outlet to know the exact steam produced and for measurement of total steam consumption.

All steam valves on high/low pressure lines shall be of glandless piston type to avoid leakage.

Condensate shall be provided at one point inside the boiler house by the client. The condensate temperature shall be max around 60 to 70 Deg C. From this point onwards scope shall be of boiler supplier to utilize the same.

Refer SLD provided for better understanding.

SCOPE/ BREAK UP FOR STEAM GENERATION AND DISTRIBUTION SYSTEM



NOTES:

1) ENTIRE SCOPE OF STEAM GENERATION AND DISTRIBUTION UPTO CONNECTING TO EXISTING STEAM LINE AS SHOWN SHALL BE IN THE SCOPE OF THE BOILER SUPPLIER.

2) ALL SPARE/USED NOZZLES TO BE TERMINATED WITH PISTON TYPE STEAM STOP VALVES.

3) ENTIRE DISTRIBUTION OF THE STEAM TO THE NEW PLANT BUILDING SHALL BE IN THE SCOPE OF SUPPLIER INCLUDING NECESSARY STEAM TRAPS, CONDENSATE TRAPS, THERMODYNAMIC AIR VENTS, ISOLATION VALVES AREA WISE, IBR AND NON IBR STEAM LINE SUPPORTS, ETC ALL NECESSARY FLOW METERS AND PRESSURE TRANSMITTERS TO BE PROVIDED AS SHOWN IN THE SLD.

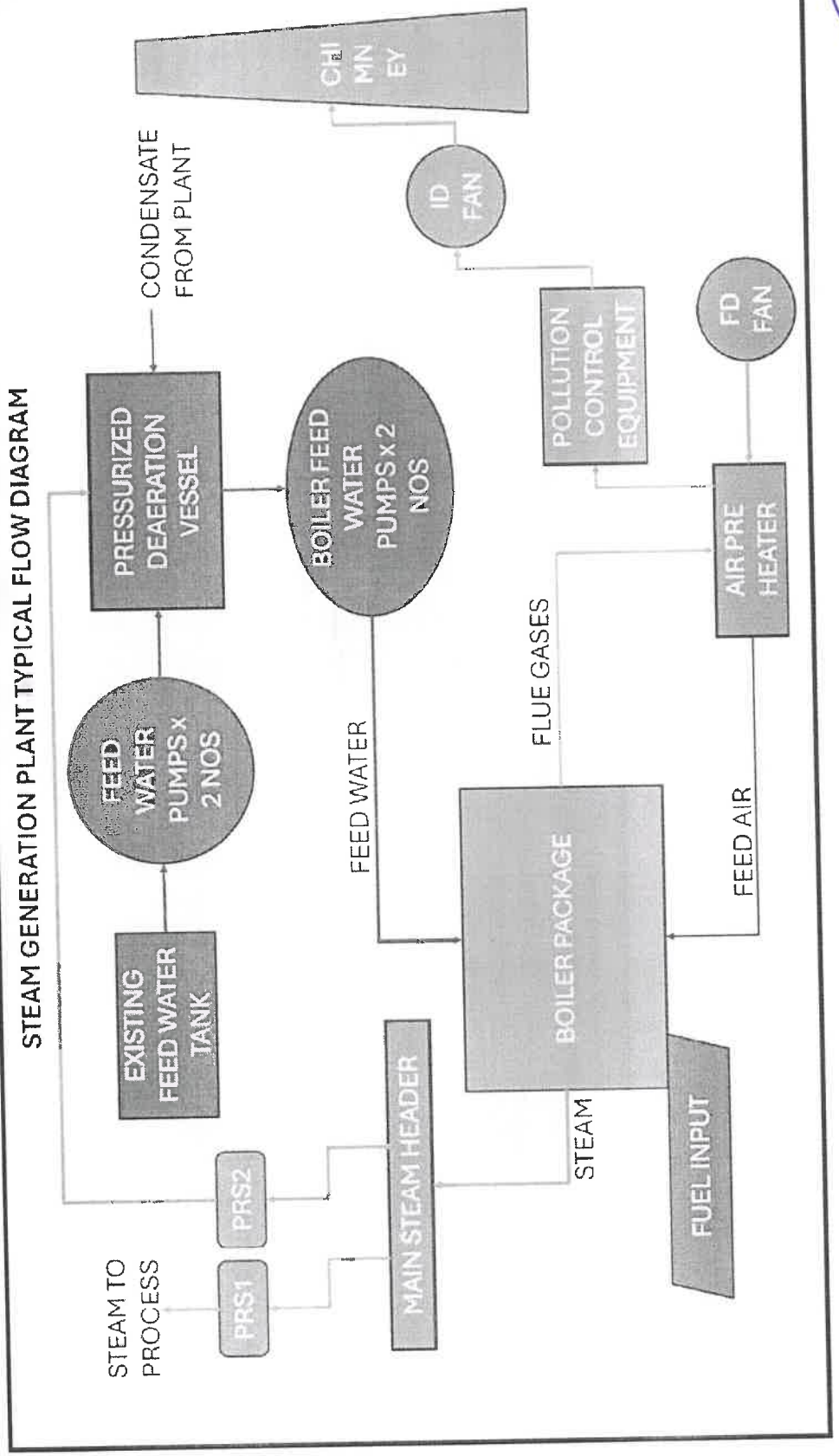
AT EVERY BATTERY LIMIT POINT, BIDDER TO PROVIDE PISTON TYPE ISOLATION VALVE.

KATRAJ DAIRY PLANT

TYPICAL FLOW DIAGRAM

THE FLOW DIAGRAM PROVIDED IS FOR UNDERSTANDING PURPOSE ONLY.

STEAM GENERATION PLANT TYPICAL FLOW DIAGRAM



FUEL SPECIFICATIONS.

Fuel Properties	Briquettes
Carbon	41
Hydrogen	3.57
Nitrogen	0.98
Sulphur	0.13
Moisture	16.36
Ash	10
Oxygen	31.53
Net Calorific Value (kcal/kg)	**3356**
Size	ø90mm x 110mm

PIPES, VALVES, FITTINGS AND SUPPORTS

The main supply pipe sizes of various utilities shall be designed keeping in view the future expansion/ modifications.

MATERIALS FOR PIPING

Filtered, soft & chilled water distribution lines : Galvanized steel (ERW) IS 1239,3589, 3601,4736 (medium duty)

SW distribution lines and Compressed Air Lines : AISI 304 with seamed joints.

For LP steam: MS 'C' class pipes (ERW) IS 1239/3601/4736. Compressed air lines shall be of GI.

High pressure steam lines, valves, PRSs & accessories shall be as per IBR.

Valves

Service	Size	Specification	Remarks
LP steam	15 mm to 40 mm	CS body, 13% Cr trim 800#, Lift Check valve with SW ends (NRV)	Pressure < 3.5Kg/ Sq.cm
		CS body, SS ball, special PTFE seats, 800# with SW ends ball valve	
	50mm to 300mm	CS body, 13% Cr trim 150#, Gland less piston type valve with flanged ends	
		CS body, 13% Cr trim 150#, flanged swing check (NRV)	
Water / Air (SS)	15mm to 40mm	CS body, SS ball, PTFE seats, 800# with SW or SCD ends ball valve	Pressure < 3.5 Kg / Sq.cm
	50mm to 300mm	CI body 13% Cr disc, 125# wafer type butterfly	
	NRV (all sizes)	CS body 13% Cr trim, wafer type check	

Chilled water	15mm to 40mm	CS body, SS ball, PTFE seats, 800# with SW or SCD ends ball valve	Pressure < 3.5 Kg / Sq.cm
	50mm to 300mm	Butterfly type flanged construction.	

Flanges/counter flanges shall be as per BS tables:

- Table F for HP & LP steam
- Table D for water
- Table E for air

For pipeline sizing following velocities of the fluid shall be considered

LP steam : 20 m/s
Water : 3 m/s
Air : 20 m/s

MS/ GI STRUCTURALS

MS (GI) structurals for outdoor pipe bridge, silo / tank platforms etc.

- These shall be provided for fabricating platforms, outdoor pipe support on service bridges etc.
- These shall include ISMB, ISMC, angles, flats, bars, MS plates, chequered plate, hand rails of minimum 900 mm height, toe guard etc. The platforms shall have frame underneath and bracing members of suitable sections. Access ladders and structural supports of C class pipe/ISMC channel shall be provided within the scope of the works for structural works quoted.
- MS 5mm thick chequered plate for the trenches shall be provided wherever required.
- Self supported hot dip galvanized steel platforms for approach of all outdoor and indoor tank / Boiler equipments with Staircase and railing.
- Outdoor pipe bridge / supports for all Utility piping, cable trays etc. Bridges as required all shall be in the scope of the supplier right from RCC footings at the floor level (+300 mm from road level). Bridges shall be required between utility building and main building, Utility/Main building to Existing plant building as required, Main building to Tanker reception area, etc.

In addition to all above mentioned requirement required GI/MS structural platform & supports shall be provided as per function requirement of the plant operation and maintenance.

Sub - Section 4
Responsibilities

RESPONSIBILITIES OF BIDDER

4.0.1 Developing the process design, complete engineering design, manufacturing and/or supply of respective equipment/goods/services as per the technical specifications and ensuring best performance of individual equipment/systems/process plant as a whole. The bidder shall avail the assistance of reputed specialists in the respective field wherever required as well as past experiences gained during installation/ commissioning of the projects.

4.0.2 Development of automation services, software, interfaces etc. wherever applicable and its incorporation in the project.

4.0.3 Providing technical data, technical literature, production and service load calculations for approval.

4.0.4 Supplier shall submit to the consultant, technical order specifications for each and every item along with required drawings, consumption details, charts, etc as required. Unless approved by Client/consultant, the specific item can not be ordered. Consultant / client reserves the right to reject the material supplied if not approved earlier.

4.0.5 Arranging for approvals from various Statutory Authorities on behalf of the Purchaser. The statutory fees will be reimbursed by Purchaser on production of receipt.

Power: The Power for erection has to be arranged from Contractor through DG/Obtaining Separate Temporary Line from Electricity Board. SANGH shall not arrange power for erection as there is constraint in getting continuous quality power, which may affect the progress/schedule.

4.0.6 First charge of oil/lubricants/gas shall be supplied by supplier along with the equipment.

4.0.7 Execution of project in accordance with prevailing Indian standards IER & IBR, wherever applicable & relevant to this project.

4.0.8 Testing and commissioning satisfactorily and performance of all equipment in bidder's scope and after sales service at mutually agreed terms.

4.0.9 Test equipment, test kits, instrumentation and materials required for establishing performance parameters.

4.0.10 Provide necessary manpower during positioning, pre-commissioning, testing and commissioning along with tests.

4.0.11 Testing, commissioning of the system under scope as per agreed performance parameters and utility consumption.

4.0.12 Training Purchaser's personnel in the field of instrumentation automation, management system, plant operation & control, maintenance & repair of systems & equipment.

