Tender Document for Design, Engineering, Manufacture, supply and labour jobs for Erection, Installation, testing and commissioning of 0.5 LLPD Expandable to 1 LLPD Buttermilk Processing, manufacturing & packing unit on turnkey basis at Dudhsagar Dairy-Patan, Mehsana

Mehsana District Co-Operative Milk Producers’ Union Ltd.

Dudhsagar Dairy, Highway, Mehsana –384 002, Gujarat, India

www.dudhsagardairy.coop, Phone: (02762) 253201-05, Fax: (02762) 253422
LOCAL COMPETITIVE BID FOR

DESIGN, ENGINEERING, MANUFACTURE, SUPPLY AND LABOR JOBS
FOR
ERECTION, INSTALLATION, COMMISSIONING AND TESTING
OF
0.5 LLPD EXPANDABLE TO 1 LLPD BUTTERMILK PROCESSING,
MANUFACTURING & PACKING
AT DUDH SAGAR DAIRY PATAN, MEHSANA, GUJARAT

BID REFERENCE NO: MDCMPUL/18-19/40/ DSD- Patan
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<td>List of acceptable Banks for BG Guarantees From Foreign / Nationalized / Scheduled Banks</td>
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Section - I
Invitation for Bid
### 1.1 Notice Inviting Tender

<table>
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<th>Tender Notice No.</th>
<th>MDCMPUL/18-19 /40 /Buttermilk /DSD Patan</th>
</tr>
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<tr>
<td>Bid Documents Download Start</td>
<td>6th October, 2018</td>
</tr>
<tr>
<td>Bid Documents Download End</td>
<td>2nd November, 2018 till 17:00 Hours</td>
</tr>
<tr>
<td>Pre-Bid Meeting</td>
<td>20th October, 2018 at 11 hrs. at M Floor, Office Building, DSD, Mehsana</td>
</tr>
<tr>
<td>Last Date &amp; Time for ONLINE submission of commercial bids</td>
<td>2nd November, 2018 till 17:00 Hours</td>
</tr>
<tr>
<td>Last Date &amp; Time for sending tender fee, EMD and other documents (in hard copy) as mentioned in the tender document</td>
<td>13th November, 2018 till 18:00 hrs.</td>
</tr>
<tr>
<td>Bid Validity Period</td>
<td>120 Days</td>
</tr>
<tr>
<td>Bid Document Fee :</td>
<td>Rs.10,000.00</td>
</tr>
<tr>
<td><strong>Bid Security/EMD (INR)</strong></td>
<td><strong>Estimated cost of Project</strong></td>
</tr>
<tr>
<td></td>
<td>Rs. 235.00 Lakh</td>
</tr>
<tr>
<td>Bid Document Fee/EMD Payable To :</td>
<td>Mehsana district Co-operative Milk producer’s Union Ltd, Mehsana</td>
</tr>
<tr>
<td>Name of Company</td>
<td>Mehsana District Co-operative Milk Producers’ Union Ltd, Dudhsagar Dairy, Highway, Mehsana-384002</td>
</tr>
<tr>
<td>Name of Project</td>
<td>Design, Engineering, Manufacture, supply and labour jobs for Erection, Installation, testing and commissioning of 0.5 LLPD Expandable to 1 LLPD Buttermilk Processing, manufacturing &amp; packing unit on turnkey basis at Dudhsagar Dairy-Patan, Mehsana.</td>
</tr>
<tr>
<td>Name of Work</td>
<td>Design, Engineering, Manufacture, supply and labour jobs for Erection, Installation, testing and commissioning of 0.5 LLPD Expandable to 1 LLPD Buttermilk Processing, manufacturing &amp; packing unit on turnkey basis at Dudhsagar Dairy-Patan, Mehsana</td>
</tr>
<tr>
<td>Period of Completion of Project</td>
<td>6 Months</td>
</tr>
<tr>
<td>Online Bidding Details</td>
<td><a href="http://www.nprocure.com">www.nprocure.com</a></td>
</tr>
<tr>
<td>Terms and Conditions</td>
<td>This is a two stage tender i.e. first, technical data submitted by bidders will get analyzed at our end. Then commercial bid of only technically qualified bidders will be considered for second stage of</td>
</tr>
</tbody>
</table>
### 1.2 Eligibility Criteria

1. The Bidder / Supplier must have turnover in each of the last three years, at least three times to the estimated cost of the job and must have executed, in the last five years at least a contract of similar nature and value equal to the estimated cost of the job.

2. Bidders shall have the experience of Installation of Fermented milk Products.

3. The bidder, in the same name, style, during the last five financial years must have successfully designed, supplied, installed and commissioned the number of contract(s) of similar nature.

4. Bidders must submit completion certificate along with copy of PO towards proof of their eligibility and qualification requirements.

### 1.3 Downloading of Tender Document

The Bid document can be downloaded from website www.nprocure.com. Price of the Bid document (non-refundable) is Rs. 10,000/- by Demand Draft only from a Nationalized / Scheduled Bank in favor of **Mehsana District Co-operative Milk Producers’ Union Limited**, payable at Mehsana.

### 1.4 Submission of the Bid

The bidder has to submit Technical Bid (signed and sealed copy of tender document, technical details, DD of tender fee and EMD) in hard copy through courier /registered post /in person to Managing Director at Dudhsagar Dairy, Mehsana Gujarat.

Bidder should submit Commercial Bid online on website www.nprocure.com. Commercial bid in physical form (price bid) sent to Dudhsagar Dairy will be rejected out rightly.
1.5 Bid Security
All Bids must be accompanied by Earnest Money Deposit (EMD) in the form specified in the Bidding document. The Bids not accompanied with EMD shall be summarily rejected. The Bid security shall be denominated in Indian Rupees of value as specified and shall be in the form of Demand Draft from Nationalized or Scheduled banks in favor of Mehsana District Co-operative Milk Producers’ Union Limited, payable at Mehsana. The Bid security may be forfeited if:

- A Bidder or Supplier withdraws its bid during the period of bid validity specified by the Purchase on the tender document or
- In case of successful Bidder / Supplier, if the Bidder / Supplier fails to sign the contract or execute the contract within specified period of contract.

1.6 Rights Reserved By Dudhsagar Dairy, Mehsana

Dudhsagar Dairy, Mehsana, at its sole discretion and without assigning any reason thereof, reserves the right to accept and / or reject the whole or part of any all the Bids received.

Only after verification and acceptance of the technical parameters the commercial bid will be opened.

1.7 Validity
The offer should be valid for 120 days from the date of tender opening.

Managing Director
Dudhsagar Dairy, Mehsana.
## 2. Check List

The details to be provided by bidders in prescribed check list format, as below:

(supporting documents to be submitted in hard copy):

<table>
<thead>
<tr>
<th>Sr.</th>
<th>Particulars</th>
<th>Confirmation / Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Agreed for Turnkey project on fixed price basis (Yes / No)</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Executed similar nature of Turnkey supply at least one no. within last five years in India (Yes / No). Submit documents.</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Details on Turn Over (in INR) Submit documents</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Yr: 2017-18</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Yr: 2016-17</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Yr: 2015-16</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Agreed for Terms, Conditions as enclosed in tender (Yes / No)</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Agreed for Technical Specification and data provided in Tender document.(Yes / No)</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Agreed for BOQ, scope and data provided in tender (Yes / No)</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Earnest Money Deposit (EMD) enclosed. (Yes / No) –Provide details</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>Total Supply &amp; Installation &amp; Commissioning - Year wise details. Submit documents</td>
<td>In numbers</td>
</tr>
<tr>
<td></td>
<td>Yr: 2017-18</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Yr: 2016-17</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Yr: 2015-16</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>Nos. of fermented milk products’ turnkey project executed by you, in Dairy / food Industry within last 5 years. Submit documents</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>Duly signed and sealed copy of tender document (submit hard copy along with supporting documents to Dudhsagar Dairy)</td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>Already Registered with Dudhsagar Dairy (Yes / No). If Yes, then mention your Vendor code no. otherwise; submit enclosed vendor registration form along with supporting documents listed therein.</td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>Contact No.</td>
<td></td>
</tr>
<tr>
<td>13</td>
<td>Address</td>
<td></td>
</tr>
<tr>
<td>14</td>
<td>Email ID</td>
<td></td>
</tr>
</tbody>
</table>
Important Points for Suppliers

1. Bids containing deviations from bidding document terms and other requirements may be rejected.

2. Bids not accompanied by bid security (EMD) shall be summarily rejected.

3. Non-compliance with even a minor technical requirement should be specifically stated by the suppliers.

4. Suppliers should furnish their complete address for the purpose of further correspondence pertaining to bidding document.

5. Corrections in the tender bid should be noted over and initiated at the place of corrections.

6. Negligence of the supplier in preparing tender bid confers no right to withdraw the bid after it is opened.

7. Specifications, corrections, conditions, schedule and drawing of bidding document constitute an integral part of the bid.

8. The bid, along with enclosures, drawing and technical literature should be in English only.

9. All equipment, system and components should be designed to perform as per the specifications mentioned in this bidding document under tropical conditions.

10. The bidding document shall be governed & interpreted according to the laws of the union of India.

11. Mehsana District Co-operative Milk Producers’ Union Limited accept or reject any or all bids without any explanation to bidders.
Section II
Instructions to Bidders
Contents

1. Cost of Bidding
2. Contents of Bidding Document
3. Clarification of Bidding Document
4. Amendment of Bidding Document
5. Pre Bid Meeting
6. Language of Bid
7. Documents Comprising the Bid
8. Bid Form
9. Bid Prices
10. Price Adjustment
11. Bid Currency
12. Documents Establishing Bidder/Supplier's Qualifications
14. Bid Security (Earnest Money Deposit)
15. Period of Validity of Bids
16. Format and Signing of Bid
17. Sealing and Marking of Bids
18. Deadline for Submission of Bids
19. Late Bids
20. Modification and Withdrawal of Bids
21. Opening of Bids by Purchaser
22. Clarification of Bids
23. Preliminary Examination
24. Evaluation and Comparison of Bids
25. Contacting the Purchaser
26. Post-qualification
27. Right to Vary Quantities at the Time of Award
28. Right to Accept any Bid and to Reject Any or All Bids
29. Notification of Award
30. Signing of Contract
31. Performance Security
32. Import License
33. Turnkey basis Contract
34. Break-up prices
35. Delivery Schedule of items

   Table 1 Check List of Bid Submission
1. **Cost of Bidding**

1.1 The Bidder/Supplier shall bear all costs associated with the preparation and submission of its bid, and the Mehansana District Co-operative Milk Producers’ Union Limited referred to as "the Purchaser", will in no case be responsible or liable for those costs, regardless of the conduct or outcome of the bidding process.

2. **Contents of Bidding Document**

2.1 The goods required, bidding procedures and contract terms are prescribed in the Bidding Document. The contents of the Bidding Document are organized in sections as given in the Table Contents at the beginning of this document.

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

3. **Clarification of Bidding Document**

3.1 A prospective Bidder/Supplier requiring any clarification on the Bidding Document may notify the Purchaser in writing by fax/telex/cable at the Purchaser's mailing address indicated in the Invitation for Bids. The Purchaser will respond in writing to any request for clarification on the Bidding Document, which it receives not later than 7 days prior to the deadline for the submission of bids prescribed by the Purchaser. Written copies of the Purchaser's response (including an explanation of the query but without identifying the source of inquiry) will be sent to all prospective Bidder/Suppliers, which have received the Bidding Documents. However, the Bidder/Suppliers cannot consider delay in receipt of clarifications, as a cause for requesting extension in the due date of submission of the bids.

4. **Amendment of Bidding Document**

4.1 At any time prior to the deadline for submission of bids, the Purchaser may, for any reason, whether at its own initiative or in response to a clarification requested by a prospective Bidder/Supplier, modify the Bidding Document by amendment.

4.2 The amendment will be notified in writing or by fax or cable to all prospective Bidder/Suppliers, which have received the Bidding Documents and will be binding on them. The amendment will be attached to the bidding document sold subsequently.

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

5. **Pre Bid Meeting**

The bidder or his official representative is advised to attend a pre bid meeting...
6. **Language of Bid**

The Bid prepared by the Bidder/Supplier and all correspondence and documents relating to the bid exchanged by the Bidder/Supplier and the Purchaser shall be written in the **English language**. Any printed literature furnished by the Bidder/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 bid, the English translation shall govern.

7. **Documents Comprising the Bid**

The bid prepared by the Bidder/Supplier shall comprise the following Components:

- A Bid Form and a Price Schedule completed in accordance with Clauses 7, 8 & 9.
- Documentary evidence established in accordance with Clause 10 that the Bidder/Supplier is qualified to perform the contract if its bid is accepted.
- Documentary evidence established in accordance with Clause 11 that the goods and ancillary services to be supplied by the Bidder/Supplier conform to the Bidding Document.
- Bid security (Earnest Money Deposit) furnished in accordance with Clause 12 along with the bid security details form.
- A statement of deviation and exception to the provision of bidding documents.

8. **Bid Form**

The Bidder/Supplier shall complete the Bid Form and appropriate Price Schedule furnished in the Bidding Document, indicating for the goods to be supplied, a brief description of the goods, their country of origin, quantity and prices.

9. **Bid Prices**

9.1 The Bidder/Supplier shall indicate on the appropriate Price Schedule attached to this document the total bid prices of the goods it proposes to supply, install and commission under the contract. Bidder/Suppliers must submit a bid for the complete requirement of goods and services specified under tender, failing which, such bids will not be taken into account for evaluation & comparison and will not be considered for award.

9.2 Prices indicated on the Price Schedule shall be entered separately in the following manner:

- **The price is to be given for the total scope of contract. The Bidder should submit price bid on fixed price basis i.e. no price escalation will be applicable on price bid / purchase order final amount. Variation is only allowed due to changes in statutory levies / taxes as applicable to the prices within the contact period.**
- **NO EPCG license/ Custom duty benefit to be considered in bid.**
- **During project execution, if additional quantity of any item covered in Tender price table is required either for completion of turnkey project or capacity expansion, bidder will have to supply & install respective item at same approved rate of our purchase order.**
• Basic rates should be inclusive of P & F, freight, insurance, i.e. FOR our site, but, exclusive of GST.

• Charges for GST applicable, to delivery of the goods to their destination; AS A PERCENTAGE OF BASIC PRICE in the price schedule format given.

• The cost of installation and commissioning as described in the technical specifications and in accordance with Special conditions of Contract with regard to erection, testing and putting the equipment into satisfactory operations, including successful completion of performance and guarantee tests to be performed at the destination by Bidder/Supplier and AS A PERCENTAGE OF BASIC PRICE in the price schedule format given.

• The cost of incidental services listed in Clause 7 of Special Conditions of Contract AS PERCENTAGE OF BASIC PRICE in the price schedule format given.

9.3 The Bidder/Supplier's separation of price components in accordance with above will be solely for the purpose of facilitating the comparison of bids by the Purchaser and will not in any way limit the Purchaser's right to contract on any of the terms offered.

9.4 Price of spare parts All the Bidder/Suppliers are required to submit the following details about the spare parts, along with their bids:

Spare parts required for the items quoted by the Bidder/Suppliers, for 2 years normal operation.

• Item wise prices of all the spare parts valid, for acceptance by the Purchaser and placement of orders, for one year from the date of bid opening.

• The prices of the spares shall be optional for evaluation

10. Price Adjustment

• Price quoted by the Bidder shall not be subject to any adjustment during the performance of the contract. The Bidder should submit price bid on fixed price basis i.e. no price adjustment will be applicable on price bid / purchase order final amount.

• Variation is only allowed due to changes in statutory levies / taxes as applicable to the prices within the contract period.