4.0.13 Dry Chemical Powder type fire extinguishers shall be provided at strategic points by purchaser as per BOQ.

4.0.14 Final Selected Makes approval must be taken by supplier from the client. Without which the sub ordering can not be placed by the supplier.

RESPONSIBILITIES OF PURCHASER

4.1.1 Details of civil design, building layout and drainage and sewage details.

4.1.2 Documents on local site conditions related to climate, access and communications.

4.1.3 **Water: Water shall be provided by Purchaser at Free of Cost at one Point for commissioning purpose.**

Power: The Power for erection has to be arranged from Contractor through DG/Obtaining Separate Temporary Line from Electricity Board. SANGH shall not arrange power for erection as there is constraint in getting continuous quality power, which may affect the progress/schedule.

4.1.4 Engineering personnel to liaison with the supplier, Project Manager and the execution team.

4.1.5 Permanent water and power supply at the time of pre-commissioning of the plant.

4.1.6 Adequate staff including operators, supervisors and engineers for product trials.

4.1.7 All civil works including buildings, roads, cable trench, underground condensate piping and drainage.

4.1.8 Provision of and cost of services, raw products, packaging materials

4.1.9 Timely provision of personnel for training.

4.1.10 Provide open storage area, lockable store during erection and commissioning of project.

4.1.11 Suitable Site fabrication yard

4.1.12 Deleted

4.1.13 Payment as per agreed terms and conditions.

4.1.14 Approval of drawing

4.1.15 Project manager with team throughout the implementation.

4.1.16 Deleted

4.1.17 Readiness of Civil Building, clear civil fronts in all respects along with necessary utilities within agreed schedule to enable commencement of erection activities to meet the overall completion schedule.

4.1.18 Availability of required quantity of milk for the designed product to conduct the first run of product trials at the rated plant capacity.

Sub - Section 5
PROJECT MANAGEMENT

4.1 TIME SCHEDULE

4.1.1 Project execution shall be scheduled to mutually agreed time bound program, which should not exceed as specified in the IFB from the date of signing of contract along with advance payment to commencement of product trials and service load trials. The Project Manager of supplier will provide all the details to the Project Manager of the Purchaser with monthly expediting and progress reports, which clearly indicate the actual vs., planned progress and the new likely completion dates of supply, erection, and commissioning and product trials.

4.1.2 The supplier shall provide project-staffing pattern before commencement of work and should include sufficient personnel to meet the execution time schedule.

4.2 BASIC PROJECT TIME SCHEDULE

Sample basic project time schedule is shown below. According to this supplier to provided the schedule as per period of completion mentioned in the tender.

BASIC STAGES	MONTHS													
	1	2	3	4	5	6	7	8	9	10	11	12	13	14
ENGINEERING														
SUPPLY														
ERECTION														
TESTING OF I/O AND DRY RUN CHECK														
HYDROTEST, WATER CIRCULATION AND LEAKAGE CHECKS OTHER IBR CHECKS AND APPROVAL														
SLOW FIRING														
FINAL FIRING WITH CAPACITY TRIALS														

4.3 WEEKLY AND MONTHLY PROGRESS REPORT SUBMISSION

Supplier to provide every 2nd weekly and monthly progress report based on the project schedule finalized. Project scheduling shall be done in MS Projects and shall be shared with the approving authority.

The report shall be made based on point system.

The basic point system is provided as below. The same shall be detailed out by supplier in consultation with consultant and shall be divided into all categories in detail.

Based on the points allotted and project schedule, S curve shall be plotted. In all 2nd weekly and monthly report, Actual S curve shall be plotted as against original S curve to see the progress chart. In case of the delay by supplier and S curve falling behind schedule, supplier shall immediately take corrective action.

KATRAJ DAIRY

PROJECT PROGRESS REPORT			
Sr. no	Description	% of Total Project	% Progress
1	Engineering	100	
2	Procurement	100	
3	Erection	100	
4	Testing & Commissioning	100	
	TOTAL	**400**	**0.00**
	Description	**Maximum Score**	**Progressive score**
1	**Engineering**		
1.1	P & ID Drawing	100	
1.2	GA Drawing & Layout Drawings	100	
1.3	Foundation drawing, Structural drawings & 3D piping & Piping GAD	100	
1.4	Preperation of Specification	100	
	Sub Total	**400**	**0.00**
2	**Procurement**		
3.1	Indigenious Bought Out Item	150	
3.2	Fabricated Item	70	
3.3	Imported Item	100	
3.4	SS Raw material used in Fabricated Item	15	
3.5	Bought Out Item used in Fabricated Item	15	
3.6	E & I Item	100	
	Sub Total	**450**	**0.00**
3	**Erection**		
	Sub Total	**100**	**0.0**
4	**Testing & Commissioning**		
	Sub Total	**50**	**0.0**
	TOTAL MARKS	**1000**	**0.00**
Overall Progress		**0.00**	%

4.4 MANAGEMENT TEAM

4.4.1 A Project Manager who shall be adequately experienced in projects of similar magnitude and type shall head a competent executive team. Reputed experts in various fields who shall be responsible for satisfactory execution of the project shall assist the Project Manager. He shall be responsible for overall implementation of the project, from commencement to final takeover of the plant.

4.4.2 A Project Engineer shall be appointed for day to day operation and co-ordination, and to ensure successful and satisfactory design, procurement, manufacture, inspection, erection, testing and commissioning of all the equipment/facilities/systems within the time bound schedule.

4.4.3 The Project Manager and Project Engineer shall attend technical and review meeting between various parties involved in the project, and ensure implementation of all decision taken in the meetings.

4.4.4 The Project Manager shall also be responsible for detailed material accounting at site and management of project materials and equipment stored at site.

4.4.5 The Purchaser will nominate a Project Manager with whom the Project Manager of the supplier shall communicate/co-ordinate.

4.4.6 For smooth execution of the project, a team of Project Manager and Key Personnel shall remain consistent throughout the execution period.

4.4.7 The Project Manager shall be fully authorized to take on-spot decision with regards to:-

- Modification in layout and execution program to suit local condition.
- To purchase essential materials from local market to avoid delays.

4.5 APPROVAL

4.5.1 Purchaser shall give approval on technical documentation within 7 working days after submission. Amendments, which are not in the original scope of work or due to changes in concept, shall be taken up by the supplier as per mutually agreed rates to be decided before execution, and shall be binding on the supplier.

4.5.2 Supplier shall obtain approval for purchase of specific makes of equipment whose makes are not mentioned in his offer. If two or more makes of equipment are mentioned in the form of alternatives in the approved list, the supplier shall select any one of the particular make from the approved list after mutual discussions with the Purchaser.

4.6 INSPECTION

4.6.1 For indigenous items, the suppliers shall invite Purchaser for inspection and preliminary testing. Inspection may be required at various stages of manufacture/assembly for some items. The Purchaser will arrange to complete such inspection as maybe necessary along with clearance within a reasonable time (7 days) from the date of intimation by the supplier.

4.6.2 For imported items, the suppliers shall invite Purchaser for inspection and preliminary testing. However, the supplier shall do the inspection at his cost and submit the necessary test certificate wherever possible to save time. If required client shall do the inspection.

4.7 SITE WORK AND INSTALLATION

4.7.1 Protection of electronic equipment.

It is the responsibility of the supplier to ensure that all electronic equipment and control system shall be fully protected against hostile environment, humidity, heat and dust that will be encountered during storage and installation.

4.7.2 Temporary power supplies.

Power supply at site is normally very stable, but the supplier is responsible to ensure that delicate electronic equipment used during construction, such as welding machine, testing devices etc. are protected against damage from mains supply. In the event of a major power failure in the system, it shall be the responsibility of the supplier to hire a diesel generator if this proves to be necessary.

4.8 COMMISSIONING

4.8.1 After satisfactory erection and testing, a competent team shall be deputed to commission the plant and to run product trials and to establish performance parameters. However the commissioning of the complete plant will be done at an appropriate stage which shall be informed to the successful supplier. Supplier to participate in the entire plant commissioning activity and ensure that his equipment is working as per the specifications and in the harmony with other equipment and design philosophy.

4.9 PRODUCT TRIAL AND PERFORMANCE GUARANTEE

4.9.1 On completion of the Commissioning period, the plant will be operated at full capacity to the satisfaction of the Project Authority for a period of seven days on the designed product.

4.9.2 If shut down occurs due to External Force Majeure reasons after 16 hours of operation in any day, this shall be considered as a full day of testing. If at less than 16 hours of operation, the trials shall be continued for an additional full day.

4.9.3 Performance Guarantee: Performance and services consumption guarantees, and the relevant penalties for not meeting the rated capacities and efficiencies are covered in the TENDER.

4.10 TRAINING

Shall be as per Design basis document

4.11 STAND BY OPERATION OF THE PLANT

Shall be as per Design basis document

Sub - Section 6
TECHNICAL SPECIFICATIONS

4. TECHNICAL SPECIFICATIONS

SR.N	ITEM DETAILS	QTY	UNIT
1	**BOILER PACKAGE COMPLETE – CAPACITY 5 TON/HR F&A 100 DEG C.** **GENERAL DESCRIPTION :** Manual Skid Mounted Hybrid design (Water Cum Smoke Tube) boilers suitable for Wood Chips, coal and Briquette firing shall be provided to generate dry saturated steam for use in various processes in the Dairy Plant . Capacity and working pressure: Capacity of the boiler shall be 5000 kg/hour F & A 100^{0}C. Rated design pressure of 10.54 kg/cm^2 (g). **DESIGN REQUIREMENTS :** **Dryness of steam:** The required dryness of steam is 98.0 % (minimum). Boiler shall have to be designed with appropriate arrangement of a system of drum internal/steam separator of adequate size to fulfill this requirement. The boiler shall be water cum smoke tube skid mounted. Boiler construction shall be in accordance with the latest revision of Indian Boiler Regulations 1950, Act 1923. All materials used shall be approved and tested as per relevant existing codes. All the welded joints shall be as per code requirement. The boiler should be of modern compact and be genuinely packaged design. The fire tubes in the tubes nest should be plain without any restriction inside & shall conform to BS 3059 ERW 320. These tubes should be easily accessible for inspection and maintenance. The ports for loading of fuel, removal of ash, primary air inlet, shall be optimally designed for maximum efficiency & minimum losses. The boiler shall be designed and constructed to generate steam at efficiency of 74% (min) on Gross calorific valve (GCV) basis at 100 % steam load. Efficiency shall be demonstrated as per standard IS 13979 Part 1 Indirect method. Boiler and accessories shall be mounted on a single base frame. Individual systems such as feed water pump etc. may be on separate base plates welded to the boiler base frame.	1	Set

Thermal efficiency:

The thermal efficiency on GCV (of fuel) basis under normal working conditions and above 50% load must exceed 70% at all the times. Efficiency shall be demonstrated as per the standard BS: 845 Part 1 – indirect method.

The boiler shall generate steam in such a way that available pressure at main steam header remains 10.54 kg/cm^2 g (operating pressure) all the time.

Further reduction of steam pressure beyond main header will be arranged by the purchaser to suit to the process requirement.

Note: 3 Nos inlet valves & 3 Nos outlet valves suitable for Boiler capacity should be installed on the steam header along with required pressure gauge, drain and vent arrangement. All valves shall be piston type only.

Steam Header shall be in supplier scope.

Power

Supply voltage – 3ph, 4 wire, 415 Volts ± 10 % and 50 Hz ± 3 %

Control voltage – 240 V, A.C., 1Ph

Steam generating equipment

The complete boiler skid mounted with required shell, water wall, heat recovery unit should be supplied in order to minimize the site work. Bidder to provide details of steam generating equipment as per below table.

DETAILS OF THE BOILER

1	Capacity	Continuous water evaporation rate of 5000 kg/hr from & at 100^0 C with Bag filter & MDC (CYCLONE BASED). Bag filter shall be common for 2 Boilers (1W+1S). MDC shall be separate
2	Design Pressure	10.54 kg/cm^2
3	Quantity	1 Set.
4	Chimney	Common Chimney for two boiler.
5	Length of flue gas duct	Ducting is to be designed and supplied to connect boiler with chimney, as per design requirement / site condition.
6	Steam flow meter	Required. (Vortex Type)
7	Water flow meter	Required (Orifice Type)

Firing/Stoking Arrangement

Manual stoking arrangement with **fixed grate system** with **alloy of Cast Iron & Chromium** suitable for agro-based briquettes shall be provided. Grates size shall be such that the Fuel can be filled easily length-wise & width-wise for uniform & optimum loading of fuel. The length of the grate shall not exceed 3 meters.

AUTOMATIC BLOW – DOWN CONTROL SYSTEM:

This system shall be used to automatically blow-down Boiler water in the shell portion by sensing the conductivity & shall be dedicated for each Boiler.
This system shall be used to inline measuring the conductivity for Boiler water & automatically blow-down when TDS levels in Boiler water exceed a set level. The system shall have isolating valves, pneumatically operated control valve, non-return valve, and conductivity sensor of suitable range and of material of construction SS 316, controller to control and monitor TDS level of the boiler water, by-pass manual blow-down valve, upstream & downstream steam piping (IBR certified) and all other associated accessories. The entire assembly shall be insulated.

Boiler shall be skid based assembly. Following features are expected from the supplier in the supplied boiler package:

- Compact and skid mounted

	• Pre-insulated and factory assembled so that time required for erection can be reduced at site • Shall have flexibility of fuels to be used. • It shall be multipass hybrid construction with high combustion volume. • Shall have easy ash removal and better accessibility for maintance. • Package shall include minimum 2 nos fire doors. • The package shall include the door for ash removal. • Skid based platform to be provided for SVLOP and other valves at the top of the boiler • Boiler package shall be inclusive of boiler shell, furnace, grate, refractory baffle walls, membrane chamber / reversal chamber, etc all.		
2	**DRAUGHT SYSTEM:** The system shall comprise of combination of Forced & Induced Draft Fan & regulation with manual damper. The induced draft fan for handling flue gas shall comprise of suitable capacity fan considering the pressure drop in the Mechanical dust collector. FANS Suitable capacity ID, FD centrifugal fans with air modulating dampers shall be selected for the requirement. Vanes of the fans shall be backward inclined /curved. ID Fan shall preferably be installed on the floor level for easier operation & maintenance. Units shall have common base-frame for the fan, gearbox/chain transmission with motor mounted on Anti-Vibration pads. Suitably rated energy efficient motor (EFF1) of TEFC enclosure with class F insulation and IP 55 protection shall be selected for the motor. ID fan capacity/head shall be selected to compensate the pressure drop across MDC, Bag filter & ducting length and Pollution control equipments. Similarly the FD fan capacity/head shall be selected based on pressure drop across APH, ducting length, combustion requirements. • FD / ID fan direct coupled with motor. • Forced / Induced draft fan supplied along with motor, base frame, controlling damper, canvas duct and with necessary flanges along with safety guard and expansion joints. • FD/ID fan MOC: IS 2062 Gr. A/B. • IE 3 Motor to be used.	1	Lot
3	**AIR PRE-HEATER (APH):** Air preheater is shall be a of shell & tube design to extract heat from exhaust flue gases, to preheat boiler feed water. The design of the APH shall be responsibility of the successful so as to ensure flue gas exit temperature to chimney of 160-180 °C	1	Lot

	Multi pass counter current flow shell and tube type self-cleaning design air pre heater to pre heat the air for combustion by drawing heat from flue gasses for optimum efficiency of Boiler. ○ Tube MOC: IS 1239 ○ Jacket MOC: IS 2062 ○ With supporting structure. Under part load conditions the Flue gas temperature may fall below 130° C & hence the APH should have a bypass damper. The design shall be complete with stiffeners, insulation, Additional instrumentation like 6" Dial temperature gauges at inlet & outlet of flue gases & Air sides, temperature sensors at FG & water side outlet with digital indication in respective Boiler panel.		
4	**REFRACTORY MATERIAL SUPPLY** Castable refractory to be used as per standard specifications required for lining complete furnace. No brick refractory to be used. Application of the Refractory at site shall be a part of supplier scope. Refractory lining work shall be part of supplier scope.	1	Lot
5	**FLUE GAS DUCTING** Flue gases from the Outlet of each boiler shall be separately taken across separate Air pre-heater & shall be connected to a common Pollution Control equipment. Flue gas ducting shall be suitable to receive and convey flue gases across the Mechanical dust collector, ID Fan from individual Boilers. MS ducting between the chimney & Boiler shall be fabricated from MS sheet of minimum 4 mm thickness & shall be designed for a peak flue gas velocity of 14 to 16 m/s. Fabricated ducting segments shall be welded to each other and suitably supported within the Boiler House. The flue gas ducting shall be insulated with 50mm thk glass wool insulation with 24 G Al. Sheet cladding & shall be connected to the chimney though a pair of flanges. The Main Flue gas ducting shall be connected to the pollution Control equipment, ID fan & shall have an expansion bellow. It is desirable to have Flue gas ducting from Boilers connected to the chimney separately.	1	Lot
6	**AIR DUCTING** Air ducting shall be suitable to receive and convey air across the Air preheated, FD Fan & shall be dedicated for each Boiler. MS ducting between the FD Fan & Boiler shall be fabricated from MS sheet of minimum 3.15mm thickness & shall be designed for a peak velocity of 14 to 16 m/s. Fabricated ducting segments shall be welded to each other and suitably supported within the Boiler House. The flue gas ducting shall be insulated with 50mm thk glass wool insulation with 24 G Al. Sheet cladding	1	Lot
7	**AIR POLLUTION CONTROL EQUIPMENT**	1	Lot

	Pollution control equipments shall be installed is Bag filter with MDC in Bypass. **Parameters Unit Levels or as Per PCB** SPM level mg/Nm^3 100mg/Nm3 or as per latest standard Other parameters if any applicable shall be followed strictly as per PCB norms. **MECHANICAL DUST COLLECTOR** Mechanical dust collector shall comprise of steel structure housing the high efficiency insulated cyclone with air-tight rotary air lock valve (RAV) with operating handle, for efficient removal of fines from the flue gases. The rotary airlock valve shall be driven by geared TEFC, Class F Insulation motor. The entire unit shall be insulated. This will be installed in parallel to the Bag filter & shall be operated in the by-pass mode of Bag filter. MDC should consist of: o Multi Cyclone dust collector made out of Chilled Cast Iron Cone to Reduce the Fly Ash Emission. o MDC < 450 mg/nm^3 outlet dust concentration. o RAV is provided at bottom for ash collection. o With supporting structure. **BAGFILTER (PULSE-JET TYPE) along with ash collection hopper.** The dusty flue gas coming out of the HWG should be routed through the Bag filter before they pass to the chimney. The maximum temperature withstanding capacity of the nomex / ryton bags is 220 Deg.C. In case the flue gas temperatures rise below 220 Deg. C. the RTD based pneumatically operated control valve will bypass the flue gases through the Mechanical Dust Collector. **The outlet emission from bag filter should be < 100 mg/nm3. Should satisfy the local pollution control norms.** o RAV is provided at bottom for ash collection. o along with ash collecting hopper. o With supporting structure. Both systems shall be installed in such a way that it can be used as common pollution control equipments for both boiler i.e. existing and new boiler however at a time only one boiler shall run.		
8	**CHIMNEY** Chimney shall be suitable to receive and convey flue gases from both Boilers. Though one boiler is sufficient for the designed capacity of the feed plant & Chimney shall be designed for conveying flue gases of any one operating boiler.	1	Lot

The chimney for the boilers shall be of self-supporting type, made out of mild steel sheets of suitable thickness. The steel plates and sections used in construction of the chimney along with other materials such as rivets, bolts, should conform to the relevant IS. The corrosion allowance for thickness (5 mm min.) of chimney should be considered for minimum of 20 years life.

The chimney height shall be as per the Pollution Control Board's regulation. Chimney shall be designed and installed in such a way that it can be used as common chimney for both boiler i.e. existing and new boiler however at a time only one boiler shall run.

The design and construction of the chimney shall be conforming to IS: 6533 – Part 1 & 2 – 1989.

The height of the chimney if indicated at clause No. 6.0 is the minimum requirement and it will be
the successful bidder's responsibility to provide the same as per the PCB regulation.

While calculating the load on the chimney the following shall be considered:

1) Dead load considering the weights of the chimney shell and permanent fixtures such as ladders with protection cage, platforms with railings, baffles, helical strakes, flanges, fasteners and all accessories.

2) The imposed load of minimum 2000Kg/sq.m shall be on the sampling platform.

3) Wind loads in accordance with the provisions contained in IS 875 (part 3)1987. The wind load force on the ladders and other fixtures and accessories fixed to the chimney shall also be determined and added to the force on the chimney.

4) Earthquake loads in accordance to IS 1893: 1975.

The chimney design and the foundation design for the chimney shall be determined by considering the maximum forces, effects and stress calculated from combination of any of the following combinations.

- Dead load + wind load
- Dead load + earthquake load
- Dead load + load due to the lining + imposed load on service platforms + wind load
- Dead load + load due to the lining + imposed load on service platforms +earthquake load

The chimney should consist of all the accessories and the minimum requirement of few are as follows:

- Base plate with gussets plate (minimum thickness of 12 mm) and base stool.

- Inspection door with minimum size of 1000 W x 800 W shall be provided.
The door shall have handles and all associated accessories. The cut-out made on the chimney should have stiffeners of not less than 50 x 50 x 6 mm angles welded

on the periphery of the cut-out in the chimney. Platform for flue gas sampling and inspection:
The platform width should be not less than 800mm and should have 1000mm high railings, one additional support shall be provided in the middle of the railings, toe guard support shall be provided at the bottom of the railing. There should be suitable arrangement in the platform for draining out the rain water. Sampling port shall be provided for flue gas sample analysis as per the PCB regulation.

• Twin aviation lights and warning lights.