11. Bid 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 invitation for bid.

12. Documents Establishing Bidder/Supplier’s Experience and Qualifications

12.1 Pursuant to Clause 7 the Bidder/Supplier shall furnish, as part of its bid, documents establishing the Bidder/Supplier’s qualifications to perform the Contract if its bid is accepted. The Bidder/Supplier should also give information in the format attached to the Bidding Document.
• The documentary evidence of the Bidder/Supplier's qualifications to perform the Contract if its bid is accepted, shall establish to the Purchaser's satisfaction

• That in the case of a Bidder/Supplier offering to supply goods and services under the Contract which the Bidder/Supplier did not manufacture or otherwise produce, the Bidder/Supplier has been duly authorized by the goods' manufacturer or producer to supply the goods. The bid shall include man bidding documents.

• That the Bidder/Supplier has the financial and technical capability necessary to perform the Contract. To ascertain this, all bids submitted shall include the information as per the pro forma along with qualification application (Table 1, 2 & 3) in Appendices II.

• Copies of original documents defining the constitution or legal status, place of registration and principal place of business of the company or firm or partnership, etc;

• Details of experience and past performance of the Bidder/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.

• Major items of plant and equipment available/ installed in the Bidder/Supplier's factory premises.

• Qualification and experience of key personnel for successful execution of the contract.

• Reports on financial standing of the Bidder/Supplier such as profit and loss statements, Balance sheets and auditor's report of the past three years, bankers etc.

• Information regarding any current litigation in which the Bidder/Supplier is involved

12.2 Bidder/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.


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

➢ The documentary evidence of the goods’ and services’ conformity to the Bidding Document may be in the form of literature, drawings and data, and shall furnish:

➢ A detailed description of the goods' essential technical and performance characteristics

➢ A list giving full particulars, including available sources and current prices, of all spare parts, special tools, etc. necessary for the proper and continuing functioning of the goods for a period of two years, following commencement of the goods' use by the Purchaser.
13.2 The purposes of the commentary to be furnished pursuant to above, the Bidder/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 Bidder/Supplier may substitute alternative standards, brand names and/or catalogue numbers in its bid, 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. **Bid Security (Earnest Money Deposit)**

14.1 Pursuant to Clause 7 the Bidder/Supplier shall furnish, as part of its bid, Bid Security (Earnest Money Deposit) as specified in the NIT (Notice Inviting Tender)

14.2 The bid security is required to protect the Purchaser against the risk of Bidder/Supplier's conduct, which would warrant the security forfeiture.

- A Demand draft in favour of Mehsana District Co-Operative Milk Producers' Union Limited payable at Mehsana.

14.3 Any bid not accompanied with bid security in accordance with clause 14.1 and 14.2 above will be rejected by the purchaser as non-responsive.

14.4 Unsuccessful Bidder/Suppliers' bid security will be discharged/ returned as promptly as possible but not later than 30 days after the expiration of the period of bid validity prescribed by the Purchaser. The successful Bidder/Supplier's bid security will be discharged upon the Bidder/Supplier's executing the Contract agreement on acceptance of the order & furnishing the performance security, pursuant to Clause 29.

14.5 The bid security may be forfeited:
- If a Bidder/Supplier withdraws its bid during the period of bid validity specified by the Bidder/Supplier on the Bid Form; or
- In the case of the successful Bidder/Supplier, if the Bidder/Supplier fails:
  - To sign the Contract in accordance with Clause 28
  - To furnish performance security in accordance with Clause 29

15. **Period of Validity of Bids**

15.1 Bids shall remain valid for 120 days after the last date of submission of the bids prescribed by the Purchaser, pursuant to Clause 16. A bid 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 Bidder/Suppliers' consent to an extension of the
period of validity. The request and the responses thereto shall be made in writing (or by cable or telex/fax). The bid security provided under Clause 12 shall also be suitably extended. A Bidder/Supplier may refuse the request without forfeiting its bid security. A Bidder/Supplier granting the request will not be required nor permitted to modify its bid.

16. Format and Signing of Bid

16.1 The Bidder/Supplier shall prepare two copies of the bid, clearly marking each "Original" and "Copy" as appropriate. In the event of any discrepancy between them, the original shall govern.

16.2 The original and all copies of the bid shall be typed or written in indelible ink and shall be signed by the Bidder/Supplier or a person or persons duly authorized to bind the Bidder/Supplier to the Contract. Written power-of-attorney must accompany the Bid to indicate the authorization. The person or persons signing the bid shall initial all pages of the bid, except for laminated printed literature.

16.3 The bid shall contain no interlineations, erasures or overwriting except as necessary to correct errors made by the Bidder/Supplier, in which case, the person or persons signing the bid shall initial corrections.

17. Sealing and Marking of Bids

17.1 The Bidder/Suppliers shall seal the original and each copy of the bid in an outer envelope, duly marking the envelopes as "original" and "copy."

17.2 All the inner and outer envelopes shall be addressed to the Purchaser and must bear the Invitation for Bids (IFB) reference number.

17.3 All the envelopes should bear the word "DO NOT OPEN BEFORE (The time and date of opening as specified).

17.4 The inner envelopes shall indicate the name and address of the Bidder/Supplier to enable the bid to be returned unopened in case it is declared "late."

17.5 If the outer envelope is not sealed and marked as required, the Purchaser will assume no responsibility for the bid’s misplacement or premature opening. A bid opened prematurely for this cause will be rejected by the Purchaser and returned to the Bidder/Supplier.

18. Deadline for Submission of Bids

18.1 The Purchaser at the address specified must receive bids not later than the time specified for receipt of the bids.

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

18.3 No telegraphic/ telephonic/ fax bids shall be considered. However, any
amendment sent in hard copy to the bid already submitted/ received shall be considered provided it is received before the due date and time of opening of the bids.

19. Late Bids

Any bid received by the Purchaser after the deadline for submission of bids prescribed by the Purchaser, pursuant of Clause 18 will be rejected and returned unopened to the Bidder/Supplier.

20. Modification and Withdrawal of Bids

20.1 The Bidder/Supplier may modify or withdraw its bid after the bid’s submission, provided that written notice of the modification or withdrawal is received by the Purchaser prior to the deadline prescribed for submission of bids.

20.2 The Bidder/Supplier’s modification or withdrawal notice shall be prepared, sealed, marked and dispatched in accordance with the provisions of Clause 15. A withdrawal notice may also be sent by fax or cable but followed by a signed confirmation copy, post marked not be received later than the deadline for submission of bids.

20.3 No bid may be modified subsequent to the deadline for submission of bids.

20.4 No bid may be withdrawn in the interval between the deadline for submission of bids and the expiration of the period of bid validity specified by the Bidder/Supplier on the Bid Form. Withdrawal of a bid during this interval may result in the forfeiture of the Bidder/Supplier’s bid security, pursuant to Clause 18.

21. Opening of Bids by Purchaser

21.1 The Purchaser will open the Price bids, on n-procure website only after verification of technical bid. This is a two stage tender i.e. first, technical data submitted by bidders will get analyzed at our end. Commercial bid of only technically qualified bidders will be considered for commercial evaluation.

22. Clarification of Bids

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

23. Preliminary Examination

23.1 The Purchaser will examine the bids 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,
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 Bidder/Supplier does not accept the correction of the errors, its bid 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 Clause 22, the Purchaser will determine the substantial responsiveness of each bid to the Bidding Document. For purposes of these clauses, a substantially responsive bid is one, which conforms to all the terms and conditions of the Bidding Document without material deviations. The Purchaser's determination of a bid's responsiveness is to be based on the contents of the bid 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 bid will be treated as incomplete and non-responsive.

23.5 To facilitate loading incomplete bids, the highest cost of such components offered by other Bidder/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 bids.

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

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

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

24. Evaluation and Comparison of Bids

24.1 The Purchaser will evaluate and compare the bids previously determined to be substantially responsive, pursuant to Clause 22. No bid will be considered if the complete requirement covered under this work is not included in the bid.

24.2 The Purchaser's evaluation of a bid 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 Bidder/Supplier. Also, applicable taxes payable by the Purchaser will be added to the bid price for evaluation.
24.3 The comparison shall be of free delivery at site basis including unloading and inclusive of all taxes (sales, works contract etc.) and customs duties (if applicable) 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 bid will take into account, in addition to the bid 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:

- Cost of inland transportation, insurance and other costs within India incidental to delivery of the goods to their final destination and applicable taxes payable by the Purchaser;
- Delivery schedule offered in the bid.
- The cost of components and service;
  - The availability of spare parts and after-sales services for the equipment offered in the bid.
  - 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.

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

- The bid price will be deemed as FOR destination price inclusive of all.
- 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 bid after allowing for reasonable transportation time.
- Bidder/Suppliers shall state their bid price for the payment schedule outlined in the Special Conditions of Contract. Bids 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 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.

24.7 The bidders / suppliers who take up the total turnkey responsibility as per
tender document will have preference as described in the tender notice.

25. **Contacting the Purchaser**

25.1 Subject to Clause 21, no Bidder/Supplier shall contact the Purchaser on any matter relating to its bid, from the time of the bid opening to the time the Contract is awarded.

25.2 Any effort by a Bidder/Supplier to influence the Purchaser in the Purchaser’s bid evaluation, bid comparison or contract award decisions may result in the rejection of the Bidder/Supplier’s bid.

26. **Post-qualification**

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

26.2 The determination will take into account the Bidder/Supplier's financial, technical and Project handling capabilities. It will be based upon an examination of the documentary evidence of the Bidder/Supplier’s qualifications submitted by the Bidder/Supplier, pursuant to Clause 10 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 Bidder/Supplier. A negative determination will result in rejection of the Bidder/Supplier’s bid, in which event; the Purchaser will proceed to the next lowest evaluated bid to make a similar determination of that Bidder/Supplier’s capabilities to perform satisfactorily.

26.4 Subject to Clause 26, the Purchaser will award the contract to the successful Bidder/Supplier whose bid has been determined to be substantially responsive and has been determined as the lowest evaluated bid provided further that the Bidder/Supplier is determined to be qualified to perform the contract satisfactorily as per Clause 22 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 the 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 Bid and to Reject Any or All Bids**

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

29. **Notification of Award**

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

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

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

30. Signing of Contract

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

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

31. Performance Security

31.1. Within 30 days of the successful commissioning and product trial run, Supplier shall furnish the performance security in accordance with the Conditions of Contract, in the Performance Security Form provided in the Bidding Document or another form acceptable to the Purchaser.

31.2. Failure of the successful Bidder/Supplier to comply with requirement of Clause 29 or Clause 30 shall constitute sufficient grounds for the annulment (cancellation) of the award and forfeiture of the bid security, in which event the Purchaser may make the award to the next lowest evaluated Bidder/Supplier or call for new bids.

32. Import License

NOT APPLICABLE

33. Turn-key Contract

All the Bidder/Suppliers should quote for the design, supply, installation, testing and commissioning of equipment as detailed in this bidding 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 Bidder/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. Items and works for which no break-up price is furnished by the Bidder/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 FOR destination price inclusive of packing and forwarding, transportation, insurance and other incidental charges, erection, and commissioning charges.
35. Delivery Schedule of items

Bidder/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.

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<td>Qualification Application and supporting</td>
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<td>3</td>
<td>Price schedule summary sheet and item wise break-up sheet <em>(to be submitted online Only)</em></td>
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<td>Manufacturers’ Authorization</td>
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<td>Bid Security (Earnest Money Deposit)</td>
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Section III
General Conditions of Contract
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1. Definitions

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

1.2 "The Contract" means the agreement entered into between the Purchaser and the Bidder/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 Bidder/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 Bidder/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 Bidder/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 Bidder/Supplier" means the individual or firm supplying the Goods and services under this Contract would include also the terms “contractor” or “Bidder/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 Bidder/Supplier to act as Engineer-in-charge for the purposes of contract.

2. Application

2.1 These General Conditions shall apply to the extent that provisions in other parts of the Contract do not supersede them.

3 Definition of Country of origin

3.1 For purpose of this Clause "origin" means the place where the Goods were mined, grown or produced, or from which the Services are supplied. Goods are produced when, through manufacturing, processing or substantial and major assembling of components, a commercially recognized new product results that is substantially different in basic characteristics or in purpose or utility from its components. The origin of Goods and Services is distinct from the nationality of the Bidder/Supplier.

4 Standards

4.1 The Goods supplied under this Contract shall conform to the standards mentioned in the Technical Specifications, and, when no applicable standard is mentioned, to the latest Indian Standards.

5 Use of Contract Documents and Information

5.1 The Bidder/Supplier shall not, without the Purchaser's prior written consent, disclose the Contract, or any provision thereof, or any specification, plan, drawing, pattern, sample or information furnished by or on behalf of the Purchaser in connection therewith, to any person other than a person employed by the Bidder/Supplier in the performance of the Contract. Disclosure to any such employed person shall be made in confidence and shall extend only so far as may be necessary for purposes of such performance.

5.2 The Bidder/Supplier shall not, without the Purchaser's prior written consent, make use of any document or information except for purposes of performing the Contract.
5.3 Any document, other than the Contract itself, shall remain the property of the Purchaser and shall be returned (in all copies) to the Purchaser on completion of the Bidder/Supplier's performance under the Contract if so required by the Purchaser.

6 Patent Rights
6.1 The Bidder/Supplier shall indemnify the Purchaser against all third-party claims of infringement of patent, trademark or industrial design rights arising from use of the Goods or any part thereof.

7 Performance Security
7.1 The Bidder/Supplier shall furnish performance security to the Purchaser in the amount specified in the Special Conditions of Contract.

7.2 The proceeds of the performance security shall be payable to the Purchaser as compensation for any loss resulting from the Bidder/Supplier's failure to complete its obligations under the Contract.

7.3 The Performance Security shall be denominated in Indian Rupees and shall be in one of the following forms:

- A bank guarantee issued by a Nationalized Bank in India or ICICI Bank or HDFC Bank and in the form provided in the Bidding Document. Such bank guarantee shall be valid till the expiry of the warranty period.
- Demand Draft from a Nationalized Bank in favour of Mehsana District Co-Operative Milk Producers' Union Ltd. payable at Mehsana.
- No interest shall be paid on the security deposit, which shall be retained till the completion of the warranty period.

7.4 The performance security will be discharged by the Purchaser and returned to the Bidder/Supplier not later than 30 days following the date of completion of the Bidder/Supplier's performance obligations, including any warranty obligations, under the Contract.

8 Inspection and Tests
8.1 The Purchaser or its representative shall have the right to inspect and/or test the Goods to confirm their conformity to the Contract. The Special Conditions of Contract and/or the Technical Specifications shall specify what inspections and tests the Purchaser requires and where they are to be conducted. The Purchaser shall notify the Bidder/Supplier in writing of the identity of any representatives, if retained for these purposes.

8.2 The inspections and tests may be conducted on the date of delivery and/or at the Good's final destination. Where conducted on the premises of the Bidder/Supplier or its subcontractors(s), all reasonable facilities and assistance including access to drawings and Production data shall be furnished to the inspectors at no charge to the Purchaser. In case of any defects or deficiency notified by the Purchaser's inspection authority, the Bidder/Supplier will rectify and make good the same without delay and not proceed with further processing of such item(s) of Goods without obtaining approval from the inspection authority.

8.3 Should any inspected or tested Goods fail to conform to the Specifications, the Purchaser may reject them and the Bidder/Supplier shall either replace the rejected Goods or make all alterations necessary to meet specification requirements free of cost to the Purchaser.

8.4 The Purchaser's right to inspect, test and, where necessary, reject the Goods after the Goods' arrival at the destination shall in no way be limited or waived by reason of the
Goods having previously been inspected, tested and passed by the Purchaser or its representative prior to the Goods shipment from the country of origin.

8.5 Nothing in this clause shall in any way release the Bidder/Supplier from any warranty or other obligations under this Contract.