Aviation obstruction light fixture shall be made of Aluminium alloy casing with separate galleries to house a set of two 40 watts (minimum) LED lamps. The lamp fixture shall have suitable red domes on the galleries and the lamp fixture shall be of reputed make. Aviation obstruction light point should be connected up to the IP 55 grade of protection Cast aluminium junction box installed at the base on the chimney with 3C x 2.5 sq.mm.,
PVC sheathed, PVC insulated copper cable. The circuit cable shall be run on the rigid PVC conduit, 2mm thick and shall be fixed on the chimney surface with suitable saddles and clamps mounted on the epoxy based insulators.

• Lightening arrestor:

Lightening arrestor should be of copper with minimum 5 prongs, the lightening arrestor should be connected to two earth stations. The earthing conductor should be of size should not less than GI 25 x 6 mm/or of equivalent size and conductor material as approved by the local statutory authorities. The earthing conductor should be mounted on the epoxy based insulators and not directly fixed to the chimney surface. Two earthing conductor should run parallel from the lightening arrestor and each connected to the independent earth stations. The earth stations in turn should be interconnected with one another.

The earth station should be of GI plate conductor and constructed as per IS 3043 latest edition. The earth station should be complete with excavation, filling with charcoal/salt, watering pipe, funnel, earthing conductor, test link, 350x350 mm CI hinged cover with frame complete with all masonry works.

• Flue gas inlet:

Flue gas ducting is separately specified. The cut-out made on the chimney should have stiffeners of not less than 50 x 50 x 6 mm angles welded on the periphery of the cut-out. The opening made on the chimney for the flue gas duct should be extended by 200 to 1000mm and terminated on counter flanges to facilitate connection of the ducting on the chimney.

• Helical strakes to reduce wind excited oscillations for the top 2/3rd height of the chimney.

• Chimney bottom should be insulated upto 3 M height by 50 mm white mineral wool followed by cladding with 3 mm MS sheet. MS sheet cladding should be of butt welded construction.

	• All MS parts of the chimney shall be given initial surface treatment including degreasing, de-rusting etc., followed by a coat of primer. The chimney should be finally painted with two coats of suitable heat resistant paint. • Foundation bolt of adequate length and diameter (min 40 mm) shall be provided along with the anchoring channel of section ISMC 150 on the bolt base. • Template shall be provided by the successful bidder suitable for the foundation bolts for casting the chimney foundation. • The design of the chimney shall be shared with the purchaser subsequent to placement of order. The Basis of design with respect to wind velocity, seismic categorization of the region etc. shall be intimated by the successful bidder post order.		
9	**Feed Water Tank** **Feed water Pumps : (1 W + 1 S).** Feed water tank shall be provided of capacity 10 KL. The tank shall be MS with level controller. Feed Water Tank – MOC IS 2062. (Vertical Tank) Min Shell thickness 6.0 mm. Inclusive of Nozzles Inlet & Outlet Valves Level Gauge Tank.(Boat and Float Type) Level Switch min 3 Nos. 2 Nos Spare Nozzles for Fresh water. The boiler will be supplied with two nos. feed water multistage vertical pumps (one no. for working duty and one no. to act as stand by) of matching capacity of the boiler. The pump shall be capable of handling water/condensate at high temperature since the condensate return from plant would be used for boiler-feed water of which temperature could go up to 120 Deg C. Pumps will be with SS 304 body & working parts and CI base. Further, maximum discharge pressure of feed water pumps must be suitable to maximum designed steam pressure of the boiler. Class of insulation and number of stages are to be selected accordingly. The pumps are to be provided with EFF-1 high energy efficient motors conforming to IS 12615 – 2004 (Rev 1). The pumps shall be supplied along with suction strainer, suction isolating valves, feed check valves and pressure gauge (100 mm) on delivery side.	1 2	No. Nos.
10	**PRESSURIZED DEAERATOR AND PIPING** The pressurized deaerator should be provided for venting off dissolved gases. The deaerator shall be common for two boilers (1W + 1S). The deaerator should be sized for 20 min of storage considering One boiler working. The deaerator should be equipped with level control system. The bidder shall provide entire utility pressure reducing station from steam header to de-aerator. Water control station shall be in bidder's scope which shall maintain level of water in deaerator tank. The deaerator should be located on control panel room. The deaeration vessel shall have 2 inputs.	1	Lot

	One from Feed water tank. Other from condensate coming from process plant. Bidder to provide control loop based on levels in the vessel, for both inlets including control loop bypass arrangements.		
11	**Boiler Feed Pumps : (1 W + 1 S).** The boiler will be supplied with two nos. feed water multistage vertical pumps (one no. for working duty and one no. to act as stand by) of matching capacity of the boiler. The pump shall be capable of handling water/condensate at high temperature since the condensate return from plant would be used for boiler-feed water of which temperature could go up to 120 Deg C. Pumps will be with SS 304 body & working parts and CI base. Further, maximum discharge pressure of feed water pumps must be suitable to maximum designed steam pressure of the boiler. Class of insulation and number of stages are to be selected accordingly. The pumps are to be provided with EFF-1 high energy efficient motors conforming to IS 12615 – 2004 (Rev 1). The pumps shall be supplied along with suction strainer, suction isolating valves, feed check valves and pressure gauge (100 mm) on delivery side.	**2**	**Nos.**
12	**SPARES** The bidder shall also quote price in the bid for essential spares for ONE year's normal operation of the plant. All spare components shall be duly quantified and included in the offer with price breakup for each of the spare components. The final list of spares shall be decided based on the offer and discussion while placing of the order. However, total quoted price against spares will be taken in to account while evaluating the bid. Following are brief of suggestive components, however, a bidder may provide quote based on his experience and past performance of the plant supplied: Manhole gasket — 1 No. Mud hole gasket — 1 No. Tube cleaning brush — 2 Nos. SS Float, rod & Magnet assembly — 1 No. Pressure switch — 1 No. Toughened glass — 2 Nos. Any other items bidder wish to add A spare not listed above but found necessary for normal functioning/ operation of the boiler for one years will have to be supplied by the supplier. Any spares required during startup and up to successful commissioning of the boiler and all associated equipment (commissioning spares) are separate from the spares mentioned above and will be arranged by the supplier without any additional	**1**	**Lot**

	cost. If a regular spare item gets consumed during commissioning, supplier shall replenish the same before handing over of the steam raising plant to purchaser without any extra cost.		
13	**ELECTRICALS** Conventional type power cum control panel (IP 42 protection) with necessary Circuit breakers, Overload relays, Contactors and Controllers etc. PLC controls for operation of Steam Generator to control the Temperatures and on/off of the blower system to cut off the firing, maintain proper air flow and safeties in the plant. There shall be communication port provided in the system so that the readings can be taken further to Main MIS system. Electrical works from Steam generator control panel and further to motors, instruments etc including earthing. **NON-COMPARTMENTALIZED POWER CUM CONTROL PLC BASED CONTROL PANEL – 1 lot** • Free standing type, conforming to IP 42 degree of protection. The panel shall be made out of **14/16 SWG CRCA** sheets. The required power switchgear for all drives shall be housed in the power section • Safety Trip for the HWG • Audio visual alarm for the individual safety trip. • VFD as required for the system A new free-standing type MCC panel for the proposed Boiler & allied system. The MCC shall be supplied with all suitable components such as main incomer, starters with MPCB as back-up protection, push buttons, indicating lamps, relays, feeder for oil heaters etc. Necessary digital type measuring instruments like voltmeter, ammeter, energy meter etc. shall also be provided in the MCC. The MCC shall be provided with one spare feeder of each rating for future load. One no of 100 A TPN MCCB unit for welding receptacle shall be provided. The welding receptacle shall be provided at appropriate location in the boiler house. Indicators, rotary switches etc. shall be provided on top of the panel and the same shall be at a convenient operating height. The panel shall be designed to operate on 415 volts, 50 Hz. AC electric power supply. It will be completely pre wired and shall have suitable incoming and outgoing feeders. The panel shall be made from 14 Gauge CRCA sheet duly pretreated and painted. Necessary isolators near motors shall be provided as per statutory requirement. MCC shall confirm to specifications mentioned. **Control panel** The control panel shall be supplied and installed in front of new boilers. Control panel shall be Relay Based with required switch gears. The panel shall be completely pre wired. Indicators, rotary switches etc. shall be provided on top of the panel and the same shall be at a convenient operating	1	Lot

height. Necessary isolators near motors shall be provided as per statutory requirement. The panel shall be installed in boiler house at an approved location. Control panel shall also conform to the general specifications pertaining to MCC. If any specific deviation is necessary to meet the process requirement, same should be highlighted in the bid.

The control panel should non-compartment type, have suitable incoming and outgoing feeders. All contactors, switches, starters, MCBs, MPCBs, relays, terminals etc., should be neatly mounted and pre-wired in the panel board terminating in suitably rated terminal blocks/epoxy based insulators. The components of the control panel should also be selected as per below guidelines:

• The main incomer to the control panel shall be of suitably rated, 4 Pole, 35 KA, MCCB, with shunt coil. Suitable copper terminal extensions shall be made and fixed on epoxy based insulators for terminating the incoming power cable to the control panel.

• Digital type Ammeter (suitable range) and Digital type Voltmeters shall be provided with selector switches. Resin cast CT shall be provided for connecting the ammeter and the voltmeter shall have MCBs for isolation.

• The outgoing feeders shall be of suitably rated 440 V, panel mounting type MPCB. Each outgoing feeder shall be segregated with one another by hylem/FRP sheet of minimum 3 mm thickness.

• All contactors shall have rated coil voltage of 240 V AC. Individual MPCBs, controls etc., shall be provided for each of the outgoing feeders. Only MCBs shall be used for controls & isolation

• Minimum rating of contactor shall be 16 Amps.

• The wiring within the panel shall be done using copper cables. Minimum section of power cables shall be 2.5 sq.mm and that of control cable shall be 1.5 sq.mm. CT wiring shall be done with 2.5 sq.mm wire. Indicating ferrules at both cable ends shall be provided. Lugs shall be provided for all
power and control cable terminations.

• Star-Delta starters shall be provided for the motor ratings above 10 HP.

LT Power Cables, LT Control cables & Instrument cables – 1 lot

Power cables from MCC to All Motor & Non Motor Electrical load shall be on 415 V system shall be of 1100 volt grade , multistranded copper conductor , steel braided up to 50 sq.mm & above 50 sq. mm copper conductor , rodent proof &, XLPE insulated, PVC sheathed, armored and overall PVC sheathed strictly as per IS : 7098 PART 1/1988.
The size of cable shall be as specified in cable selection chart. No copper cable of size less than 1.5 sq. mm. shall be used.

LT CONTROL CABLES
Quantity : 1 Lot

Control cables for use on 415 V system shall be of 1100 volts grade, copper conductor, XLPE /PVC insulated, Rodent proof, steel braided type, PVC sheathed and overall PVC sheathed, strictly as per IS: 1554 (Part I) - 1976. The minimum conductor diameter shall be 1.5 sq.mm.