9 Packing and Marking

9.1 The Bidder/Supplier shall provide such packing of the Goods as is required to prevent their damage or deterioration during transit to their final destination as indicated in the Contract. The packing shall be sufficient to withstand, without limitation, rough handling during transit and exposure to temperature, salt and precipitation during transit and open storage. Packing case size and weights shall take into consideration, where appropriate, the remoteness of the Goods’ final destination and the absence of heavy handling facilities at all points in transit.

9.2 The packing, marking and documents within and outside the packages shall comply strictly with such special requirements as shall be expressly provided for in the Contract and, subject to Clause 18, in any subsequent instructions ordered by the Purchaser.

9.3 Each package shall be marked to indicate a) Name of the Bidder/Supplier, b) Details of items in the package, c) Name of the Consignee, d) Purchase Order Number, e) Gross, net and tare weights of the item, f) Destination.

10 Delivery and Documents

10.1 Delivery of the goods shall be made by the Bidder/Supplier in accordance with the terms specified by the Purchaser in its Schedule of Requirements and the Special Conditions of Contract. For the purpose of the Contract, “FOB”, “C&F”, “CIF”, “FOR Destination”, “Free delivery at site” and other trade terms used to describe the obligations of the parties shall have the meanings as per the common trade practices.

11 Insurance

11.1 The goods supplied under the Contract shall be fully insured in Indian Rupees against loss or damage incidental to manufacture or acquisition, transportation, storage and delivery in the manner specified in the Special Conditions of Contract. Where the Purchaser requires delivery of the Goods on free delivery at site basis; the Bidder/Supplier shall arrange and pay for marine insurance naming the Purchaser as the beneficiary. The Bidder/Supplier shall provide a copy of the insurance policy along with invoice to the Purchaser and will make arrangements to extend the validity of the policy, if necessary. The Bidder/Supplier shall initiate and pursue claim till settlement and promptly make arrangements for repair and/or replacement of any damaged item/s irrespective of settlement of claim by the underwriters.

12 Transportation

12.1 The Bidder/Supplier is required under the Contract to deliver the Goods FOR destination, specified in the Schedule of Requirement. Transport of the Goods, up to the destination shall be arranged and paid for by the Bidder/Supplier and the cost thereof shall be included in the Contract Price. Where the Bidder/Supplier is required to affect delivery under any other terms, for example, by post or to another address in the source country, the Bidder/Supplier shall be required to meet all transport and storage expenses until delivery. In all the above cases, transportation of the Goods after delivery shall be the responsibility of the Purchaser.

13 Incidental Services

13.1 As specified in the Special Conditions of Contract, the Bidder/Supplier shall be required to provide any or all of the following services:
• Performance or supervision of on-site assembly and/or start-up of the supplied Goods.
• Furnishing of tools required for assembly and/or maintenance of the supplied goods.

17.1 Furnishing of a detailed operations and maintenance manual for each appropriate unit of the supplied Goods; and manuals covering the operation and maintenance of automation software and control systems.

17.2 Performance or supervision or maintenance and/or repair of the supplied Goods, for a period of time agreed by the parties, provided that this service shall not relieve the Bidder/Supplier of any warranty obligations under this Contract and

17.3 Conduct of training of the Purchaser's personnel, at the Bidder/Supplier's plant and/or on-site, in assembly, start-up operation, maintenance and/or repair of the supplied Goods.

14 Sparce Parts

17.4 As specified in the Special Conditions of contract, the Bidder/Supplier may be required to provide any or all of the following materials and notifications pertaining to spare parts manufactured or distributed by the Bidder/Supplier:

• Such spare parts as the Purchaser may decide to purchase from the Bidder/Supplier, provided that this decision shall not relieve the Bidder/Supplier of any warranty obligations under the Contract; and

• In the event of termination of Refrigeration of the spare parts:

• Advance notification to the Purchaser of the pending termination, in sufficient time to permit the Purchaser to procure its needed requirements; and

• Following such termination, furnishing at no cost to the Purchaser, the soft-copies, the blueprints, drawings and specifications of the spare parts, if and when requested.

15 Warranty/Guarantee

17.5 The Bidder/Supplier warrants that the Goods and equipment supplied, installed and commissioned under the Contract are new, unused, of the most recent or current models and incorporate all recent improvements in design and materials unless provided otherwise in the Contract. The Bidder/Supplier further warrants that the Goods supplied under this Contract shall have no defect arising from design, materials or workmanship (except in so far as the design or material is required by the Purchaser's Specifications) or from any act or omission of the Bidder/Supplier, that may develop under normal use of the supplied Goods in the conditions obtaining in the country of final destination. The Bidder/Supplier also guarantees that the Goods supplied shall perform satisfactorily as per the designed/rated/installed capacity as provided for in the Contract. The warranty will not cover normal wear and tear of consumables and minor spares.

17.6 This warranty/guarantee shall remain valid for not less than 18 months after the Goods or any portion thereof as the case may be, have been delivered and commissioned, or for not less than 12 months after the
date of installation and commissioning, whichever period concludes earlier.

17.7 The Purchaser shall promptly notify the Bidder/Supplier in writing of any claims arising under this warranty.

17.8 Upon receipt of such notice, the Bidder/Supplier shall, with all reasonable speed, repair or replace the defective Goods or parts thereof, without costs to the Purchaser other than, where applicable, the cost of inland delivery of the repaired or replaced Goods or parts from the port of entry to the final destination.

17.9 If the Bidder/Supplier, having been notified, fails to remedy the defect(s) within a reasonable period, the Purchaser may proceed to take such remedial action as may be necessary, at the Bidder/Supplier's risk and expense and without prejudice to any other rights which the Purchaser may have against the Bidder/Supplier under the Contract.

17.10 This warranty/guarantee shall not cover any damage/s resulting from normal wear and tear or improper handling by the Purchaser or his authorized representatives.

17.11 The Bidder/Supplier shall guarantee the complete installation for satisfactory performance for a minimum period of twelve months from the date of commissioning. The Bidder/Supplier at his own cost shall rectify any defect arising out of faulty installation or use of substandard material or workmanship.

16 Payment

17.12 The method and conditions of payment to be made to the Bidder/Supplier under the Contract shall be specified in the Special Conditions of Contract.

17.13 The Bidder/Supplier's request(s) for payment shall be made to the Purchaser in writing, accompanied by an invoice describing, as appropriate, the Goods delivered and Services performed, and by shipping documents, submitted pursuant to Clause 10, and fulfillments of other obligations stipulated in the Contract.

17.14 Payments shall be made promptly by the Purchaser within sixty (60) days of submission of an invoice/claim by the Bidder/Supplier and shall be in Indian Rupees only except stated otherwise in the Special Conditions of contract.

17 Prices

17.15 Prices charged by the Bidder/Supplier for Goods delivered and Services performed under the Contract shall not vary from the prices finally agreed and given in the section elsewhere. The prices quoted by the Bidder/Supplier in its bid and the Contract are on fixed price basis. The negotiated prices are also on the fixed price basis. The negotiated prices are inclusive of all taxes, duties, levies including transportation, erection and commissioning.

17.2 Variation is only allowed due to changes in statutory levies / taxes as applicable to the prices within the contact period.
18  Change Orders
18.1 The Purchaser may, at any time, by a written order given to the
Bidder/Supplier make changes within the general scope of the Contract in any
one or more of the following:

- Drawings, designs or specifications, where Goods to be furnished
  under the Contract are to be specifically manufactured for the
  Purchaser
- The method of shipment or packing
- The place of delivery or
- The Services to be provided by the Bidder/Supplier.

18.2 If any such change causes an increase or decrease in the cost of, or the time
required for, the Bidder/Supplier's performance of any part of the work under
the Contract, whether changed or not changed by the order, an equitable
adjustment shall be made in the Contract Price or delivery schedule, or both,
and the Contract shall accordingly be amended. Any claims by the
Bidder/Supplier for adjustment under this clause must be asserted within
thirty (30) days from the date of the Bidder/Supplier's receipt of the
Purchaser's change order.

19  Contract Amendment
19.1 No variation in or modification of the terms of the Contract shall be made except by
written amendment signed by the parties.

20  Assignment
20.1 The Bidder/Supplier shall not assign, in whole or in part, its obligations to perform
under the Contract, except with the Purchaser's prior written consent.

21  Sub-contracts
21.1 The Bidder/Supplier shall notify the Purchaser in writing of all sub-contracts awarded
under the Contract if not already specified in his bid. Such notification, in his original
bid or later, shall not relieve the Bidder/Supplier from any liability or obligation under
the Contract.

21.2 Sub-contracts must comply with the provisions of Clause 5.

22  Delays in the Bidder/Supplier's Performance
22.1 Delivery of the Goods and performance of Services shall be made by the Bidder/Supplier
in accordance with the time schedule specified by the Purchaser in its Schedule of
Requirements.

22.2 An unexcused delay by the Bidder/Supplier in the performance of its delivery obligations
shall render the Bidder/Supplier liable to any or all of the following sanctions:

- Forfeiture of its performance security,
- Imposition of liquidated damages, and/or
- Termination of the Contract for default

22.3 If at any time during performance of the Contract, the Bidder/Supplier or its
subcontractor(s) should encounter conditions impeding timely delivery of the Goods and
performance of Services, the Bidder/Supplier shall promptly notify the Purchaser in
writing of the fact of the delay, its likely duration and its cause(s). As soon as practicable
after receipt of the Bidder/Supplier's notice, the Purchaser shall evaluate the situation and
may at its discretion extend the Bidder/Supplier's time for performance, in which case the
extension shall be ratified by the parties by amendment of the Contract.

23  Liquidated Damages
23.1 Subject to Clause 25, if the Bidder/Supplier fails to deliver any or all of the Goods or

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perform the Services within the time period(s) specified in the Contract, the Purchaser shall, without prejudice to its other remedies under the Contract, deduct from the Contract Price, as liquidated damages as under:

a. **For the Supply Component:**

   A sum equivalent to 0.5% of the price of undelivered goods (As per the price break up furnished by the supplier and accepted by the Purchaser) which the supplier fails to supply within the time period specified in the contract for each week of delay.

b. **For the Erection and Commissioning Component:**

   A sum equivalent to 0.5% of the un-executed portion of each week of delay or part thereof beyond the time specified in the contract for the successful completion of the plant.

The total amount so deducted as per above, shall not exceed 10% of the Contract value. Once the maximum is reached, the Purchaser may consider termination of the Contract.

23.2 Any incremental taxes and levies on account of delay in performance of the Contract by the Bidder/Supplier shall be to the Bidder/Supplier's account.

24 **Termination for Default**

24.1 The Purchaser may, without prejudice to any other remedy for breach of contract, by written notice of default sent to the Bidder/Supplier, terminate the Contract in whole or in part:

   - If the Bidder/Supplier fails to deliver any or all of the Goods within the time period(s) specified in the Contract, or any extension thereof granted by the Purchaser pursuant to Clause 22 or
   - If the Bidder/Supplier fails to perform any other obligation(s) under the Contract.

24.2 In the event the Purchaser terminates the Contract in whole or in part, pursuant to Clause 24, the Purchaser may procure, upon such terms and in such manner, as it deems appropriate, Goods similar to those undelivered, and the Bidder/Supplier shall be liable to the Purchaser for any excess costs for such similar Goods. However, the Bidder/Supplier shall continue performance of the Contract to the extent not terminated.

24.3 Consequent to such termination of Contract, the Purchaser shall recover the advance paid, if any, to the Bidder/Supplier along with interest @ 18% per annum compounded quarterly on the last day of March, June, September and December on the advance paid for the entire period for which the advance was retained by the Bidder/Supplier.

25 **Force Majeure**

25.1 Notwithstanding the provisions of Clauses 22, 23 and 24, the Bidder/Supplier shall not be liable for forfeiture of its performance security, liquidated damages or termination for default, if and to the extent that, its delay in performance or other failure to perform its obligations under the Contract is the result of an event of Force Majeure.

25.2 For purposes of this clause, "**Force Majeure**" means an event beyond the control of the Bidder/Supplier and not involving the Bidder/Supplier’s fault or negligence and not foreseeable. Such events may include, but are not restricted to, acts of the Purchaser either in its sovereign or contractual capacity, wars or revolutions, fires, floods, epidemics, quarantine restrictions and freight embargoes.

25.3 If a Force Majeure situation arises, the Bidder/Supplier shall promptly notify the Purchaser in writing of such condition and the cause thereof. Unless otherwise directed by...
the Purchaser in writing, the Bidder/Supplier shall continue to perform its obligations under the Contract as far as is reasonably practical, and shall seek all reasonable alternative means for performance not prevented by the Force Majeure event.

26 **Termination for Insolvency**

26.1 The Purchaser may at any time terminate the Contract by giving written notice to the Bidder/Supplier, without compensation to the Bidder/Supplier, if:

- The Bidder/Supplier becomes bankrupt or otherwise insolvent,
- The Bidder/Supplier being a Company is wound up voluntarily by the order of a Court receiver, liquidator or Manager appointed on behalf of the debenture holders or circumstances shall have arisen which entitle the court or debenture holders to appoint a receiver, liquidator or a Manager, provided that such termination will not prejudice or affect any right of action or remedy which has accrued or will accrue thereafter to the Purchaser.

27 **Termination for Convenience**

27.1 The Purchaser, may by written notice sent to the Bidder/Supplier, terminate the Contract, in whole or in part, at any time for its convenience. The notice of termination shall specify that termination be for the Purchaser's convenience, the extent to which performance of work under the Contract is terminated, and the date upon which such termination becomes effective.

27.2 The Purchaser shall purchase the Goods that are complete and ready for dispatch within 30 days after the Bidder/Suppliers’ receipt of notice of termination at the Contract terms and prices for the remaining Goods, the Purchaser may decide:

- To have any portion completed and delivered at the Contract terms and prices
- To cancel the remainder and pay to the Bidder/Supplier an agreed amount for partially completed Goods and for materials and parts previously procured by the Bidder/Supplier.

Both Purchaser and Supplier shall mutually settle all terminations as per clause 24, 25, 26 and 27.

28 **Resolution of Disputes**

28.1 The Purchaser and the Bidder/Supplier shall make every effort to resolve amicably by direct informal negotiation any disagreement or dispute arising between them under or in connection with the Contract.

28.2 If, after thirty (30) days from the commencement of such informal negotiations, the Purchaser and the Bidder/Supplier have been unable to resolve amicably a Contract dispute, either party may require that the dispute be referred for resolution to the formal mechanisms specified in the Special Conditions of Contract. These mechanisms may include, but are not restricted to, conciliation mediated by a third party, adjudication in an agreed national or international forum, and/or international arbitration. The mechanism shall be specified in the Special Conditions of Contract.

29 **Governing Language**

29.1 The Contract shall be written in the language of the bid, as specified by the Purchaser in the Instructions to Bidder/Suppliers. Subject to Clause 30, that language version of the Contract shall govern its interpretation. All correspondence and other documents
pertaining to the Contract, which are exchanged by the parties, shall be written in that same language.

30 **Applicable Law**

30.1 The Contract shall be interpreted in accordance with the laws of the Union of India.

31 **Notices**

31.1 Any notice given by one party to the other pursuant to the Contract shall be sent in writing or by e-mail and confirmed in writing to the address specified for that purpose in the Special Conditions of Contract.

31.2 A notice shall be effective when delivered or on the notice’s effective date, whichever is later.

32 **Taxes and Duties**

32.1 The Bidder/Supplier shall be entirely responsible for all taxes, duties, license fees, etc. incurred until delivery of the contracted Goods to and taking over of the works by the Purchaser. The onus of paying all the statutory levies as per the applicable tariff heads and norms shall be on the Bidder/Supplier.