INSTRUMENT CABLES
Quantity : 1 Lot

Instrumentation cables shall be of multi-stranded annealed plain copper conductor, extruded XPLE/PVC type A insulated. Steel braided with Al. Mylar tape along with tinned copper braided for analog signals. For digital signals cable will be unscreened type. Extruded PVC ST1 inner sheath, armoured. Extruded PVC type ST1 outer sheathed instrument signal cables. All instrument cables shall be rodent proof. Min. Size of the instrument cable shall be 0.75 sq.mm.

RCP's & JB's : As per system requirement – 1 lot
Cable Trays, Cable Glands & Conduits – 1 lot
Earthing for electrical power & Automation system – 1 lot
UPS FOR Control & Automation system – 1 Lot

Required quantity of armored aluminium & copper cable, copper control cable, signal & instrument cable, GI perforated cable trays, GI conduits pipe, plate type earth pit, earthing network, earthing conductors, load break Isolators / plug & sockets with Emergency stop Push Button near motors for emergency isolation, rubber mats for panels etc. shall also be provided.
The sizes of power cables for different capacity of loads / Motor rating shall be as indicated in cable selection charts. All the power & control cables shall be laid through GI perforated trays and GI conduits. GI shrouds for all pumps & motors shall be provided. Supply & placement of rubber mats of proper size as per the Gujarat state Electrical Inspectorate rules shall be provided. All armored cables between feeders in MCC and plug & socket/isolator junction boxes near motors shall be of copper conductor for cable size up to 35 sq mm. Armored aluminium conductor cable shall be used only for cable size beyond 50 sq mm. Connection from plug & socket/isolator junction boxes to motor junction boxes shall be with PVC insulated flexible copper cable in flexible conduit. The bidder shall provide power cables of suitable rating and no. of runs from PCC in substation to the new MCC in boiler and terminate them at both ends with suitable lugs and glands. Plug in type isolators with emergency stop push button in SS-304 water tight enclosure should be provided for all motors below 10 KW. For motors of 10 KW & above SS-304 water tight junction box with emergency stop push button shall be provided. Cable trays from PCC to MCC & further distribution inside the plant, earth pits & earth strips shall be of GI. Earthing for automation and instrumentation shall be independent of power earthing. Earthing of individual motors shall be provided with PVC insulated 10 sq mm copper wire.

Electric Motors All electric motors shall be energy efficient motors and shall comply with the following:

a) All poly phase motors of 0.375 kW or more shall have a minimum acceptable nominal full load motor efficiency not less than shown in Table below or as per the IS 12615 – 2004 (Rev 1) for Eff1 energy efficient motors.

b)

Table for Minimum Acceptable Motor Efficiencies

Efficiency (%)		
Motor Size (KW)	2 Pole	4 Pole
1.1 (1.5 hp)	82.2	83.8
1.5 (2 hp)	84.1	85.0
2.2 (3 hp)	85.6	86.4
3.0 (4 hp)	86.7	87.4
4.0 (5.5 hp)	87.6	88.3
5.5 (7.5 hp)	88.6	89.2
7.5 (10 hp)	89.5	90.1
11.0 (15 hp)	90.6	91.0
15.0 (20 hp)	91.3	91.8
18.5 (25 hp)	91.8	92.2
22.0 (30 hp)	92.2	92.6
30.0 (40 hp)	92.9	93.2

b) Motor nameplates shall list the nominal full-load motor efficiencies and the full-load power factor.

c) Certificates shall be obtained and kept on record indicating the motor efficiency.

Earthing for electrical power & Automation system

Quantity : 1 Lot

Complete earthing for the required steam generation plant shall be in the supplier scope. Earthing shall be done in compliance with the local rules and regulations.

14	**Water / Compressed Air pipes, Valves, Fittings, supports & Insulation** **COMPRESSED AIR PIPING, FITTINGS AND ACCESSORIES – 1 Lot**	1	Lot

Oil free, moisture free compressed air shall be provided at one point on the pipe bridge outside the boiler house. Further distribution from this point up to the individual consumption points and including the main header shall be from GI- C class piping.

All compressed air pipe supports inside the steam generation plant shall be of GI / MS with GI paint box section. Pipe supports outside the plant shall be of Galvanised MS section.

Sizes	: As required
Material	: GI- C Class
Valves	: SS ball / SS globe / SS diaphragm valves / As required
Fittings	: As required
Air filter and regulators	: As required
PU tube and fittings	: As required
Pipe support	: As required
Pipe clamps	: As required

WATER PIPING, FITTINGS AND ACCESSORIES – 1 Lot

General : Pipe sizes and fittings etc. are to be decided as per requirement of various equipment

Feed water / soft water shall be provided at the header level on the nearest pipe bridge. From there entire water distribution shall be in the scope of the supplier. This water shall be put in 10 KL new feed water storage tank. Complete Feed water piping with an isolation valve from new 10 KL feed water tank to boiler feed water pumps and then to the water-inlet of the boiler shall be designed, supplied & installed by the supplier. A 150 mm temperature indicating gauge shall be provided to display the temperature of feed water. The pipeline shall be suitably insulated and cladded with 22 SWG Aluminum sheet.

The inlet piping/fitting to Boiler shall conform to IBR requirements and drawing-approval, clearance etc. will be obtained and ensured by the supplier without any extra cost. The feed water pipes shall be of MS "C" class ERW. 1 no. water flow meter magnetic type, suitable for operation up to 120 C (or as required as per heat balance requirements) and pressure higher than the hydraulic test pressure shall be supplied and connected with flanged type isolating valves and accessories in the feed water piping for measurement of water consumption in the new boiler.

Feed water tank shall be existing. Supplier to take tapping from the existing feed water tank and shall provide connection to new water pumps. Piping shall include water piping from Feed water tank to water pump, water pump to Deaeration Vessel, Deaeration vessel to boiler feed water pumps to boiler system. Complete piping required for boiler / steam generation plant shall be in the scope of the supplier.

All pipes going to drain shall be provided up to nearest drain point provided in the Boiler section.

Bidder shall provide necessary pipe supports for the all the piping.

Pressure guage to be provided on the each pump discharge line. All piping within this battery limit shall be in the scope of bidder.

Drain and Vent Piping also included in the supplier scope.

Piping

MS "C" class ERW, scheduled 40 pipes / as per IBR wherever applicable, with insulation and aluminum cladding.

Quantity : 1 lot

Insulation : Glass wool of specified thickness covered with GI wire netting generally. Insulation shall be covered with aluminum cladding – 22 Guage.

Thickness : As per relevant IBR standard.

The piping and insulation shall be generally as per IBR standard specifications.

Sizes	: As required
Valves	: As required
Control valves	: As required
Fittings	: As required
Insulation	: As required
Cladding	: As required
Pipe support	: As required
Pipe clamps	: As required

Valves

Isolation valves for Pressure gauges and pressure switches
Safety relief valve on the heater outlet.
Non return valves as required.
Isolation valves as required.
Auto Valves as required.
Refer flow diagram given in Design basis. Minimum valves as shown in flow diagram shall be provided.

Feed Water Piping from existing feed Tank to Feed Water Pumps to Deaeration vessel to Boiler Feed water pumps to Boiler.
All hardware like bends, flange, gasket etc as required.
Complete set of isolation and non return valves required in the feed line.
Drain Piping from Water Wall, shell & boiler, level gauge etc.
Safety Valve Exhaust Piping from Safety Valves upto the Boiler House Outlet.
Air Vent Piping from auxiliary valve upto boiler house outlet.

Blowdown Piping from Blowdown Valve to the Blowdown Pit.
All above included.

Compressed air and water shall be provided at one point inside the steam generation section. From that point onwards entire piping, valves, fittings and distribution including accessories required shall be in the scope of the supplier.

15	**HP STEAM PIPES AND FITTINGS INCLUDING HIGH PRESSURE STEAM HEADER:** Quantity : 1 Lot Type: Seamless, MS heavy duty, Schedule 40 / As per pressure requirements, ASTM A 53 welded type pipes with CS body globe valves/NRVs with SS working parts in flange execution shall be supplied. All pipes and fittings shall be as per IBR requirements only and shall be IBR stamped. The HP steam header shall have 3 incoming nozzles from three Boilers and 3 outgoing nozzles along with condensate drain and pressure gauge system as per IBR rules. All nozzles on HP steam header shall be supplied with the steam cut off valves. Supporting: In mild steel painted execution generally as per requirements. **Piping** Seamless, MS heavy duty, scheduled 40 pipes / as per IBR, with insulation and aluminum cladding. Quantity : 1 lot Insulation : Glass wool of specified thickness covered with GI wire netting generally. Insulation shall be covered with aluminum cladding – 22 Guage. Thickness : As per relevant IBR standard. The piping and insulation shall be generally as per IBR standard specifications. Sizes : As required Valves : As required Control valves : As required Fittings : As required Insulation : As required Cladding : As required Pipe support : As required Pipe clamps : As required **Valves** Isolation valves for Pressure gauges and pressure switches. Safety relief valve on the heater outlet. Non return valves as required. Isolation valves as required. Auto Valves as required.		

Refer flow diagram given in Design basis. Minimum valves as shown in flow diagram shall be provided.

INSULATION OF HP PIPES AND FITTINGS

Quantity : 1 Lot

Type: Glass wool of specified thickness covered with GI wire netting Insulation shall be covered with aluminium cladding.
Thickness: As per standard practice.

The steam piping and insulation shall be generally as per standard specifications.

Note : Unit rate per meter for the HP Steam piping shall be provided. Total approximate

General : Pipe sizes and fittings etc. are to be decided as per requirement of various equipment

Steam piping from outlet of boilers to the steam header & out goings thereof will be supplied, installed and connected by the supplier. A dedicated Steam flow meter, density compensated vortex type with digital display & communicate to central control system for flow rate, total flow, pressure, temperature etc. from each of the boilers with requisite fittings shall be installed as recommended by the OEM of flow meter. The data from these steam flow meters shall be displayed on the boiler control panel and facility shall be provided to transfer the data to utility PC. Necessary approval for header and interconnecting HP steam piping from boiler will be obtained from IBR authorities by the supplier within the quoted price. The scope includes preparation and submission of requisite drawings. Bidder shall provide necessary pipe supports for the all the piping. Steam trap lines shall be taken to a suitable location maintaining the aesthetic. The steam header shall have necessary arrangements to remove condensate. Traps to be provided accordingly. Pressure guage to be provided on the steam header. For all steam isolation valves piston type valves shall be used.

All piping within this battery limit shall be in the scope of bidder. Refer Design Basis Distribution scheme.