33 **Right to use defective equipment**

33.1 If after delivery, acceptance and installation and within the guarantee and warranty period, the operation or use of the equipment proves to be unsatisfactory, the Purchaser shall have the right to continue to operate or use such equipment until rectification of defects, errors or omissions by repair or by partial or complete replacement is made without interfering with the Purchasers’ operation.

34 **Income Tax and Other Taxes**

34.1 The Bidder/Supplier shall be liable to pay all corporate taxes, income tax and other taxes that shall be levied according to the laws and regulations applicable from time to time and the price bid by the Bidder/Supplier shall include all such taxes. Wherever the laws and regulations require deduction of such taxes at the source of payment, the Purchaser shall effect such deductions from the payment due to the Bidder/Supplier. The remittance of amounts so deducted and issuance of certificate for such deductions shall be made by the Purchaser as per the laws and regulations in force. Nothing in the Contract shall relieve the Bidder/Supplier from his responsibility to pay any tax that may be levied on income and profits made by the Bidder/Supplier in respect of the Contract. The Bidder/Supplier’s staff, personnel and labour will be liable to pay personal income taxes in respect of such of their salaries and wages as are chargeable under the laws and regulations for the time being in force, and the Bidder/Supplier shall perform such duties in regard to such deductions thereof as may be imposed on him by such laws and regulations. The Purchaser shall not, in any way, be responsible for such payments by the Bidder/Suppliers’ staff.

35 **Jurisdiction**

35.1 Settlement of any dispute out of the purchase order / contract against this bid shall be subject to the courts at Mehsana only.
Section IV - Part I

Special Conditions of Contract
Contents

1. Definitions
2. Performance Security
3. Inspection and Tests
4. Delivery and Documents
5. Insurance
6. Incidental services
7. Spare Parts
8. Warranty/Guarantee
9. Payment
10. Resolution of Disputes
11. Notices
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 Mehsana District Co-operative Milk Producers’ Union Limited (Here in after referred as Dudhsagar Dairy) and would include the term "Owner"

1.2 The Bidder/Supplier is (Name of Bidder/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 Bidder/Supplier and submitted to the Purchaser at least 30 days prior to the date when the Bidder/Supplier desires the Purchaser's approval. In the event the Purchaser determines that such proposed deviations do not ensure equal or higher quality, the Bidder/Supplier shall comply with the standards set forth in the documents.

2 Performance Security (Clause 7)

2.1 The Performance Security shall be in the amount of 20% of the Contract price up to sixty days after the date of completion of performance obligations including warranty obligations.

3 Inspection and Tests (Clause 8)

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 (Clause 10)

4.1 For imported goods: Upon shipment, the Bidder/Supplier shall notify the Purchaser and the Insurance Company by cable or fax 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 Bidder/Supplier shall mail the following documents to the Purchaser for EPCG clearance:

- 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;
- Packing list identifying contents of each package;
- Insurance certificate;
- Manufacturer's/Bidder/Supplier's guarantee certificate;
Mehsana District Co-operative Milk Producers’ Union Limited  
DSD-PATAN, E-tender document: MDCMPUL/18-19/40/Buttermilk/DSD Patan

- Inspection certificate, issued by the nominated inspection agency or the Bidder/Supplier’s factory inspection report;

If Purchaser does not want to get the consignment cleared under EPCG license, the Bidder/Supplier shall be solely responsible for custom clearance and delivery up to our destination as per Purchase order terms and conditions. In both cases, applicable all custom duties, surcharge and GST will be born by Bidder/Supplier.

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

4.3 For Domestic Goods: Original and three copies of:

- The Supplier’s invoice showing purchase order no., Goods’ description, quantity, unit price, applicable GST, total amount;
- Delivery note/packing list/lorry receipt;
- Manufacturer’s/Bidder/Supplier’s guarantee certificate;
- Inspection Certificate issued by the nominated inspection agency or the Bidder/Supplier’s factory inspection report;
- Any other document evidencing payment of statutory levies.
- Single MCE insurance policy shall cover the entire project.

4.4 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 (clause 11)

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 Bidder/Supplier towards all risks during storage, erection, testing, commissioning and up to acceptance of the plant.

6 Incidental services (Clause 13)

6.1 The incidental services shall be provided as per the requirements outlined in the Schedule of Specifications and as covered under Section III Clause 13 of General Conditions. The cost shall be included in the contract price, if provided for in the scope of the Contract.

7 Spare Parts (Clause 14)

7.1 Bidder/Suppliers shall carry sufficient inventories to assure ex-stock supply of consumable spares such as seal, 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.

8 Warranty/Guarantee (Clause 15)

8.1 The warranty/guarantee shall be as per provision under Section III Clause 15 of General Conditions.
9 Payment (Clause 16)

9.1 Payment for supply, installation and commissioning contract shall be strictly as below:

10% advance of total contract value (Supply + Erection & Commissioning) on:

(i) Acceptance of the order i.e.

a. Submission of the Duplicate copy of the order duly signed by the authorized signatory putting stamp of the Organization.

b. Execution of the Contract Form.

(ii) Against submission of bank guarantee for equivalent amount valid for 30 days beyond the stipulated delivery (as per schedule of delivery/supply)/ completion period

10% on first submission of Plant layout and P&I Diagrams for process and services.

60% progressive payment of supply value against safe receipt of goods at site.

60% of payable erection value on progression of erection as per Joint Measurement Sheet within 60 days of submission of JMS.

20% balance retention payment to be released after 03 months of satisfactory commissioning of the plant against submission of PBG for 12 months from commercial production.

9.2 The Bank Guarantees should be obtained from Nationalized Banks or ICICI Bank, IDBI Bank or HDFC Bank and acceptable Foreign Banks operating in India (please refer to list given in the Appendices I).

9.3 Notes:

- All Payments shall be made within 60 days from the date of submission of Invoice.

- Payment shall be made on complete supply of an item/ group of items specified in the Contract as per the Price Break up. No payment shall be made if supply of an item/ group of items is incomplete.

- Bank Guarantees for advance payment shall be released not later than 30 days after the date of delivery of all the Goods at their final destination.

- For items, which do not involve any supply and the Bidder/Supplier/ contractor has to do only the erection and commissioning, 60% payment shall be made on completion of erection of the items as per the break-up prices to be given in the Purchase Order.

10 Price (Clause 17): NOT APPLICABLE

11.0 Resolution of Disputes (Clause 28)

11.1 All disputes or differences in respect of which the decision is not final and conclusive shall, on the initiative of either party, be referred to the adjudication of sole Arbiter. Within thirty days of receipt of notice from the Bidder/Supplier of his intention to refer the dispute to arbitration, the Purchaser shall finalize a panel of three Arbitrators and intimate the same to the Supplier. The Supplier shall within fifteen days of receipt of this list select and confirm his acceptance to the appointment of one from the panel as Arbiter. If the Supplier to communicate his selection of name, within the stipulated period, the Purchaser shall without delay select one from the panel and appoint him as the
sole Arbitrator. If the Purchaser fails to send such a panel within thirty days, as stipulated, the Bidder/Supplier shall send a similar panel to the Purchaser within fifteen days. The Purchaser shall then select one from the panel and appoint him as the sole Arbitrator within fifteen days. If the Purchaser fails to do so, the Bidder/Supplier shall communicate to the Purchaser the name of one from the panel who shall then be the sole Arbitrator. The appointment of sole Arbitrator so made shall be final and conclusive.

11.2 The Arbitration shall be conducted in accordance with the provisions of the Indian Arbitration Act, 1996 and rules thereunder or any statutory modifications thereof for the time being in force. The Arbitration proceedings shall be held in Mehsana ONLY at the time as the sole Arbitrator may decide. The decision of the sole Arbitrator shall be final and binding upon the parties and the expenses of the Arbitrator shall be paid as may be determined by the Arbitrator.

11.3 Performance under the Contract shall, if reasonably possible, continue during the Arbitration proceedings and payments due to the Bidder/Supplier by the Purchaser shall not be withheld, unless they are the subjects of the Arbitration proceedings.

All awards for claims equivalent to Rupees thirty thousand or more shall be in writing and state the reasons for the amounts awarded.

Neither party is entitled to bring a claim to Arbitration if its Arbitrator has not been appointed within thirty days after expiration of the warranty/guarantee period.

12.0 Notices (Clause 31)

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

**Purchaser:**
Mehsana District Co-Operative Milk Producers' Union Limited
DUDHSAGAR DAIRY, HIGHWAY, Mehsana 384002, Gujarat (India)
Phone: +91-2762-253201-05 Fax: +91-2762-253422

**Supplier:** Bidders to provide details.
Section IV – Part II
Special Conditions of Contract
For
General Erection & Commissioning
Mehsana District Co-operative Milk Producers’ Union Limited
DSD-PATAN, E-tender document: MDCMPUL/18-19/40/Buttermilk/DSD Patan

Contents

1. Sufficiency Of Tender
2. Programme Of Installation & Commissioning
3. Preparation of Drawings for Approval
4. Superintendence, Team And Conduct
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7. Bidder/Suppliers’ Functions
8. Variations
9. Duties of the Bidder/Supplier Vis-a-Vis the Purchaser
10. Supply Of Tools, Tackles And Materials
11. Protection Of Plant
12. Unloading, Transportation And Inspection
13. Storage Of Equipment
14. Approvals
15. Review & Co-Ordination of Erection Work
16. Extension of Time for Completion

Table 1 List of Drawings required Submission
1 **Sufficiency of Tender**

1.1 The Bidder/Supplier by bidding 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 labor position at site and to have determined the prices accordingly.

2 **Programme of Installation & Commissioning**

2.1 The Supplier shall submit to the Purchaser for his approval a comprehensive programme in the form of PERT network/bar chart and any other form as may be required by the Purchaser showing the sequence of order in which the Supplier 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 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 of any of his duties or responsibilities under the Contract. The Supplier 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 specifications/conditions concerning the submission of drawings by the Supplier are detailed as under:

i. Within four weeks from the date of receipt of the order, Supplier shall furnish a list of all necessary drawings, which the Supplier 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.

ii. 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.

iii. All dimensions on drawings shall be in metric units.

iv. Drawings (three sets) submitted by the Supplier for approval will be checked, reviewed by the Purchaser, and comments, if any, on the same will be conveyed to the Supplier within 7 days of submission. It is the responsibility of the Supplier to incorporate correctly all the comments conveyed by the Purchaser on the Supplier’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 has incorporated all the comments. If the Supplier is unable to incorporate any comments in the revised drawings, Supplier shall clearly state in his forwarding letter such non-compliance along with the valid reasons.

v. Drawings prepared by the Supplier 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 of his responsibility for engineering design, workmanship, and quality of materials, warranty obligations and satisfactory performance on installation covered under the contract.

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

3.2 The Supplier 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.

4. Superintendence, Team and Conduct:

4.1 The Supplier shall employ one or more competent representatives, whose name or names shall have previously been communicated in writing to the Purchaser by the Supplier, 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 shall be deemed to have given to the Supplier. 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 shall, execute the works with due care and diligence within the time for completion and employ Suppliers' evinced team cum engineers together with adequate skilled, semi-skilled and unskilled workmen in the site for carrying out the works. The Supplier shall ensure adequate workforce to keep the required pace at all times as per the schedule of completion. Supplier 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 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 or Supplier'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.

5. Right of the Purchaser

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 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.

- If in the judgment of the Purchaser, the supplier should or may be directed to accelerate the work, the Supplier, in its discretion, shall cease work at any particular such other point or points and execute such works, as may be directed by the Purchaser and at the discretion of the Purchaser.
Right to order modifications of methods and equipment

- If at any time the Supplier’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 to ensure safety, and increase their efficiency and adequacy and the Supplier shall promptly comply with such directives. If at any time the Supplier’s working force and equipment are inadequate in the opinion of the Purchaser, for securing the necessary progress as stipulated, the Supplier 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 of Supplier’s obligations to secure the safety, the safe conducting of the work and the rate of progress required by the contract. The Supplier alone shall be and remain liable and responsible for the safety, efficiency and methods, materials, working force and equipment, irrespective of whether or not the Supplier makes any changes as a result of any order or orders received from the Purchaser.

Right to inspect the work

- The Purchaser reserves the right to call for the original test certificates for all the materials used in the erection work.
- 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’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 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.

6. **Supplier’s Functions**

The Supplier 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 finds any discrepancy therein, Supplier shall immediately refer the same to the Purchaser whose decision shall be final and binding on the Supplier.

The Supplier 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.

7. **Variations**

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 to do and the Supplier shall do any of the following:
The Supplier 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 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 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.

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. 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.

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

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 and the Purchaser or, failing agreement, fixed by the Purchaser having regard to all material and relevant factors, including the Supplier's site and general overhead costs of the contract.

The Supplier shall send to the Purchasers’ are giving particulars, as full and detailed as possible, of all claims for any additional payment to which the Supplier may consider himself entitled and of all extra or additional work ordered by the Purchaser which he has executed during the preceding month.

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's failure to comply with this condition, if the Supplier has, at the earliest practicable opportunity, notified the Purchaser in writing that he intends to make a claim for such work.

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's job schedule must not d Supplier’s schedules-to-daywork. The Purchaserofdaywillofferprovide all reasonable assistancefor carrying out the jobs.

Night work will be permitted only with prior approval of the Purchaser. The Purchaser may also direct the Supplier 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 at no extra cost. The Supplier should employ qualified electricians and wiremen for these facilities. In case of S personnel, the Purchaser has the
right to arrange such facilities and personnel and to charge the cost thereof to the Supplier.

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 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 due to which any item does not get covered under the insurance of the Purchaser; the consequential losses shall be charged to the Supplier.

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 or any sub-Supplier, save and except an accident or injury resulting from any act or default of the Purchaser, his agents, or servants. The Supplier 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.

The Supplier 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 the receipt for payment of the current premium. Provided always that, in respect of any persons employed by any sub-Supplier, the Supplier’s obligations to ensure as aforesaid under this sub-clause shall be satisfied if the sub-Supplier has insured against the liability in respect of such persons in such manner that the Purchaser is indemnified under the policy, but the Supplier shall require such sub-Supplier 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.

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

The Supplier 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’s work due to the likely delay in delivery of such equipment/components to enable him to take remedial actions.

8 Supply of Tools, Tackles and Materials

8.1 The Supplier 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.

9 Protection of Plant

9.1 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 or any of Supplier's Sub-Suppliers even though such tools and equipment may be furnished, rented or loaned to the Supplier or any of Supplier’s Sub-Suppliers. The acceptance and/or use of any such tools and equipment by the Supplier or Supplier’s Sub-Supplier shall be construed to mean that the Supplier accepts all
responsible 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.

9.2 The Supplier and Supplier's Sub-Suppliers shall be responsible, during the works, for the protection of work, which has been completed by other Suppliers. Necessary care must be taken to see that the Supplier's men course of execution of the work.

9.3 The Supplier 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 and to the satisfaction of the Purchaser. The Supplier shall also be liable for any loss of or damage to the works occasioned by the Supplier or the Supplier's men in the course of any operations carried out by the Supplier or by Supplier's Sub-Suppliers for the purpose of completing any outstanding work or complying with the Supplier's obligations.

10. Unloading, Transportation and Inspection

The Supplier shall be required to unload all the materials/equipment from the carriers, those received at site after Supplier's team arrives at site. Supplier shall be paid extra for unloading of the equipment being supplied by the Purchaser whereas no extra payment for unloading of the equipment/piping shall be paid to Supplier for the equipment being supplied by the Supplier. The Supplier shall plan in advance, based on the information received from the Purchaser, Supplier's requirement of various tools, tackles, jacks, cranes, sleepers etc. required to unload the material/equipment promptly and efficiently. The Supplier shall ensure that adequate and all measures necessary to avoid any damage whatsoever to the equipment at the time of unloading are taken.

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

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

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

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

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

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

10.8 All the information and observations by the Supplier shall be furnished in the form of 'INSPECTION REPORT' to the Purchaser with specific mention/suggestions which in the opinion of the Supplier 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.

10.9 The inspection for all the equipment handed over to the Supplier shall be completed.
10.10 The protection, safety and security of the materials so taken over from the Purchaser shall be the responsibility of the Supplier, until they are handed over to the Purchaser after erection, commissioning and testing as per the terms of the Contract.

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Section IV – Part III
Special Conditions of Contract
For
Mechanical Works
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Mechanical Works.

1. Scope

a) General installation i.e. positioning and installing all the Refrigeration, miscellaneous and service equipment as per approved layout drawings and as per the contract.
b) Supply and installation of structural platforms and tables.
c) Supply and installation of all service and product piping including ancillary items.
d) Insulation and cladding of piping, equipment including supply of materials.
e) Interconnections of services and Electrical with equipment.
f) Guide line for expansion work.
g) Clean up of work site.
h) Supply of all cleaning chemicals and lubricants.
i) Testing, commissioning and start-up.
j) Painting including supply of paints as approved by the Purchaser.
k) Training of personnel.
l) 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’s drawings. The Supplier shall final adjustment of the foundations including alignment and dressing of foundation surface, embedding and grouting of anchor bolts and bedplates. The Supplier 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 has checked the alignment and witnessed by the Purchaser. The Supplier 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 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 Bidder/Supplier shall supply, fix and maintain, at his own cost, during the erection work, all the necessary centering, 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 Bidder/Supplier shall take out and remove any or all such centering, 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 Bidder/Supplier 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 equipments. 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. The payment shall be made on the basis of the actual weight executed and the unit rates agreed upon or as per provisions made in the contract for such items.

### 3. Service Piping Installation

#### 3.1 General Guidelines

- All piping systems shall comply with the latest editions of the following regulations wherever applicable:
  - Indian Boiler Regulations if applicable
  - Regulations of explosives inspectorate
  - All applicable Indian Standards
  - All applicable State Government/ Central Government Laws/ Acts

#### 3.2 Scope of Supply

- The Bidder/Supplier 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 Bidder/Supplier, for the class and make of all materials, must obtain prior approval of the Purchaser. The Bidder/Supplier should furnish the details of makes selected by him, in the pro forma given in Table 5.

#### 3.3 Scope of Piping Erection

- The scope of erection for piping, includes all system covered in the flow diagrams and specifications. The Bidder/Supplier’s work commences/ terminates at the pipe connections with valves or flanges as specified in flow diagrams/battery limits.

- The Bidder/Supplier shall also install necessary piping and any specialties furnished with or for equipment such as relief valves, if any, built-in-bypass, primary elements for flow measurements, if any, control valves if any, and on-line metering if any, equipment.

- The Bidder/Supplier shall perform necessary internal machining of pipes for installing orifices, flow nozzles, control valves if applicable etc. The Bidder/Supplier shall install all pipes, valves and specialties being procured from other sources.

- **Testing of Piping**

- The Bidder/Supplier shall test all piping systems including valves and specialties and instruments as per procedure mentioned in Table 4.

- All piping shall be internally cleaned and flushed by the Bidder/Supplier after erection in a manner suited to the service and as directed by the Purchaser.

- For hydrostatic testing and water flushing, the Bidder/Supplier shall furnish necessary pumps, equipment, instruments and piping etc.
3.4 Other Guidelines

- Color code shall be used to identify pipe material. The Supplier shall be able to identify on request all random piping prior to field fabrication.

- The Supplier 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.

- 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 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 4 kg/cm²

  - Low-pressure steam piping when the working pressure of steam is up to 3.1 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 schedule 40.

- The high pressure steam piping after installation should be hydraulically tested in presence of the Boiler Inspector for his approval.

- The high-pressure steam piping work should also include fabrication and installation of
pressure reducing stations strictly conforming to IBR.

4.2 Other Piping

- All the piping for chilled water, Ammonia High pressure & low pressure side (gas/liquid), soft and raw water, 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.

5.0 Insulation of Piping and Equipment

5.1 Cold Insulation of Chilled Water and Ammonia Pipeline

- All the chilled water lines & 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.

- In case the insulation sweats or the specified/required insulation properties are not attained, the entire insulation in such region shall be redone with fresh material, entirely at the Supplier's cost.

- The thickness of insulation shall be as required.

- All the main lines valves flanges & headers should also be insulated in case of ammonia.

5.2 SS 304 Cladding

- The chilled water, ammonia, water, steam & hot water lines after insulations may be covered by SS 304

- SS 304 cladding will be done with 22 gauge (1 to 1.2mm thick) sheet with proper grooves and overlaps and screwed in position with 12 mm self tapping parker screws.
6. Interconnections of Services

6.1 The Supplier shall lay service piping and provide connections with the equipment complying strictly with the equipment manufacturers' instructions. The Supplier 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 shall also carry out electrical connections for equipment with the control panels including equipment lighting as per the wiring diagrams of the equipment Suppliers. 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. 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 existing equipment/piping. These shut downs should be planned carefully well in advance to enable the Purchaser to take suitable actions for ensuring normal Plant operations. The details of shut downs, the numbers and duration should be worked out and intimated to the Purchaser for approval. The Bidder/Supplier 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 Bidder/Supplier 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 Bidder/Supplier 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 Bidder/Supplier 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 Bidder/Supplier at mutually agreed cost (Landed cost + 18% 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 from the site of work for proper disposal.

The Supplier 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 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 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. Before completion of the work, the Supplier 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 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 shall remove and shall restore the site to neat workman like conditions at his cost.

8. **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 and nothing extra would be paid for these.

9. **Testing, Commissioning and Start-up**

9.1 The Supplier 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/purchaser/Purchaser of the plant at the rated output. The Supplier 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 shall incorporate/execute necessary minor modifications during the trial period for maximizing operational efficiency. The Supplier should also execute minor modifications as may be suggested by the manufacturer/Purchaser, if required. The Supplier 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.

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. **Trouble shooting during the trial period**
10.1 The Supplier 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 particular equipment is not working properly or not giving rated output the Supplier 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 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, then the charges incurred for the manufacturer's representative visit would be debited to the Supplier'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 Bidder/Supplier for start-up help, assist and guide the Bidder/Supplier during commissioning in the following cases:

- The Bidder/Supplier has no previous experience of commissioning and start-up of the similar equipment.
- The Purchaser is of the opinion that the Bidder/Supplier 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 Bidder/Supplier and the Bidder/Supplier will have to extend all co-operations to such representatives in good spirit and in the interest of the work.

10.6 After satisfactory commissioning and start-up the Supplier 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's representatives should be present at all times during the running and operation of plant and equipment. During this period the Supplier 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. 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.
11.2 Lettering and other markings, including capacity and flow direction markings, shall also be carried out by the Supplier on the tanks, pipe lines, starters, motors, isolators and wherever else necessary, as directed and as per the standard practice of installation. ISI color codes and color charts as mentioned in Table 3 & Table 2 must be adhered to.

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

12. Training of Personnel

12.1 The Supplier 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. Code of Practice for Painting Service Pipe Lines

13.1 On Non-insulated Pipe Line & Insulated Pipeline without Aluminum or SS 304 Cladding

- Ground colour to be applied throughout the length of the pipeline.
- Colour bands to be applied near every valve and branch connection as well as in every room near the entry.
- The 1st band should be 4" wide and the second band should be 1" wide.
- On the 1st band a white arrow to be put to indicate the direction of flow.
- 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.
- The valves should be painted with the same colour as the ground colour of the pipeline.

13.2 On Insulated Pipeline with SS304 Cladding

- 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.
- 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.
- On the 1st band a white arrow is to be put to indicate the direction of flow of the fluid.
- 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.
- The valves should be painted with the same colour as the ground colour.
- 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.
- 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.
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.

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>
<thead>
<tr>
<th>SN</th>
<th>Item</th>
<th>Painting Shade</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Refrigeration Compressor</td>
<td>Original colour</td>
</tr>
<tr>
<td>2</td>
<td>All M.S. platforms/pipe supports/ pipe bridges and any other structures</td>
<td>Dark admiral grey shade No.632 of ISI</td>
</tr>
<tr>
<td>3</td>
<td>Water Pumps.</td>
<td>Original colour</td>
</tr>
<tr>
<td>4</td>
<td>HT &amp; LT panels</td>
<td>Original colour</td>
</tr>
<tr>
<td>5</td>
<td>LT distribution switchboards</td>
<td>Dark admiral grey</td>
</tr>
<tr>
<td>6</td>
<td>Refrigeration Plant Receiver</td>
<td>Dark Red</td>
</tr>
<tr>
<td>7</td>
<td>Evaporative Condensers</td>
<td>Original Paint</td>
</tr>
<tr>
<td>8</td>
<td>Plate Type Chiller</td>
<td>SS Cladding</td>
</tr>
</tbody>
</table>
### Table 2

**Colour Code for Pipelines as per BIS 2379-1963**

<table>
<thead>
<tr>
<th>SN</th>
<th>Services</th>
<th>Ground Colour</th>
<th>First Band</th>
<th>Second Band</th>
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</thead>
<tbody>
<tr>
<td>1</td>
<td>Cooling Water</td>
<td>French Blue 166</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Boiler Feed Water</td>
<td>-</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Condensate</td>
<td>Sea Green 217</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Hot Water</td>
<td>-</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Drinking Water</td>
<td>-</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Treated Water</td>
<td>-</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Cold Water</td>
<td>French Blue 166</td>
<td>Canary Yellow</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>Untreated Water</td>
<td>-</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>Compressed Air</td>
<td>Sky Blue 101</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>Vacuum</td>
<td>-</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>Steam</td>
<td>Silver Grey 628</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>Diesel</td>
<td>Light Brown 410</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>13</td>
<td>Lubricating Oil</td>
<td>Light Grey 631</td>
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<tr>
<td>14</td>
<td>Drainage</td>
<td>Black</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>15</td>
<td>Ammonia</td>
<td>Signal Red 537</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>Sr No</td>
<td>Name</td>
<td>Test Pressure</td>
<td>Test Medium</td>
<td>Duration of Test (Hour)</td>
</tr>
<tr>
<td>-------</td>
<td>--------------------------</td>
<td>---------------</td>
<td>-------------</td>
<td>-------------------------</td>
</tr>
<tr>
<td>1</td>
<td>Steam pipe lines</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1A</td>
<td>LP steam</td>
<td>10</td>
<td>Water</td>
<td>24</td>
</tr>
<tr>
<td>2</td>
<td>Water pipe line</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2A</td>
<td>Raw water pipe line</td>
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<td>Water</td>
<td>24</td>
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<tr>
<td>2B</td>
<td>Soft water pipe line</td>
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<td>Water</td>
<td>24</td>
</tr>
<tr>
<td>2C</td>
<td>RO water pipe line</td>
<td>10</td>
<td>Water</td>
<td>24</td>
</tr>
<tr>
<td>3</td>
<td>Air line</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3A</td>
<td>Air line</td>
<td>12</td>
<td>Air</td>
<td>12</td>
</tr>
<tr>
<td>4</td>
<td>Ammonia pipe lines</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>4a</td>
<td>Suction</td>
<td>24</td>
<td>N2</td>
<td>24</td>
</tr>
<tr>
<td>4b</td>
<td>Discharge</td>
<td>24</td>
<td>N2</td>
<td>24</td>
</tr>
<tr>
<td>4c</td>
<td>Vacuum Test of Ammonia Lines</td>
<td>Absolute Zero</td>
<td>Vacuum</td>
<td>48</td>
</tr>
</tbody>
</table>

Engineer-in-charge shall provide water at available supply point from which the Supplier shall connect temporary piping for testing water.
Section IV – Part IV
Special Conditions of Contract
For
Electrical Works
Mehsana District Co-operative Milk Producers’ Union Limited
DSD-PATAN, E-tender document : MDCMPUL/18-19/40/Buttermilk/DSD Patan

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34. Earth Bus, Earthing Lead and Earth Wire/Strip
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Erection Procedure Guidelines for Instrumentation & Control System Table 1 Bureau Indian Standards (BIS)

Table 2 Pro forma for PCC, DB, and Motor Control Centers Test Table 3 Pro forma for motor testing

Table 4 Pro forma for Testing Cables

Table 5 Recommended Cables Sizes For Industrial Wiring Table 6 Sizing of Earthing Lead/Wire
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, LTPanels and power control centers, 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 Bidder/Supplier 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/Aluminum 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 Aluminum 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 Aluminum housing. **Sample to be got approved before supply.**

14. **Control Junction Box**
    14.1 These shall be in Aluminum cast housing, completely dust, vermin and weather proof (IP 65). 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**
    These shall be used for remote OFF for motors, away from MCC. These shall be suitable for surface/structure mounting in Cast Aluminum housing having IP-55 class of protection i.e. completely weather proof. For dairy's process area SS-304 push button shall be used.
16 Erection of Equipment

16.1 The cases containing the equipment (being supplied by the purchaser shall be handed over to the Bidder/Supplier. The Bidder/Supplier 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 Power Control Centers, Distribution Boards, Control Panels & Bus Ducts

17.1 Erection: The manufacturers shall deliver electrical panels and bus duct in convenient shipping section. The Bidder/Supplier shall be responsible for final assembly and inter-connection of bus bars/wiring. The Bidder/Supplier shall grout foundation channel in the flooring. Switchgears shall be aligned and leveled on their base channels and bolted or tack welded to them as per the instructions of the Engineer-in-charge. The earth bus shall be made continuous throughout the length. Loosely supplied relays and instruments shall be mounted and connected on the switchgears. The contacts of the draw out circuit breakers shall be checked for proper alignment and inter-changeability.

17.2 After erection the switchboard shall be inspected for dust and vermin proofness. Any hole, which might allow dust or vermin etc. to enter the panel, shall be plugged suitably at no extra cost.

17.3 If the instrument transformers are supplied separately they shall be erected as per the direction of the Engineer-in-charge. The Bidder/Supplier shall fix the cable glands after drilling the bottom top plates of all switchboards with suitable holes at no extra cost.

17.4 Range of overload relays/timers etc. shall be checked with requirement of motor/systems actually to be connected at site and if the same is undersized/oversized, it shall be brought to the notice of Engineer-in-charge, who shall arrange procurement of correct rated components. However, the Bidder/Supplier shall not charge anything extra for labour for such replacements.

17.5 The bus duct shall be suitably supported between switchgear and transformer. The opening in the wall where the duct enters the switchgear room shall be sealed to avoid rainwater entry. The foundation of the switchgear shall be raised suitably for minor adjustment to ensure proper alignment and connection of the bus duct at no extra cost. Expansion joints, flexible connection, etc. supplied by the manufacturer of the bus duct shall be properly connected.

17.6 Testing: Before electrical panel is energized, the insulation resistance of each bus shall be measured from phase to ground. Measurement shall be repeated with circuit breakers in operating positions and contact open. Before switchgear is
energized, the insulation resistance of all DC control circuits shall be measured from line to ground. Tests shall be performed on all circuit breakers during erection as per Table 2.

17.7 Contact alignment and wipe shall be checked and adjusted where necessary in accordance with the breaker manufacturer's instructions. Each circuit breaker shall be drawn out of its cubicle, closed manually and its insulation resistance measured from phase to phase and phase to ground. All adjustable direct acting trip devices shall be set using values given by the Engineer-in-charge / manufacturer. The dielectric strength of insulating oil wherever applicable shall be checked. Before switchgear is energized tests shall be performed on each circuit breaker in its test position as per Table.

17.8 Close and trip the circuit breaker from its local control switch, push button or operating handle. Switchgear control bus may be energized to permit test operation of circuit breaker with AC closing with prior permission of the Engineer-in-charge.