LP STEAM / CONDENSATE COLLECTION & TRANSFER PIPES, VALVES, FITTINGS AND SUPPORTS

ERW, MS heavy duty (C class) with insulation and aluminium cladding

General : Pipe sizes and fittings etc. are to be decided as per requirement of various equipment

Quantity : 1 lot

	Insulation : Glass wool of specified thickness covered with GI wire netting generally. Insulation shall be covered with aluminum cladding. Thickness : As per relevant IS standard. The piping and insulation shall be generally as per IS standard specifications. Sizes : As required Valves : As required Control valves : As required Fittings : As required Insulation : As required Cladding : As required Pipe support : As required Pipe clamps : As required **INSULATION OF HP/LP/CONDENSATE PIPES & FITTINGS** Insulation : glass wool of specified thickness covered with gi wire netting generally. Insulation shall be covered with aluminum cladding. Thickness : as per relevant is standard Note: condensate pipes shall be insulated with glass wool. **STEAM TRAPS ASSEMBLY - COMPACT TYPE** Quantity : 1 LOT		
16	*1 PRESSURE REDUCING STATION* There shall be 1nos of PRS station; For Deaeration Vessel steam (10.5 4 Kg/cm2- 3.5 Kg/cm2) PRS -2 (Located in boiler house) Steam Inlet Pressure : 10.54 Kg/cm2 Steam Outlet Pressure : 3.5 Kg/cm2 Steam flow : Suitable as per Supplier Scope of Supply: PRS shall be equipped with: • Pneumatically Operated Pressure Reducing Valve with Roboter • Moisture Separator with compact steam trap module	2	Lot

	• Strainer • Three Isolation Valve (Inlet, Outlet & By pass) All valves shall be zero leak asbestos free type valve. • Safety Valve - 1 No • All interconnecting piping flange to flange end		
17	.2 *Vortex Type HP steam flow meter at the outlet of the Boiler with Transmitter The reading shall be shown in PLC control panel also.*	1	No.
18	.3 *Magnetic type water flow meter at the inlet of the Boiler system with transmitter. The reading shall be shown in PLC control panel also.*	1	No.
19	**Supporting Structural, Platforms, Ladders, etc & Painting** All supporting structure for tank, Deaerator, Boiler, APH, MDC, Bag filter, Fans, Piping, Electricals, Ducting and other equipments. Civil foundations shall be provided by the Client however supplier to provide template and bolts for foundation wherever required. **Painting: - 1 Lot** All the exposed MS surfaces and boiler shall be thoroughly cleaned with sand blasting followed by two coats of heat resistance anti corrosive primer followed by two coats of heat resistance paint. Similarly all other structures, boiler package items, etc all shall be thoroughly cleaned with sand blasting followed by two coats of heat resistance anti corrosive primer followed by two coats of heat resistance paint.	1	LOT
20	STATUTORY REQUIREMENTS & APPROVALS The steam generation plant and piping shall comply with the latest Indian Boiler Regulations (IBR), International Standards Organization (ISO) if required as per State and Indian laws. The electrical equipment and their installation shall comply with the latest Indian Electricity Regulations, local CEIG and the Electricity Board regulations of the Local state. The HP steam piping shall be got approved by the supplier from the statutory authorities and any modifications or changes, if suggested by the authorities, shall have to be carried out by the supplier without any additional cost. IBR certifications shall be provided for entire package including the HP steam pipe line and headers. Before outlet valves of main PRS system, all statutory requirements such as steam generation plant, Steam Main header, HP steam piping, etc shall be in the scope of the bidder. Original IBR certificate shall have to be handed over to the purchaser. The retention amount against SUPPLY component of the order will be certified only after the supplier submits to the Purchaser the file containing all IBR certificate including pipeline IBR certificate as well as statutory approvals.	1	Job
21	INSTALLATION, TESTING AND COMMISSIONING.	1	Job

Quantity : 1 Job

Erection, testing and commissioning is inclusive but not limited to the following:

- Erection & Commisioning of complete steam generation plant shall be responsiblity of the bidder. All required material, equipments, tools, welding machines, etc are to be provided by the bidder. This is a turnkey project and hence bidder to take entire responsibility of the erection and commissioning of the steam generation plant along with utilities.

- Positioning of all the plant equipment in the approved locations, including grouting, anchoring etc as per requirement and as specified in the Special conditions of contract - Mechanical.
- Laying of steam and Service pipelines inclusive of the necessary valves, fittings, insulations, etc including the necessary accessories if any.
- Anchoring of the pipe lines on necessary supports for all Service pipelines.
- Erection/Welding/Grouting into place necessary structural platforms, walkways, hand rails etc., as per requirement.
- Laying of LT Power cables in GI conduit pipes, Cable trays, underground (including excavation etc as per specifications or in trenches provided by the purchaser, including the anchoring of cable trays/conduits, isolators, junction boxes, remote push button stations, capacitor banks etc.
- Termination of Power cables on MCC and on Motor starters, Capacitors, isolators with suitable cable glands, lugs etc. including the drawing & termination through flexible conduits, the flexible copper conductors between motor and isolators/junction boxes.
- Termination of control cables/sensor wires on RCPs, control panels, limit switches, indicators, controllers etc
- Earthpit installation complete including excavation, installation, refilling etc. In case of chemcial earthing drilling as per required process.
- Earthing of all electrical equipment with two runs of earth electrode of appropriate size from earthpits, Panel board trenches etc
- Approval of Electrical installation executed by the bidder by the Electrical Inspectorate. Necessary statutory fees will be reimbursed on production of stamped receipt.
- IBR Approval of all installation executed by the bidder by the IBE Inspectorate. Necessary statutory fees will be reimbursed on production of stamped receipt.
- Slow firing of boiler as per Steam generation process plant requirements and as per IBR requirements for each boiler.
- Final Boiler firing as per Steam generation process plant requirements and as per IBR requirements for each boiler.

- Establising Equipment and Services consumption and efficiency parameters as mentioned in the PO and supplier bid for each boiler.

NOTE

1. The bidder has to take note of the Special conditions of contract - Mechanical, Electrical and erection which gives in detail the specifications for painting, cable laying/handling as also the details of the Earthing network.

2. Welding: All weld joints for fabricated items should be ground smooth from inside to facilitate easy and free flow of material

3 This is a turnkey project and hence erection, testing and commissioning of the steam generation plant shall be considered in totallity so as to acheive the desired product capcity and quality.

Testing & Commissioning

After completion of erection and connection of all services, the plant shall be operated by the Supplier section wise to make final testing, adjustments & modifications. Supplier shall arrange and demonstrate the commissioning & performance trial runs of the entire plant as per the technical rated parameters offered in the technical proposals. Supplier to depute their commissioning / process engineers to site for pre-commissioning check up and during commissioning period.

During Testing and trial period, necessary operating guide lines and practices should be explained to the operating personnel and shall be trained accordingly.

Training of the personnel of purchaser at different stages of assembling, installation and operations etc. should be provided.

Supplier shall provide complete set of plant documentation in Consultant's format for the items supplied and design documents related to it. Also supplier to submit entire plant asbuilt drawings along with Complete plant operation manual. Without this obligation, the supplier shall not be relieved from his duties and plant handover shall not be done. All documents shall be submitted in soft and hard format (3 sets)

COMMISSIONING ASSISTANCE

Supplier to depute their engineers to site for pre-commissioning check up and during commissioning for maximum 30 days in maximum 2 visits.

	LIST OF SPARES The Vendor is requested to provide the list of recommended spares for 1 years of operation and maintenance. The Vendor is also required to provide 1 sets of Service Kits for each Boiler set.		
22	**STANDBY OPERATION & TRAINING** Complete operation, maintenance and trouble shooting Training for at least 10 man days shall be considered and provided to the Client personals.	1	Job

NOTE:

The scope includes design, manufacturing, supply, installation, testing, commissioning and demonstration of performance guarantee of complete Steam generation System according to the specifications mentioned in the technical specification and design basis section. The Vendor shall also be responsible for training the customer's personnels in the field of plant operation & control, maintenance & repair of the equipment involved in the system.

Bidder to quote lumpsum value for entire project in the online Price bid section based on but not limited to the equipment list and specifications mentioned in the tender. This is a turnkey job, therefore the items which are not specifically mentioned, but required to commission the plant successfully as per tender requirements shall have to be supplied by the bidder, to meet the tender requirements. Also if bidder has not mentioned any extra items and if at later stage the demand for extra item is made by the bidder to complete the turnkey job then the same item has to be supplied at free of cost to the Purchaser.

Sub -Section 7

LIST OF PREFERRED MAKES OF MAJOR BOUGHT OUT ITEMS

LIST OF PREFERRED MAKES OF MAJOR BOUGHT OUT ITEMS

Item Description	Makes
INSTRUMENTATION, CONTROLS & AUTOMATION	
VFD	SIEMENS / SCHNEIDER / DANFOSS / ROCKWELL / YASKAWA
LEVEL TRANSMITTER & INDICATOR	E&H / EMERSON / SIEMENS/ ANDERSON NEGLE/ BAUMER
TEMPERATURE / PRESSURE TRANSMITTER	E&H / EMERSON / SIEMENS/ ANDERSON NEGLE / BAUMER
CONDUCTIVITY & PH TRANSMITTER / TURBIDITY TRANSMITTER	E&H / EMERSON / YOKOGAWA / ANDERSON NEGLE
DENSITY TRANSMITTER	E&H / EMERSON
RTD	ALTOP / GIC / RADIX / ANDERSON NEGLE / E&H
PID CONTROLLER	YOKOGAWA / JUMO / HONEYWELL / RADIX
FLOW SWITCH	DANFOSS / SWITZER / IFM, GMBH/ ANDERSON NEGLE
PROXIMITY SWITCH	IFM / SICK / P&F
LEVEL SWITCH (VIBRATING FORK TYPE/ CAPACITANCE/ADMITANCE TYPE)	E&H / EMERSON / SIEMENS / ANDERSON NEGLE / BAUMER
LEVEL SWITCH (FLOAT TYPE)	PUNE TECTROL OR EQUIVALENT
VORTEX / MAGNETIC FLOW METER	E&H / EMERSON / SIEMENS
MASS FLOW METER	E&H / EMERSON / SIEMENS
CONTROL VALVE	DANFOSS/BURKET/DEMBLA / SAMSON
PRESSURE SWITCH / TEMP. SWITCH / THERMOSTAT	DANFOSS / SWITZER / E&H / ORION / WIKA / ALCO
PRESSURE & TEMPERATURE GAUGE	GIC / WIKA / WAAREE / RADIX / BAUMER
DUAL TYPE PRESSURE / TEMP GAUGES	GIC / WIKA / WAAREE / RADIX / BAUMER
TEMPERATURE DIGITAL INDICATOR / CONTROLLER	YOKOGAWA / RADIX / HONEYWELL
LOAD MANAGER / POWER / ENERGY MONITOR	ALLEN BRADLEY / SIEMENS / ABB / L&T / SCHNEIDER
PC (PERSONAL COMPUTER)	HEWLETT-PACKARD/ DELL / SONY
DCS/PLC SYSTEM & AUOTMATION SYSTEM	SIEMENS / SCHNEIDER / ROCKWELL
ELECTRICALS	
TRANSFORMERS	VOLTAMP / GE / SCHNEIDER / CROMPTON GREAVES
ELECTRIC MOTORS	SIEMENS / CROMPTON / ABB / BHARAT BIJLEE
AIR CIRCUIT BREAKER	SCHNEIDER / SIEMENS / ABB / L&T