17.9 Carry out tripping test of the electrically operated circuit breaker by operating mechanical trip device. Test operation of circuit breakers latch, check carriage limit switch if provided. Test proper operation of lockout device in the closing circuit, wherever provided by simulating conditions that would causes a lockout to occur. Trip breaker either manually or by applying current or voltage to each of its associated protective relays. Before switchgear is energized, the test covered above shall be repeated with each breaker in its normal operating position.

17.10 Capacitor banks in capacitor control panel shall be tested as per manufacturer instructions. In addition, test for output and/or capacitance, insulation resistance test and test for efficiency of discharge device shall be carried out.

17.11 All electrical equipment alarms shall be tested for proper operation by causing alarms to sound under simulated abnormal conditions.

17.12 The Bidder/Supplier shall arrange testing and calibrations of relays. The testing equipment including primary and secondary injection sets (if required) etc shall also have to be arranged by the Bidder/Supplier. Payment for above work shall be deemed to have been included in the erection of switch boards / control panels.

18. Sealed Maintenance Free Batteries & Battery Charger

18.1 Batteries shall be erected on stands and insulators supplied by the manufacturer of the batteries. Interconnections shall be made with leads supplied by the manufacturer. Filling of electrolyte (supplied by the manufacturers), charging, discharging and recharging shall be carried out under the supervision of the Engineer-in-charge or his authorized representative. The Bidder/Supplier under the supervision of the Engineer-in-charge or his authorized representative will carry out erection of battery charger and DC board. The Bidder/Supplier shall also offer such facilities as may be required for carrying out tests on the complete battery charger and DC board / AC board.

18.2 Battery charger shall be tested for proper operation and to verify the charger delivers its maximum rated output. The Bidder/Supplier shall supply skilled / unskilled
labor for carrying out the test by the engineer-in-charge. Batteries shall be given a boost charge in accordance with the manufacturer's instructions and adjusted for float operation before being placed for regular service.

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 Bidder/Supplier. 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 Bidder/Supplier shall take adequate precaution and care while executing the work. For all damage due to negligence etc. the Bidder/Supplier 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 GCMMF.

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 Bidder/Supplier. 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
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 Bidder/Supplier.

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 Bidder/Supplier shall determine their location and obtain approval of the Engineer-in-charge before cutting is to be 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 Bidder/Supplier 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 Bidder/Supplier to support the cables without any extra charge. Cables shall be clamped to these supports with Aluminum 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 Bidder/Supplier. In processing area/Process building, Supplier has to consider the SS cable trays and to be fixed with SS box pipe or in SS pipe racks only.

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

25.3 Earthing flat/ wire can also be laid in cable tray along with cables. Power earthing and control earthing must be separate and in separate tray i.e. Power cable tray and Control cable tray.

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 Bidder/Supplier 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, close fit holes should be drilled in the bottom plate for all the cables in one line, and 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 aluminum 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.

지는 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 Aluminum cables, the Bidder/Supplier 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**

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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. Terminiations 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 there under. The Bidder/Supplier 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 (No Conventional Earthing only Chemical Earthing to be considered)

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 / chemical earthing by approved vendor.

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 centers of 2 earth pits.

33.4 Supplier has to consider separate earthing network for their to be carried out work. No connection shall be done with existing earthing network. Power earthing and control earthing network must be separate.

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

33.1 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 armored 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, Aluminum 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/ Aluminum 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 Bidder/Supplier.

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. **Two/Four Pole Structure**

35.1 ISMB 200 x 100 mm to be grounded in concrete 1:2:4 for at least 1/5th length i.e. 2 meters size of concrete pedestal 500 x 500 mm. All necessary civil works such as excavation, centering, concreting and back filling is included in Bidder/Supplier's scope of work.

35.2 Interconnecting by Aluminum conductor jumpers with connectors/ PG clamps etc.

35.3 Installation, testing and commissioning of complete two/four pole structure including ISMB & cross channels, G.O. switch, insulators and other items mentioned under equipment supply for two-pole structure.

35.4 Complete structure to be provided with two coats of Aluminum paint.

36. **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 Bidder 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 Level 2’’ SS 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, Siphons 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/cage type SS 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>
<thead>
<tr>
<th>SN</th>
<th>Description</th>
<th>BIS</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>PVC insulated cables (light duty) for working voltage unto 1100 volts</td>
<td>694-1977 Part I &amp; II</td>
</tr>
<tr>
<td>2</td>
<td>PVC insulated cables (heavy duty) for voltage unto 1100 volts</td>
<td>1554-1976 Part I</td>
</tr>
<tr>
<td>3</td>
<td>-- Do -- for voltage 3.3 kV to 11 kV</td>
<td>1554-1976 Part II</td>
</tr>
<tr>
<td>4</td>
<td>Specification for polyethylene insulated PVC sheathed heavy duty electric cables, voltage not exceeding 1100 V</td>
<td>5959-1970 Part I</td>
</tr>
<tr>
<td>5</td>
<td>-- Do -- voltage 3.3 kV to 11 kV</td>
<td>5959-1970 Part II</td>
</tr>
<tr>
<td>7</td>
<td>Code of practice for installation and maintenance of paper insulated power cables</td>
<td>1255-1967</td>
</tr>
<tr>
<td>8</td>
<td>Code of practice for earthing</td>
<td>3043-1966</td>
</tr>
<tr>
<td>9</td>
<td>Guide for safety procedures and practices in electrical work</td>
<td>5216-1969</td>
</tr>
<tr>
<td>10</td>
<td>Code of practice for installation and maintenance of AC induction motor starters</td>
<td>5214-1969</td>
</tr>
<tr>
<td>11</td>
<td>Code of practice for installation and maintenance of induction motors</td>
<td>900-1965</td>
</tr>
<tr>
<td>12</td>
<td>Code of practice for installation and maintenance of switchgears</td>
<td>372-1975</td>
</tr>
<tr>
<td>13</td>
<td>Code of practice for installation and maintenance of transformers</td>
<td>1886-1967</td>
</tr>
<tr>
<td>14</td>
<td>Code of practice for electrical wiring installation, voltage not exceeding 650 V</td>
<td>732-1963</td>
</tr>
<tr>
<td>15</td>
<td>Code of practice for electrical wiring installation (system voltage exceeding 650V)</td>
<td>2274-1963</td>
</tr>
<tr>
<td>16</td>
<td>Guide for testing three phase induction motor</td>
<td>4029-1967</td>
</tr>
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# Table 2

## Pro forma for PCC, DB, Motor Control Centre Test

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

Signature and seal of Engineer-in-charge of Purchaser  
Signature and seal of Engineer-in-charge of Bidder/Supplier
### Table 3
Pro forma for motor testing

<table>
<thead>
<tr>
<th>SN</th>
<th>Test</th>
<th>Report</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Name plate details</td>
<td></td>
</tr>
<tr>
<td>A</td>
<td>Voltage</td>
<td></td>
</tr>
<tr>
<td>B</td>
<td>HP / KW</td>
<td></td>
</tr>
<tr>
<td>C</td>
<td>Mounting</td>
<td></td>
</tr>
<tr>
<td>D</td>
<td>Current</td>
<td></td>
</tr>
<tr>
<td>E</td>
<td>RPM</td>
<td></td>
</tr>
<tr>
<td>F</td>
<td>Frame size</td>
<td></td>
</tr>
<tr>
<td>G</td>
<td>Make</td>
<td></td>
</tr>
<tr>
<td>H</td>
<td>Sr. No.</td>
<td></td>
</tr>
<tr>
<td>I</td>
<td>Others</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Insulation test (before cable connection)</td>
<td></td>
</tr>
<tr>
<td>A</td>
<td>Between Phase and Earth (Mega Ohms)</td>
<td></td>
</tr>
<tr>
<td>B</td>
<td>Between each Phase (Mega Ohms)</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Insulation test (after cable connection)</td>
<td></td>
</tr>
<tr>
<td>A</td>
<td>Between Phase and Earth (Mega Ohms)</td>
<td></td>
</tr>
<tr>
<td>B</td>
<td>Between each Phase (Mega Ohms)</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>No load current</td>
<td></td>
</tr>
<tr>
<td>A</td>
<td>R Phase Amps</td>
<td></td>
</tr>
<tr>
<td>B</td>
<td>Y Phase Amps</td>
<td></td>
</tr>
<tr>
<td>C</td>
<td>B Phase Amps</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Full load current</td>
<td></td>
</tr>
<tr>
<td>A</td>
<td>R Phase Amps</td>
<td></td>
</tr>
<tr>
<td>B</td>
<td>Y Phase Amps</td>
<td></td>
</tr>
<tr>
<td>C</td>
<td>B Phase Amps</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Temperature rise after 4 hours run</td>
<td></td>
</tr>
<tr>
<td>A</td>
<td>On no load degree C</td>
<td></td>
</tr>
<tr>
<td>B</td>
<td>On full load degree C</td>
<td></td>
</tr>
<tr>
<td>C</td>
<td>Ambient temperature during test degree C</td>
<td></td>
</tr>
</tbody>
</table>
7. **Operation of thermal overload relay**

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>A</strong></td>
<td>At normal Full Load current of motor</td>
</tr>
<tr>
<td><strong>B</strong></td>
<td>At twice Full Load current of motor trips in seconds</td>
</tr>
</tbody>
</table>

Signature and seal of Engineer-in-charge of Purchaser

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

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**Table 4**

**Pro forma for Testing Cables**

<table>
<thead>
<tr>
<th>Sr No</th>
<th>Test</th>
<th>Report</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Date of Test</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Drum Number (from which cable is taken)</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Cable From -&gt; To</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Length of run of this cable (meter)</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td><strong>Insulation resistance test (In Mega Ohm)</strong></td>
<td></td>
</tr>
<tr>
<td><strong>A</strong></td>
<td>Between core-1 to earth</td>
<td></td>
</tr>
<tr>
<td><strong>B</strong></td>
<td>Between core-2 to earth</td>
<td></td>
</tr>
<tr>
<td><strong>C</strong></td>
<td>Between core-3 to earth</td>
<td></td>
</tr>
<tr>
<td><strong>D</strong></td>
<td>Between core-1 to core-2</td>
<td></td>
</tr>
<tr>
<td><strong>E</strong></td>
<td>Between Core-2 to Core-3</td>
<td></td>
</tr>
<tr>
<td><strong>F</strong></td>
<td>Between Core-3 to Core-1</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td><strong>High Voltage Test (Voltage Duration)</strong></td>
<td></td>
</tr>
<tr>
<td><strong>A</strong></td>
<td>Between Cores and Earth</td>
<td></td>
</tr>
<tr>
<td><strong>B</strong></td>
<td>Between Individual Cores</td>
<td></td>
</tr>
</tbody>
</table>

---

Supplier’s Sign & Seal

DUDHSAGAR DAIRY

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| Signature and seal of Engineer-in-charge of Purchaser | Signature and seal of Engineer-in-charge of Bidder/Supplier |
Table 5
Recommended Cables Sizes for Industrial Wiring

<table>
<thead>
<tr>
<th>3 Ø 415 V Motor HP</th>
<th>Aluminum Conductor Cable Size (in mm²)</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Rotor Resistance Starter</td>
<td>Star Delta Starter</td>
</tr>
<tr>
<td></td>
<td>Supply side</td>
<td>Motor Side (2 Cables)</td>
</tr>
<tr>
<td>10</td>
<td></td>
<td>6</td>
</tr>
<tr>
<td>15</td>
<td>10</td>
<td>10</td>
</tr>
<tr>
<td>20</td>
<td>16</td>
<td>16</td>
</tr>
<tr>
<td>25, 30</td>
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<tr>
<td>40</td>
<td>35</td>
<td>35</td>
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<td>50</td>
<td>50</td>
<td>50</td>
</tr>
<tr>
<td>60</td>
<td>70</td>
<td>70</td>
</tr>
<tr>
<td>75</td>
<td>95</td>
<td>95</td>
</tr>
<tr>
<td>100</td>
<td>120</td>
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<td>150</td>
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<td>180</td>
<td>300</td>
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</tr>
<tr>
<td>215</td>
<td>300</td>
<td>300</td>
</tr>
</tbody>
</table>

For **DOL Starter up to 10 HP Motor**, 4 mm² cables should be used.
<table>
<thead>
<tr>
<th>Sr. No</th>
<th>ITEM</th>
<th>Size</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Control switches</td>
<td>Copper</td>
</tr>
<tr>
<td>2</td>
<td>Motor up to 10 HP</td>
<td>Copper</td>
</tr>
<tr>
<td>3</td>
<td>Motor above 10 HP up to 125 HP</td>
<td>G.I. strip 25 x 3 mm</td>
</tr>
<tr>
<td>4</td>
<td>Motor above 125 HP</td>
<td>G.I. strip 25 x 6 mm</td>
</tr>
<tr>
<td>5</td>
<td>Switch Board</td>
<td>G.I. strip 25 x 6 mm</td>
</tr>
<tr>
<td>6</td>
<td>Power control centre/ LT panel of sub-station</td>
<td>G.I. strip 40 x 6 mm</td>
</tr>
</tbody>
</table>
SECTION V
PLANT CONFIGURATION
SECTION V, Sub-section-1

Introduction
BACKGROUND:

The dairy, as it grew, became the largest co-operative dairy in the whole of Asia and handles more than 26.0 Lakh liters of milk per day in peak season. The union has two satellite dairies and three chilling centers to collect and supply raw chilled milk to the dairy. The product range of the Mehsana District Co-operative Milk Producers’ Union Ltd. includes liquid milk in pouches, butter, ghee, infant milk substitute, dairy whitener, whole milk powder, skimmed milk powder, sweetened condensed milk, sterilized flavored milk, Chhash (butter milk), ice cream, Dahi (yoghurt) and UHT milk in pouches. Mehsana District Co-operative Milk Producers’ Union Ltd. has set down as tapping stone to provide good quality, pure and safe milk to the consumers in Delhi NCR market also. To achieve this, it has established Dudhmansagar Dairy in Manesar, Gurgaon, Haryana to handle 10 LLPD milk with product making facilities. The Organization further expands its wings by establishing ultramodern Dudhmotisagar Dairy in Dharuhera Haryana to handle 15 LLPD milk expandable up to 30 LLPD milk handling capacity. The turnover of the Union is Rs. 4271 Crores in the financial year of 2017-18.

1.1 Introduction:

DSD-Patan was established in 04_October1976 for raw milk reception and chilling purpose. In the recent past, it has been expanded to facilitate milk processing facility for 3.0 LLPD and milk pouch packing facility for 2.0 LLPD Dudhsagar Dairy-Patan. Presently we are packing and dispatching about 0.70 LLPD milk pouches from DSD-Patan and 0.20 LLPD of Buttermilk. The additional manufacturing of Buttermilk DSD-Patan will enhance the proper utilization of plant building and utilities. Presently we are transferring the Packed Buttermilk from DSD-Mehsana. The plant is under operation since 12_October-2012. We are supplying pouch milk & Buttermilk to Patan, Unjha, Siddhpur, Chansma, Harij and nearby places of Patan.

PROJECT SCOPE:

Presently Buttermilk section is to be designed for manufacturing, packing and dispatch facility for 0.50 LLPD and expandable to 1.0 LLPD. The expansion of DSD-Patan will be having facility of Buttermilk processing, packing, storage and dispatch of Buttermilk. The Buttermilk will be dispatch to local market and also various places of Mehsana, Patan and Gandhinagar area i.e. Milk shed area of Dudhsagar Dairy-Mehsana.

<table>
<thead>
<tr>
<th>S. No.</th>
<th>Particulars</th>
<th>Pack size</th>
<th>Total quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Pouch Packing</td>
<td>500</td>
<td>40000</td>
</tr>
<tr>
<td>2</td>
<td>Pouch Packing</td>
<td>6000 (6 LTR.)</td>
<td>10000</td>
</tr>
</tbody>
</table>
The entire Buttermilk section is to be proposed in the 1st floor area existing dairy building called HMST area.

a. Milk for Buttermilk processing will receive in existing 15 KL HMST.

b. Pre-heated milk (with 42 Deg C.) to be stored in 5 KL VMST. VMST tank to be suitable for culture addition and Dahi Preparation.

c. Buttermilk pasteurizer, homogenizer along with holding tube.

d. Buttermilk Storage Tank for storage of processed Buttermilk

e. Buttermilk Buffer tanks to feed the buttermilk to pouch machine by gravity.

f. Pouch packing as per pack size decided.

g. Utilities line to be connected from existing main header at ground floor of DSD-Patan.

h. One MCCB will be provided by DSD-Patan for charging of Buttermilk sections' MCC panel. All electrical & control work in supplier scope. Supplier has to lay main incomer cable from our Electrical panel room to Buttermilk sections' panel.

WORKING CONDITIONS:

Site work of every nature has to be planned and executed with the knowledge that it is not a new green field site and milk chilling centre and milk processing & packing has already established / running & the new work to be clubbed accordingly to cater present as well as future requirements.

I. PROJECT TIME SCALE:

The Buttermilk processing & Packing Plant should be completed in 6 months’ time from the date of PO acceptance by Supplier and Product trials to be commenced at the end of this period and commercial production to start within 10 days thereafter.

II. SITE CONDITIONS:

Average Ambient Temperature (Deg C): 26 - 27
Maximum Ambient Temperature (Deg C): 45 - 46
Minimum Ambient Temperature (Deg C): 10 - 15
Relative Humidity (%): 85 - 95 Max & 50 Min

III. SITE ADDRESS:

Dudhsagar Dairy-Patan
A unit of Dudhsagar Dairy,
Mehsana District Co-Operative Milk Producers Union Limited
Unjha-Patan Road
Dist. - Patan
Gujarat, India
Contact Details for Clarification: At Dudhsagar Dairy, Mehsana

<table>
<thead>
<tr>
<th>Name</th>
<th>Designation</th>
<th>Contact No.</th>
<th>Email- ID</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sri N.S. Chaudhari</td>
<td>AGM (Project &amp; Civil)</td>
<td>09662537523</td>
<td><a href="mailto:nsc@mehsanaunion.coop">nsc@mehsanaunion.coop</a></td>
</tr>
<tr>
<td>Sri J.P. Jani</td>
<td>DM (Project &amp; CCs.)</td>
<td>09974059258</td>
<td><a href="mailto:jpjani@mehsanaunion.coop">jpjani@mehsanaunion.coop</a></td>
</tr>
</tbody>
</table>
SECTION V, SUB SECTION 2
Instruction to Bidders
INSTRUCTIONS TO BIDDERS

2.1 This Sub - Section of the tender defines the way that bidders are required to structure the presentation of the technical section of their bids.

2.2 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.

2.3 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.

BID STRUCTURE OF TECHNICAL SECTION

2.4 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:

<table>
<thead>
<tr>
<th>Sub-section</th>
<th>Subject</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Introduction</td>
</tr>
<tr>
<td>2</td>
<td>Instruction to Bidders</td>
</tr>
<tr>
<td>3</td>
<td>Design Basis</td>
</tr>
<tr>
<td>4</td>
<td>Responsibilities</td>
</tr>
<tr>
<td>5</td>
<td>Project Management</td>
</tr>
<tr>
<td>6</td>
<td>Scope of Supply and Technical Specifications (Tender package)</td>
</tr>
<tr>
<td>7</td>
<td>Battery Limits</td>
</tr>
<tr>
<td>8</td>
<td>Deviations from Technical Requirements</td>
</tr>
<tr>
<td>9</td>
<td>Optional &amp; Additional Items</td>
</tr>
<tr>
<td>10</td>
<td>Drawings and Documentation</td>
</tr>
<tr>
<td>11</td>
<td>Criteria for Technical Evaluation of Bid</td>
</tr>
<tr>
<td>12</td>
<td>Process Performance and Consumption Guarantee</td>
</tr>
<tr>
<td>13</td>
<td>Requirement for Bidder meeting</td>
</tr>
</tbody>
</table>

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:

SUB - SECTION 1: INTRODUCTION

Preamble

The bidder is to describe his technical proposal in details, stating the processes and systems, which he has, applies 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 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.
SUB –SECTION 2 : ACCEPTANCE OF WORKING CONDITION

A statement is required accepting the "working Tender Section 1.

SUB –SECTION 3: BASIS OF DESIGN

The bidder is to require following the Basic of Design in the tender and indicating 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 sections quantified the peak and daily loads of each utility and cross-reference this two service load histogram data to be provided with this bid.

SUB –SECTION 4: RESPONSIBILITIES

Responsibilities of the Bidder

The bidder is required to specifically state his acceptance of 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.

SUB –SECTION 5: PROJECT MANAGEMENT

- Time Schedule

The bidder is to state in this subsection the proposed programme 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 detail the makeup 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 detained and quantify the duration and manpower supplied to each.

- Commissioning
- Product trials
- Training

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.

SUB –SECTION 7: List of equipments (TENDER PACKAGE)

SUB –SECTION 8: BATTERY LIMITS

Battery limits for the plant are mentioned in this sub-Section.
SUB –SECTION 9: Exclusions from supplier scope.

SUB –SECTION 10: Makes of equipment brought items (Tender package)

SUB –SECTION 11: 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

SUB –SECTION 12: OPTIONAL ITEMS

Items that the bidder includes in this Sub - Section 12 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.

SUB –SECTION 13: DRAWINGS, DATA & DOCUMENTS

The list of drawings and technical documents required for technical evaluation is included in Sub - Section 13. 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.

SUB –SECTION 14: CRITERIA FOR TECHNICAL EVALUATION OF BIDS SUB – SECTION 15: PERFORMANCE AND CONSUMPTION GUARANTEES SUB – SECTION 16: BIDDER MEETINGS
SECTION V, SUB SECTION - 3
Design Basis
Mehsana District Co-operative Milk Producers’ Union Limited
DSD-PATAN, E- tender document : MDCMPUL/18-19 /40/ Buttermilk /DSD Patan

Design Basis:

Production plant machinery & equipments

3. BACKGROUND:
The dairy, as it grew, became the largest co-operative dairy in the whole of Asia and handles more than 25 lakhs liters of milk per day in peak season. The union has five satellite dairies to collect and supply raw chilled milk to the dairy. The product range of the Mehsana District Co-operative Milk Producers’ Union Ltd. includes liquid milk in pouches, butter, ghee, infant milk substitute, dairy whitener, whole milk powder, skimmed milk powder, sweetened condensed milk, sterilized flavored milk, Chhash (Butter milk), Ice cream, Dahi (yoghurt) and UHT milk in pouches. Mehsana District Co-operative Milk Producers’ Union Limited stone to provide good quality, pure and safe milk to the consumers in Delhi & Delhi NCR market also. To achieve this, it has established Dudhmanasagar Dairy in Manesar, Gurgaon, Haryana to handle 10 LLPD milk with product making facilities. The Organization further expands its wings by establishing ultramodern Dudhmotisagar Dairy in Dharuhera Haryana to handle 15 LLPD milk expandable up to 30 LLPD milk handling capacity. The turnover of the Union is Rs. 4271 Crores in the financial year of 2017-18.

3.1 Introduction:
DSD-Patan was established in 04_October 1976 for raw milk reception and chilling purpose. In the recent past, it has been expanded to facilitate milk processing facility for 3.0 LLPD and milk pouch packing facility for 2.0 LLPD Dudhsagar Dairy-Patan. Presently we are packing and dispatching about 0.70 LLPD milk pouches from DSD-Patan and 0.20 LLPD of Buttermilk. The additional manufacturing of Buttermilk DSD-Patan will enhance the proper utilization of plant building and utilities. Presently we are transferring the Packed Buttermilk from DSD-Mehsana. The plant is under operation since 12_October 2012. We are supplying pouch milk & Buttermilk to Patan, Unjha, Siddhpur, Chansma, Harij and nearby places of Patan.

3.2 PROJECT SCOPE:
Presently Buttermilk section is to be designed to 0.50 LLPD & Expandable to 1.0 LLPD manufacturing, packing and dispatch facility at DSD-Patan. The expansion of DSD-Patan will be having facility Buttermilk processing, Packing, storage and dispatch of Buttermilk will be dispatch to local market at Patan, Unjha, Siddhpur, Chansma, Harij and nearby places of Patan and also various places of Mehsana, Patan and Gandhinagar Districts of Mehsanaunions’ milk shade area.

3.2.1 TENDER PACKAGE: DSD-Patan, A unit of Dudhsagar Dairy Mehsana
This tender covers the Design, Engineering, Supply, Installation/erection, commissioning, testing and trial of capacity 0.50 LLPD Buttermilk manufacturing, packing and dispatch facility at DSD-Patan with provision for expansion of capacity to 1.0 LLPD. It also covers the training of Dairy personnel in management, operation and maintenance of the plant and allied equipments.

3.2.2 WORKING CONDITIONS:
Site work of every nature has to be planned and executed with the knowledge that it is not a new green field site & milk chilling centre, Milk Processing and packing has already established / running & the new work to be clubbed accordingly to cater present as well as future requirements.
3.3 BUTTERMILK SECTION:

a. 50000 LPD of Buttermilk will make from Fresh milk.

b. Standardized Dahi milk will be store in 15 KL existing HMST tank.

c. This milk shall then be transferred to 5 KL X 04 Nos. of VMST i.e. Dahi Settling Tanks through a PHE heater for bringing up of the suitable inoculation temperature. The RST-744 + CHN11 culture shall be added to these tanks and the contents will be agitated. The CIP system to be considered for Dahi Milk PHE Heater.

d. After proper agitation, agitator will stop and Culture added milk will allow to set Dahi of uniform consistency.

e. After getting requires PH of Dahi, Agitator will start to break Dahi and will make curd slurry.

f. Now this Dahi slurry will passed through Buttermilk Pasteurizer with 5 KLPH Capacity shall have the following temperature Programme. The Buttermilk Pasteurizer will be connected with two stage Homogenizer of 5 KLPH Capacity.

35 - 65 - 76.8 - 84 - 4 Deg C for 16 Sec Holding

g. The pasteurized Dahi Slurry will be stored in 25 KL capacity HMST storage tanks.

h. The rated quantity of Pasteurized water will added in this 25 KL HMST to make the Buttermilk with require FAT/SNF and Acidity parameters.

i. The Buttermilk shall then betransferred to Buffer tanks (5 KL X 2 Nos.) through PHE Chiller for Pouch packing. The temp of to be packed Buttermilk shall be 4 Deg C (maximum)

j. The Buttermilk will be packed in a High Speed-Twin head Pouch Packing Machine with capacity of 5000 LPH X 1 No. New Pouch packing machine for 500 ML Pouches and Normal speed-single head machine X 1 No. New Pouch Pacing machine for 6 LTR. Pouches. The Pouch Packing Machines will be fed from the 5 KL Pouch Buffer Tanks.

k. SS chute and collection trays, seating tools & electronic weigh scale shall be considered.

l. Filled crates are shifted to Pouch cold store via Pouch crate conveying system.

m. Buttermilk pouch crates shall be shifted in existing Pouch cold store and the temperature of Buttermilk Pouches needs to be maintained to 4°C till dispatch.

n. Material handling operations shall be manual but all process equipment CIP shall be done by existing Auto-CIP unit.

o. The MCC panel shall be designed and supplied by vendor and the remaining electrical accessories like control panel, power cables control cables SS cable tray etc. work is in the scope of supplier.
p. Compressed air will be supplied from existing compressor unit.

**PRODUCT PIPES, CHILLING AND STORAGE EQUIPMENT (COLD MILK CIRCUITS)**

<table>
<thead>
<tr>
<th>Sequence</th>
<th>Time</th>
<th>Temp.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Flush with fresh water</td>
<td>2 min.</td>
<td>Normal</td>
</tr>
<tr>
<td>2. Rinse with water</td>
<td>3 min.</td>
<td>Normal</td>
</tr>
<tr>
<td>3. Lye circulation</td>
<td>10 min.</td>
<td>80 deg C</td>
</tr>
<tr>
<td>4. Rinse with water</td>
<td>5 min.</td>
<td>Normal</td>
</tr>
<tr>
<td>5. Acid circulation</td>
<td>10 min.</td>
<td>70 deg C</td>
</tr>
<tr>
<td>6. Rinse with water</td>
<td>5 min.</td>
<td>Normal</td>
</tr>
<tr>
<td>7. Hot water sterilization</td>
<td>10 min.</td>
<td>85 deg C</td>
</tr>
</tbody>
</table>

**Total CIP Program** 45 min.

All the pipe lines, chilling and storage equipments shall be cleaned on each emptying if the gap is more than one hour before handling the product next.

The milk, rinse milk recovery system processing section equipments shall be cleaned once in a day on completion of the day packing / operation.

3.4 **Cleaning-In-Place (CIP)**

a) One no of centralized CIP station with two no. of circuits are considered for the tanker cleaning and other Process section equipments is available

b) CIP program for raw milk tank, product, pipes, chilling, and storage equipments, milk pasteurizer shall be followed strictly.

c) All the pipe lines, chilling and storage equipments shall be cleaned on each emptying if the gap is more than one hour before handling of next product.

d) Cream, rinse milk recovery system shall be cleaned once in a day on completion of the day operation.

e) For milk pasteurizers, full program/sequence CIP shall be done at least once in a day and intermediate CIP program shall be without Acid circulation sequence after every 5 to 6 hrs of operation.) Each route shall have different flow; temperature and time duration set point

f) Maximum recovery of CIP solution, milk and water shall be possible.

g) The system shall be operated and controlled from control station. The details of the on-going CIP program shall be displayed in the control station.

h) The system shall be totally secured against the mixing of cleaning solutions with the products in case of malfunction in the system or power failure.

i) The system shall be fully automatic and pre-programmed. However, it shall be possible to select/modify the cleaning sequence and duration from the control station.

j) For Road Milk Tankers, CIP program shall ensure that line connections have been made and man way shall be open before starting CIP.

**Cleaning Program: (of Existing AUTO CIP KITCHEN)**

**General:**

A CIP circuit shall consist of a set of CIP tanks (Flush Water, Lye, Acid, Hot Water and Recuperation), plate heat exchangers, filters, pumps, valves and fittings etc. The system shall be operated and controlled from CIP control room through PLC. The details of the on-going CIP program shall be displayed in the CIP control room. The system shall be fully automatic and pre-programmed. However, it shall be possible to select/modify the cleaning sequence and duration from the main control room.
Cleaning Program

The CIP system will generally have the cleaning program detailed below:

Sequence
a) Water Pre-rinse (to be drained)
b) Hot Detergent circulation
c) Hot/cold water rinse
d) Hot Acid circulation
e) Hot/cold water rinse
f) Hot water Sterilization

The route for CIP circulation will be pre-programmed. The solution spray will be only through spray balls. CIP solution will be returned to CIP unit through self-priming CIP return pumps in each circuit. Vendor has to consider the self-priming CIP pumps as and where require.

Arrangements will be made to ensure that adequate quantity of the cleaning solutions at the desired temperature and pressure, reach the equipment to be cleaned.

Within each CIP unit, return lines from each CIP circuit will be equipped with a conductivity probe and a temperature transmitter. The conductivity probes will detect the interface between detergent/acid solution and rinse water, and will be used to control various routing valves in each circuit return line. These probes will also detect substandard solutions and divert them to drains.

The temperature transmitter will monitor temperature of water returning during hot water sterilization cycle.