MCCB	SCHNEIDER / SIEMENS / ABB / L&T
MPCB	SCHNEIDER / SIEMENS / ABB / L&T
CONTACTORS	SCHNEIDER / SIEMENS / ABB/ L&T
STARTER OVERLOAD RELAYS	SCHNEIDER / SIEMENS / ABB / L&T
TIMERS ELECTRONIC	SCHNEIDER / SIEMENS / ABB / L&T
SWITCH FUSE UNITS	SCHNEIDER / SIEMENS / ABB/ L&T
MCBS	SCHNEIDER / SIEMENS / L&T HAGER / MDS - LEGRAND/ L&T
PUSH BUTTONS	TEKNIC / ABB / SCHNEIDER / GE / SIEMENS / L&T
INDICATING LAMPS (LED)	TEKNIC / SCHNEIDER / SIEMENS / ABB / L&T
DIGITAL AMMETER & VOLTMETER & POWER FACTOR METER	L&T / SELEC / SIEMENS/ L&T
ANALOG AMMETER & VOLTMETER & POWDER FACTOR METER	RISHABH / IMP / MECO / AE / BHEL/ L&T
DIGITAL ENERGY METER	CONZERV/L&T / HPL SOCOMEC / SIEMENS/ L&T
ANALOG ENERGY METER	GEC / UNIVERSAL / HAVEL/ BHEL/ L&T
PVC CONDUIT & ACCESSORIES	PRECISION / CLIPSAL / POLYCAB
CURRENT TRANSFORMER	KAPPA / MECO / AE / IMP / INDCOIL / KALPA
LT POWER CABLES – ALUMINIUM CONDUCTOR - ARMOURED	RPG(KEC) /NICCO / UNIVERSAL / POLYCAB / HAVELLS / KEI / RR KABLE/ Lapp / SBEE/ Thermocab
COPPER POWER / CONTROL CABLES – STEEL BRAIDED	POLYCAB / RPG ASIAN / HAVELL'S / KEI/ Lapp/ SBEE/ Thermocab
LT COPPER POWER CABLES – ARMOURED	HEVELLS /RPG-KEC/POLYCAB/ SBEE/ Thermopad / KEI / RR KABLE / Lapp/SBEE/Thermocab
SIGNAL & INSTRUMENT CABLE	POLYCAB / KEI / LAPP/ RR KABEL/ SBEE/ Thermocab
POWER CAPACITORS	EPCOS / SCHNEIDER / SIEMENS /L&T
APFC RELAY	SCHNEIDER /BELUKE / EPCOS / L&T / SIEMENS
CABLE TRAY	INDIANA / MEK / PILCO / ELCON / METALICA PRESSINGS / POWER CONTROLS /SWASTIK/ KVT /Silverline
ISOLATING SWITCHES	SIEMENS / ABB / SCHNEIDER / L&T
HRC FUSES	L&T / SIEMENS / GE POWER
IP 55 BOXES FOR MOTOR ISOLATORS, PUSH BUTTONS, JUNCTION BOXES, ETC.	HENSEL / ELDON / FABRICATED (IF APPROVED)
PLUG & SOCKET	LEGRAND / CLIPSAL/ SCHNEIDER / HENSEL
POTENTIAL TRANSFORMERS	KAPPA / BHARTI / AE / ASHMORE

TERMINAL BLOCKS	WAGO / CONNECT WELL / ELMEX / LAPP INDIA
ROTARY SELECTOR SWITCH	KAYCEE / SALZER / L&T / SIEMENS / SCHNEIDER
CABLE GLANDS	COMMET / EX-PROTECTA / DOWELS / LAPP KABEL
CABLE LUGS	DOWELS / COMMET / LAPP KABEL
MECHANICAL INTERLOCK	SCHNEIDER / ABB / SIEMENS/ L&T
ELECTRONIC SOFT STARTER	SIEMENS / ALLEN BRADLEY / SCHNEIDER / ABB/ L&T /DANFOSS
Programmable Protection Relay	MINILEC / L&T / SIEMENS / SCHNEIDER
SERVO VOLTAGE STABILIZER	SUVIK / EMERSON / CRYCARD / APLAB
UPS	EMERSON-LIEBERT / HI-REL / APC / REILO PC
SMF BATTERY	YUASA-ROCKET / FURUKAWA / EXIDE / PANASONIC / AMARAJA
HT VCB	Siemens /ABB/SCHNEIDER/l&t
VALVES & PIPES (MS & GI)	
WATER VALVES (BUTTERFLY / BALL)	AUDCO / SAUNDERS / INTERVALVE / BDK / CRESCENT / FESTO / DELVAL/ LEADER /UNIKLINGER /KSB /EXPERT / MICON/ARI
WATER VALVES (DIAPHRAGM)	SAUNDERS / BDK / DELVAL / AUDCO / ARI
NON-RETURN VALVE FOR WATER	AUDCO / INTERVALVE / BDK / LEADER/ DELVAL / ARI
WATER FOOT VALVE	KIRLOSKAR / GG / LEADER/ DELVAL / ARI
GI PIPES FOR WATER	TATA / JINDAL / ZENITH
MS PIPES FOR AIR, STEAM, CONDENSATE	TATA / JINDAL
NRV FOR AIR / OIL LINE	INTERVALVE / AUDCO / LEADER / DELVAL
SOLENOID VALVE FOR WATER LINE	DANFOSS / AVCON / ROTEX / BURKERT / SMC/FESTO / ARI
Vortex Water Flow Meter	E&H / EMERSON
FO flow meter	E&H / EMERSON
HP / LP Steam / condensate Valves	SPIRAX / ARM STRONG, USA / THERMAX / FORBES MARSHALL/ UNIKLINGER/ARI
RESIN BONDED MINERAL WOOL	LLOYD / UP TWIGA / ROCKWOOL/ MINWOOL
Steam relief valve, traps & strainers	SPIRAX / ARM STRONG, USA / THERMAX/ FORBES MARSHALL / ARI
Steam Pressure Reducing Valve	SPIRAX / ARM STRONG, USA / THERMAX / MAZDA / FORBES MARSHALL/ARI
AIR COMPRESSORS & AIR LINE FITTINGS	

AIR COMPRESSOR (SCREW/ RECIPROCATING)	ATLAS COPCO / INGERSOLL RAND / KOBELCO (KOBE)
REFRIGERATED AIR DRYER	ATLAS COPCO / INGERSOLL RAND / ELGI / SABROE/CHICAGO PNEUMATICS/HIRAS
AIR LINES ACCESSORIES	FESTO / LEGRIS / SMC / ROTEX / NUCON / AIRMATIC / SHAVO NORGEN
AUTO DRAIN VALVE	ULTRA FILTER / ZANDER
BOILER	
BOILER WITH ACCESSORIES	FORBES MARSHALL / THERMAX
Boiler steel drum plate	SAIL /TISCO Conforming to IBR
Boiler tubes	TATA Conforming to IBR
HP steam pipes and fittings	TATA Conforming to IBR
HP steam pipe fittings	IBR approved
Feed water pump / Boiler Feed pump	Grundfoss / CNP / WILO / KSB / Xylem
FD fan	OILON / WEISHAUPT /SAACKE
Burner	SAIL/TISCO/RINL/IISCO/ESSAR
Sequence controller	Thermax / GESTRA/ INDITECH
Photocell	Kromschroeder/ Dungs
Steam NRV	EXPERT/THERMAX/MICON/
Blow down valves	LEVCON / LEADER
Single/two/three element water level controller	Levcon/ EMERSON/ E&h
Orifice plate	General Instrument / Starmech
Structural steel	SAIL/TISCO/RINL/IISCO/ESSAR
Automatic Blow down Control System	Thermax / GESTRA/ INDITECH
MISCELLANEOUS ITEMS	
GEARED MOTOR / GEAR BOX	PBL / POWER MASTER / ELECON / IC BAUER

(Note : In case the make of specific items/ equipment is not available in the above list, the bidder may indicate the same in their bids. However the acceptance of the make of specific items/ equipment is discretion of the purchaser.) All makes needs to be approved from SANGH / CONSULTANT before placement of order to vendors during detail engineering stage. In case of OEM package such as Boiler plant, etc OEM makes can differ and hence the same shall be allowed only with pre-approval before placement of sub-order only.

Sub -Section 8
Battery limits

BATTERY LIMITS

Supplier will be responsible to undertake all the works involved in completing the project within the battery limits prescribed below

STEAM:

Entire new steam Generation plant for the New plant shall be in the scope of supply and execution shall be done accordingly the supplier. The steam distribution from new boiler system shall be upto the main steam header located in the new Boiler building. New main steam header shall also be connected to the existing steam pipeline going to the plant by the supplier including isolation valves (Piston type) for current and spare nozzles both. Supplier shall provide low pressure steam including PRS to the Deaeration system. Statutory approval for HP steam lines and entire boiler package shall be in the scope of the supplier. Refer Basic Steam Distribution Diagram given in Design Basis. Entire Distribution of the HP/LP steam within the battery limits shall be in the scope of the supplier including flow meters, piping, supports, valves, insulations, steam traps, PRS, thermodynamic traps, vents, drains, etc all.

Condensate

The client shall collect all the good condensate from plant and shall connect the same upto the inlet of the boiler Deaeration vessel condensate input control loop located in the new boiler house. Refer Basic Condensate Collection Diagram given in Design Basis.

POWER:

Power shall be made available by the client at the inlet of the Boiler MCC incoming feeder level. Entire Power Distribution including MCC panel and onwards as required for new boiler plant shall be in the scope of the Supplier. From this point onwards MCC, Power & Control cable, all equipment earthing, cable trays, SS/MS conduits, support, gland termination, earthing etc. shall be in the scope of this tender.

SOFT WATER:

Soft water shall be provided by the client at the nearest location outside the boiler house. From this point onwards including water collection, piping, fittings, valves, NRV, supports, racks, etc. shall be in the scope of this tender.

COMPRESSED AIR:

Compressed Air shall be provided by the client at the nearest location outside the boiler house. From this point onwards entire scope of Compressed Air distribution shall be in the scope of this the supplier. Distribution of Compressed Air shall be in the scope of the supplier including pipes, supports, Header, flexible connection, instant fitting etc shall be in the scope of this tender.

Automation and Instrumentation:

Automation and Instrumentation for entire new Boiler plant project shall be in the scope of this tender.

Civil Work:

All type of civil work shall be in the scope of purchaser. However, the bidder shall provide for the supply of foundation bolts along with template/ sub- base, motor slide rails etc. for erection and alignment of the equipment.

Exhaust Air / Flue Gas

Shall be let out at height of 30 M or height as per PCB norms, whichever is higher, by supplier. Shall follow Local Pollution control norms.

Fuel

Purchaser shall provide fuel as required for trial runs, commissioning and performance demonstrations.

Sub -Section 9

Deviations from Technical Requirement

9. DEVIATION FROM TECHNICAL REQUIREMENT

9.1 This tender document provides guidelines for the processes and equipment to be used in tender package and the "basis of design" and the "standards and specifications", define the qualitative parameters against which equipment will be required to perform.

9.2 It is incumbent on bidder to provide a fully detailed list of equipment and services, which they intend to provide a fully execute the contract inline with the tender document.

9.3 At various points in the tender the purchaser has stated that alternative processes or alternative equipment will be considered. The bidder as part of the bid document shall provide the fully detailed list of such alternatives, together with a consider rationale for employing such alternatives.

9.4 Items, which deviate from the tender proposal, shall be as per design specification of the bidder and shall be treated as a deviation from the text of this tender document. Deviated item should fulfill the minimum performance parameters as specified in the tender.

9.5 This tender does not allow bidders to make exclusions from any part of tender packages for which they bid, and an incomplete list of equipment or an incomplete schedule of services to be provided would be considered as a non-responsive bid.

Table 3
Technical Deviation Statement Form

Sr. No	Clause Reference	Deviation	Remarks (Justification)

Above are the particulars of deviations from the requirements of the tender specifications. The technical specifications furnished in the bidding document shall prevail over those of any other document forming a part of our bid, except only to the extent of deviations furnished in this statement.

Date

Signature of Authorised Signatory of Bidder/Supplier

NOTE: Where there is no deviation, the statement should be returned duly signed with an endorsement indicating "No Deviations".

Sub -Section 10
OPTIONAL ITEMS

10. OPTIONAL ITEMS

10.1 All items mentioned in the tender packages or in the basis of design as optional items shall be quoted on the basis of equipment of the systems that are supplied "ready to pipe in ". The price for such items shall include supply, installation, commissioning and connections including all necessary piping, fitting, instrumentation, controls, utilities etc.

10.2 The entire system shall be designed with all provisions to include the optional items in such a way that no major changes would be required in the system. The provision shall be made in the system irrespective of whether these additional items are supplied or not. The specifications of optional items shall be the same as that of similar items mentioned in tender.

10.3 The cost of optional items shall not be included in the calculation of total bid price. In the event that the purchaser, for supply, selects optional items, the quoted price for the optional item shall include all incidental costs of installing that item as part of the contract.

Sub -Section 11

DRAWING, DATA & DOCUMENTATION SUBMISSION

11. DRAWINGS ENCLOSED WITH THE TENDER

- A set of site plan drawings along with tentative Building layout is enclosed along with the tender document for bidder's reference.

11.1 DOCUMENTS REQUIRED FROM THE BIDDER

11.1.1 The Bidder must enclose the following Drawings with the Offer:

The vendor is required to submit the following documents as applicable with the offer:

- Heat and Mass Balance Detail Diagram
- Safety certificates / Equipment catalogue / G. A
  Drawings with all the equipment / system specifications.
- Proposed layout showing space and building area required.
- Piping and Instrumentation Diagram.
- End connections / Battery Limit / Scope / Exclusion details.
- Material of Construction.
- Specific Fuel consumption and power consumption.
- **Utility requirement and other special requirements.**

The following Technical data shall be provided during detailed engineering stage:

- Design basis for the proposed plant.
- Final Heat and Mass Balance Detail Diagram
- Specific fuel consumption and power consumption
- Standards followed.
- Final P&ID & Layout.
- Foundation details and foundation layout.
- QAP.
- Packaging details.
- Manufacturing plan/schedule.
- Commissioning program.
- Technical specifications and Makes of bought out and fabricated items.
- Material testing certificates
- GA drawings of mechanical bought out and fabricated items.
- Electrical and automation scheme details along with interlock arrangements.
- Factory acceptance test (FAT) report before dispatch
- Operation & maintenance & Manuals Copies - 1 No. Soft Copy - 3 No. colour Hard Copy
- Shipping Details

11.1.2 The Bidders must enclose the following information in their Offer:

- Category wise staff requirement for various productions and utility Section of the plant on shift and daily basis.
- Literature covering general and technical information for all equipment covered within the scope of the tender.

- Detailed calculations for selection of process and utility equipment based on utility consumption and process requirements.

11.2 PERFORMANCE TESTS

11.2.1 The bidder is required to detail the documentation proposed for performance tests of all major items of equipment and all major processes and services plant. This shall detail the guaranteed vs. actual throughput or output or performance (as relevant) and the tolerance of accuracy. Also the test methods proposed to demonstrate that these guarantees have been met.

11.3 DESIGN DATA TO BE PROVIDED BY THE SUPPLIER

- Design Considerations / calculations wherever required.
- Literature & data sheets – The bidder shall furnish the relevant details.
- Makes of all equipment and accessories - The bidder shall furnish the relevant details.
- Details of any other equipment/item, which is not mentioned above but is required as per description in the text, shall also be provided.
- Details of any other equipment/item that the bidder feels is necessary shall also be provided.

11.4 UTILITIES CONSUMPTION

The following tables are to be completed by the bidder and returned with bidding documents. This is mandatory and failure to comply may make the bid deemed non-responsive.

Utilities Consumption Data		
Steam	Peak Load kg/hr Average Load Kg/Hr Total Load kg/day Tolerance ± %	
Power	Peak Load kW Total Load kWh/day Tolerance ± %	
Fuel (Briquettes / Wood)	Peak Load Kg/hr Average Load Kg/Hr Total Load Kg/day Tolerance ± %	
Filtered Water, RO Water & Soft Water (Separately)	Peak Load lt/hr Average Load Lt/Hr Total Load lt/day Tolerance ± %	

Sub-Section 12
Criteria for
Technical Evaluation of Bids

12. TECHNICAL EVALUATION OF BIDS

The purchaser will evaluate and compare the technical merits of the bids based on the information supplied by the bidders taking in to account the following factors:

12.1 Suitability of the process with regards to ultimate product quality conforming to the standards specified in the tender.

12.2 Specifications of individual equipment as well as the system as a whole for material of construction, throughput, operating parameters, level of automation etc.

12.3 Energy efficiency of individual equipment and system as a whole.

12.4 Determination of filling accuracy of the product packaging machines and product losses.

12.5 Product losses during processing and product manufacturing for individual equipment and ultimately in the effluent system.

12.6 Consumption of consumable materials.

12.7 Space requirement.

12.8 Cost of spare parts.

12.9 Preference shall be given on better and advance technology.

12.10 Utility and raw material consumptions provided by the bidder.

12.11 Data as asked in sub-section 11 must be provided by the supplier along with the technical bid. Bidder's bid may be rejected if the same data is not provided.

12.12 Following evaluation of technical bid shall be done which shall form part of the tender evaluation and shall be final for technical details provided.

- The availability in India of spare parts and after-sales services for the goods/ equipment offered in the tender
- Type of Technology offered by the bidder.
- Utility and raw material consumptions –used by bidder in his system.
- The projected operating and maintenance costs during the life of the equipment; and
- The performance of productivity of the equipment offered
- If it is found that any Bidder/Supplier for any reason indicates impractical or impossible data to arrive performance guarantees, such data shall be corrected and all the calculations shall be based on the data furnished by the highest Bidder/Supplier for the purpose of comparison.
- All information asked in the Technical tender - Section – II, Sub section 11 of the tender document must be provided along with the bid. Failure to provide the details as per these sections may cause bid to be rejected. Based on the data received under these sections the bids shall be evaluated.
- Based on the consumption data provided by bidders and after checking the same technically it shall be established that which bidder plant is having lower plant operational cost. The bidder with lower plant operational cost shall be preferred. The figures provided by bidder shall be binding to them though out the contract period.

Sub- Section 13

Process Performance and Consumption Guarantees

13. PROCESS PERFORMANCE & CONSUMPTION GUARANTEE

The supplier shall warrant that the goods and equipment, supplied, installed and commissioned are new, unused, of most recent or current design and incorporate all recent improvements in design and material unless provided otherwise. The supplier shall further warrant that goods supplied shall have no defect arising from design, material, poor workmanship. The supplier shall also guarantee that the goods supplied shall perform satisfactorily as per the signed / rated / installed capacity as provided in contract. The warranty / guarantee shall remain valid for 18 months after the goods have been delivered at site or 12 months after installation and plant successfully tested, commissioned, and accepted by the customer. The Vendor shall upgrade / replace the equipment in case it does not perform as per the Performance Parameters mentioned in the specifications.

Equipment should run continuously during manufacturing operation

The supplier shall be responsible and be liable, free of cost to replace or repair at our option the system supplied that need replacement or repair at because of any defect in the material, workmanship or in the design, brought to the suppliers notice within 12 months from the date of commissioning or 18 months from the date of Supply whichever is earlier, based on 24 hours continuous duty per day.

Following procedure shall be followed to demonstrate performance of the plant which will be carried out over a period of Seven day trails after the stabilization of the Steam generation plant:

• Steam generation plant
a) Achieving 10.54 Kg/cm2 pressure with output of 5 Tons/hr F&A 100 deg C. Full flow Capacity - Derived through pressure and Flow meter measurement - 2 Test for each Steam generation set.

b) During Full flow capacity trial – Checking of fuel consumption vs output of steam to cater the cost per kg of steam. The data shall match with the guarantee figures provide by the supplier.

c) During Full flow capacity trial – Checking of Utility i.e. specially power consumption. The data shall match with the guarantee figures provide by the supplier. Checking of each motor power consumption using the multimeter as per rated capacity.

d) Efficiency calculations with respect to fuel feeding and load given to the Steam generation sets –(Derived from flow meter and pressure transmitter given on steam lines) against given amount of fuel.
e) Achieving full plant capacity – 2 trials.

If the plant or any part thereof does not give the agreed process performance and consumption guarantees during the warrantee period due to reasons attributable to the supplier, the supplier shall, subject to following:

EQUIPMENT PERFORMANCE

The satisfactory performance of the equipment/processing plant will be considered achieved if the plant operates above 98% of the rated capacity declared by supplier in the offer.

If the performance is between 95-98% of the rated capacity, penalty will be calculated at 2 % of the rupee value of the contract, per 1% of shortfall and part thereof.

If the performance is below 95%, the contractor will be required to upgrade the plant or replace the plant to comply with the above performance criteria. Otherwise the plant will be deemed unacceptable.

SERVICES REQUIREMENT

If measure demand of services in the plant is less than 102% of the consumption declared by the contractor, the buyer will accept that the service requirement guarantee has been achieved.

If the requirement of any of the services in the plant is between 102% and 105% of the declared demand, penalty will be charged at 2% of every 1% rise and part thereof in consumption for each of the services which falls in the category of excessive demand. For the purpose of this calculation, only the main services, water, steam, power and chilled water will be considered.

If the measured demand for services and energy is above 105%, the contractor will be required to up-grade the plant or replace the plant to comply with the declared performance criteria. Otherwise the plant will be deemed un-acceptable.

The penalty shall be levied for shortfall in performance of individual sections. However, if the shortfall in performance of any section affects the performance of the other sections, then penalty shall be levied for the entire contract value of all the affected sections.

MAXIMUM LIABILITY

The maximum liability of suppliers on all counts of penalties including above, Liquidated Damages clause and other liabilities of any kind shall not exceed 5% of Contract value.