Pneumatically operated drain valves will be provided in all low points of the system pipe work to ensure the lines are fully drained.

3.5 SS Pipes, Process Pneumatic Valves and Fittings

The process pipes shall generally be of AISI 304 in welded construction. The valves and fittings would also be of AISI 304 construction. The valves would include Manual, pneumatic as well as non pneumatic valves

SS-304 pipe of outside polished and inside acid pickled of thickness 1.6 mm up to 51mm and 2mm thickness for higher sizes. SS 304 fittings used shall be SMS type for product pipes.

SS-316L pipe only of outside polished and inside acid pickled of thickness 1.6 mm up to 51mm and 2mm thickness for higher sizes. SS 316 fittings used shall be SMS type for CIP supply & return line.

3.6 UTILITY SERVICES:

3.6.1 STEAM DISTRIBUTION AND CONDENSATE RECOVERY SYSTEM

The Tapping for APT of flash steam recovery system shall also be taken from all PHE heaters. All steam valves on high pressure lines shall be of piston type. The recovered condensate from Buttermilk section shall be transferred to Boiler feed water tank with SS316 line. Boiler feed water tank is available at same floor. Piping of condensate is in supplier scope.

Distribution of LP steam to all consumption points of liquid milk plant is included the scope of work. All LP distribution lines from the header shall have isolation valves at accessible locations.
3.6.2 Chilled water distribution system

Chilled water header shall be made tapped from the main header of chilled water line at ground floor & return chilled water also tapped in main return chilled water header at ground floor in plant/visiting lobby of process section. (GI line, insulated/Al cladded) including necessary isolating valves at various tapings are included. Chilled water supply & return line shall be suitable for 1.0 LLPD Buttermilk Processing.

3.6.3 Compressed air supply & distribution

Compressed air distribution piping up to all duty points shall be considered. For Compressed air, vendor has to tap the suitable pipe size with main air compressed line at ground floor.

3.6.4 Water distribution system

The water distribution system shall start at the outlet of hydro flow system header of respective type of water and distribution to various applications as detailed in the battery limits of the plant.

Usage of water:

1. Raw water: To be tapped in main header of raw water line at process section. Pipe size shall be considered as per process requirement of Buttermilk.

2. Soft water: To be tapped in main header of soft water line at process section. Pipe size shall be considered as per process requirement of Buttermilk.

3. RO water line: To be tapped in main header of RO water line at Process Section. All PHE heaters of Buttermilk Section. MOC must be considered SS 316, scheduled 10.

Necessary isolation valves, pressure gauges for each section, piping, controls and instrument including flow meters etc. for water distribution system shall be in scope of supply.

3.7 ELECTRICALS:

Electrical distribution system shall be suitable to operate, control and maintain all the parameters required for Buttermilk processing, chilling & storage.

Intelligent Motor Control Centre with required number of feeders complete with switchgears, push buttons and indications, auto-manual selection switches and facility to operate and control electrical motors etc. through remote controlled push button stations etc. as per the requirement of the plant & equipment shall be provided for effective and safe operation of the Buttermilk plant.

Required quantity of braided copper / armouredaluminum& copper power cable, copper control cable, instrument cable, SS cage type cable trays inside the process area and GI perforated trays outside the process area, SS cage type vertical drop cable trays/pipes in milk processing & product making sections, plate type earth pit, earthing network, earthing conductors, load break Isolators / plug & sockets with Push Button Station with “ON” indication, near 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 perforated cable trays and drop conduits. MOC of cable trays & drop conduits shall be SS inside the process area & GI outside the process area.
SS shrouds for all pumps & motors shall be provided.

Supply & placement of electrical grade rubber mats of proper size as per the State Electrical Inspectorate rules shall be provided.

Power Cables shall be armoured copper conductor cable for motors up to 50 HP rating. Formotors’ rating 60 HP and above, armoured

All armoured cables between the outgoing feeders in MCC and plug & socket/isolator junction boxes near motors shall be of copper/aluminum conductor as above. Connection from plug & socket/isolator junction boxes to motor junction boxes shall be with PVC insulated flexible copper cable.

**The electrical LT distribution system specification is detailed below.**

### 3.3.1 ELECTRIC MOTOR

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.

<table>
<thead>
<tr>
<th>Motor Size (KW)</th>
<th>2 Pole Efficiency (%)</th>
<th>4 Pole Efficiency (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.37 (0.5 hp)</td>
<td>70.2</td>
<td>69.4</td>
</tr>
<tr>
<td>0.55 (0.75 hp)</td>
<td>74</td>
<td>72</td>
</tr>
<tr>
<td>0.75 (1 hp)</td>
<td>78.5</td>
<td>74.6</td>
</tr>
<tr>
<td>1.1 (1.5 hp)</td>
<td>82.2</td>
<td>83.8</td>
</tr>
<tr>
<td>1.5 (2 hp)</td>
<td>84.1</td>
<td>85.0</td>
</tr>
<tr>
<td>2.2 (3 hp)</td>
<td>85.6</td>
<td>86.4</td>
</tr>
<tr>
<td>3.0 (4 hp)</td>
<td>86.7</td>
<td>87.4</td>
</tr>
<tr>
<td>4.0 (5.5 hp)</td>
<td>87.6</td>
<td>88.3</td>
</tr>
<tr>
<td>5.5 (7.5 hp)</td>
<td>88.6</td>
<td>89.2</td>
</tr>
<tr>
<td>7.5 (10 hp)</td>
<td>89.5</td>
<td>90.1</td>
</tr>
<tr>
<td>11.0 (15 hp)</td>
<td>90.6</td>
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</tr>
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<td>15.0 (20 hp)</td>
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<tr>
<td>18.5 (25 hp)</td>
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</tr>
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<tr>
<td>37.0 (50 hp)</td>
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<tr>
<td>45.0 (60 hp)</td>
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<td>93.9</td>
</tr>
<tr>
<td>55.0 (75 hp)</td>
<td>94.0</td>
<td>94.2</td>
</tr>
<tr>
<td>75.0 (100 hp)</td>
<td>94.6</td>
<td>94.7</td>
</tr>
<tr>
<td>90.0 (120 hp)</td>
<td>95.0</td>
<td>95.0</td>
</tr>
</tbody>
</table>

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.

### 3.3.2 MOTOR CONTROL CENTRE (MCC)

MCC panel shall be provided by Dudhvidyasagar Dairy, Kadi
3.3.3 ELECTRICAL ACCESSORIES

Cable trays from PCC to MCCs & 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 4 sq mm copper wire. For higher rating motors, GI earth strip of suitable cross-section shall be provided. Each motor shall have double earthing.

All JB's/DB's etc. shall be in Al. Die cast housing or thermo-plastic construction. The cable drops (power, control & instrument cables) from the overhead cable trays shall be through SS-304 conduit pipe. Necessary 11KV rating, 12 mm thick rubber mats should be provided for all MCCs, sub-power panels.

3.4 LABORATORY EQUIPMENTS AND FURNITURE

Existing QA lab and Equipments shall be used for Buttermilk Analysis and Testing.

3.5 TRAINING, SERVICE AND STANDBY OPERATION

3.5.1 The objective of the training is to provide selected staff members of the dairy with necessary knowledge of dairy technology and maintenance to ensure a sound and suitable operations of the plant. Emphasis will be given on application as well as operation and not on basics.

- Dairy staff for:
  - Operation of process, services utilized and process technology
  - Operation of machinery and equipment
- Maintenance & Electrical staff for:
  - On the job training for technical personnel
  - Maintenance of plant and equipment
- Instrumentation staff:
  - On job training covering calibration
  - On the job training for technical personnel regarding set points
  - Fault finding and maintenance
  - Training of hardware & software.
  - Process logic
  - Fault finding and maintenance

3.5.2 For above training 05 trainer’s- man days are to be considered. Time allocation for each of those can be finalized before testing of the plant.

3.5.3 Services to be provided by Purchaser:

- Classrooms with chairs and tables for theoretical training
- Persons selected for training will have a good basic technical education
- Continuity in training and their assistance during start up of the plant
- Teaching material and audio visual aids.
3.6 SPARES

- List of spares parts with quantity to be submitted on two years inventory basis considering normal wear and tear and as recommended by the original equipment manufacturer.

3.7 GENERAL GUIDELINES

3.7.1 General Specification:
The following shall apply to all the equipment in various sections of the Dairy Plant.

All MS/GI structures and equipment to be given one coat of anti-corrosive paint followed by two coats of paint of approved shade.

All motors in production units shall be covered with SS shrouds. Shrouds should be easily removable and should allow free air circulation as well as entry of electrical cables. All motors installed outside the building shall have GI shrouds.

Suitable safety guards should be provided wherever required.

All weld joints shall be ground smooth. All corners should be well-rounded. In case of SS surfaces, external & internal surfaces shall be polished to 150 grits. DP tests shall be carried out for all welds after polishing for all holding vessels/tanks.

All equipment surfaces coming in contact with milk shall be made of SS 304 or SS 316 depending on the application as subsequently desired.

Stainless steel tables of required size and at appropriate locations shall be provided for work-in-process inventory and other such activities. Platforms and hoists for general operation and maintenance of equipment shall also be provided.

All fittings/equipments are to conform to SMS standard.

Detailed preventive maintenance schedules as well as operational manuals of all equipment shall be provided by the Bidder in the form of computer software after commissioning along with printed copies.

The manual shall cover the following aspects:

Brief Process Description & Flow sheet.

- Unit-wise function and description.
- Equipment-wise details, operational instructions, maintenance procedures and schedules.
- Plant start-up, commissioning, normal operation, and emergency operation.
- Trouble-shooting.
- As built drawings of the equipment as build drawing connection diagrams.
- Spares inventory and services of supply.

The manuals and drawings are to be supplied as follows:

- 4 sets of manuals and drawings in hard copy.
- 3 set of above in soft copy in CDs.
Following documents in the list for the manual should be added to the mentioned list:

1. 3D Model of complete plan including piping to save time installation and future expansion is must.
2. Isometric drawings for process and utility piping.
3. Plan layout with sections, Floor wise plant layout, GA drawing
4. As built P&IDs with complete equipment list with specifications.

3.7.2 Automation: As Required & If Applicable only

3.7.3 LIST OF DRAWING AND DOCUMENTS

The following drawings & documents shall be enclosed by the bidder with the offer.

Drawings:

- Machinery layout for the liquid milk plant, allied services based on the tentative layout enclosed with the tender document
- Product flow diagram including production equipment, service and product piping, controls, instruments etc.
- CIP equipment arrangement and flow diagram
- Service utilities flow diagram including utility equipment, inter connecting piping, controls, instrument, automation etc.
- Single line diagram for electrical distribution system
- Detailed automation system configuration/architecture proposed

Charts:

- Load diagram for all the services viz. steam, power, raw and soft water, chilled water, compressed air on 24 hours basis showing hourly consumption, total daily consumption, peak load and average load
- Hourly equipment-wise service consumption data on 24 hour basis
- Bar chart for project execution

Brochures:

- Literature covering general and technical information for all equipment covered within the scope of tender
- Technical details of any other equipment /item which is not mentioned but is considered to be required as per the description in the text
SECTION V, Sub - section - 4
Responsibilities
4.0 RESPONSIBILITIES OF BIDDER

4.0.1 Developing the process design, complete engineering design, manufacturing and/or supply of goods and service 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. and its incorporation in the project.

4.0.3 Providing technical data, technical literature, Refrigeration and service load calculations.

4.0.4 Arranging for approvals from various statutory authorities on behalf of the Purchaser. The statutory fees will be reimbursed by Purchaser on Refrigeration of receipt.

4.0.5 First charge of oil / lubricants.

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

4.0.7 Testing and commissioning satisfactorily and performance of all equipment in bidder’s scope and mutually after agreed sale terms & service.

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

4.0.9 Provide necessary manpower during erection, testing and commissioning along with tests.

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

4.0.11 Training to Purchaser’s personnel in the management system, plant operation & control, maintenance & repair of systems & equipment.

4.0.12 Powder type fire extinguishers shall be provided at strategic points.
SECTION V, Sub –Section - 5

Project Management
Project Management

5.0 TIME SCHEDULE / MANAGEMENT TEAM

5.0.1 Project execution shall be scheduled to mutually agreed time bound programme, which should not exceed 6 months from the date of signing of contract along with advance payment to commencement of product trials and service load trials. The Project Manager of bidder will provide 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.

5.0.2 The project-staffing pattern shall be submitted before commencement of work and should include sufficient personnel to meet the execution time schedule.

5.0.3 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.

5.0.4 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. The Project Manager and Project Engineer shall be the same person throughout the project.

5.0.5 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.

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

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

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

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

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

5.1 APPROVAL

5.1.1 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.

5.1.2 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.

5.2 INSPECTION

5.2.1 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 may be necessary along with clearance within a reasonable time (7 days) from the date of intimation by the supplier.

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

5.3 SITE WORK AND INSTALLATION

5.3.1 Protection of electronic equipment.

It is the responsibility of the bidder 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.

5.3.2 Temporary power supplies.

Power supply at may be erratic and the bidder 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 bidder to hire a diesel generator if this proves to be necessary.

5.4 COMMISSIONING

5.4.1 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.

5.5 PRODUCT TRIAL AND PERFORMANCE GUARANTEE

5.5.1 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.

5.5.2 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.

5.5.3 Performance Guarantee: Performance and services consumption guarantees, and the relevant penalties for not meeting the rated capacities and efficiencies are covered in the tender.
SECTION V

Sub-section- 6

Scope of supply & Technical Specifications

BUTTERMILK PLANT/SECTIONS’ MACHINERIES
Buttermilk Manufacturing Section:

The pasteurized standardized milk is used for the manufacturing of the buttermilk in the buttermilk section. The standardized Double Toned Milk will be used with 1.7% Fat and 9.2% SNF. The 60% of the DTM and 40% of water will give the buttermilk with the specifications of 1.0% Fat and 5.5% SNF. The DTM will be transferred to the Dahi settling tank through Dahi milk transfer line. The milk is heated with the help of the PHE heater in the buttermilk section. The capacity of the PHE heater shall be 5 KLPH. The temperature of the heated milk should be 42 C. The supplier should consider the suitable controls for achieving the milk temperature to 42 C. The 5 KL tanks shall be filled up to 5 KL level with milk and then calculated quantity of direct addition to Vat (DAV) culture will be added for the preparation of the Dahi. The firm Dahi will be formed within 4 to 5 hours of incubation. Once, the Dahi achieved the acidity of 0.7% to 0.8% than the Dahi will be break with the help of the agitator provided in the tanks. The required quantity of Pastd. Chilled water shall be added after processing of Dahi slurry. The supplier shall provide the mass flow meters with the accurate transfer of water as the addition of SNF or Fat is very difficult in the buttermilk. The curd slurry will be circulated in the tanks with the help of the pump. This will give the homogeneous mass of the curd slurry. The acidity of the buttermilk will be 0.45% LA to 0.50% LA. The Dahi slurry will be pasteurized at 65 C for 16 sec holding. The two stage homogenizer shall be connected with Buttermilk pasteurizer only. The temperature of the incoming Dahi Slurry will be 38 to 40 C therefore the pasteurizer should be designed accordingly. The temperature range will be 35 - 65 - 76.8 - 84 - 4 Deg C for 16 Sec Holding. The pasteurized curd slurry will be transfer to 1 nos. of the 25 KL HMST Tank. Pastd. Chilled water of calculated quantity will be added in this tank. This Buttermilk will be transfer to buffer tank through PHE Chiller for pouch packing. The temperature of Buttermilk to be packed shall be 4 Deg. C maximum.

Equipment & Brief Specifications – for buttermilk manufacturing:

6.1 Pasteurized milk storage Tank for pasteurized Milk storage for Buttermilk preparation: (EXISTING)

DSD-Patan having three numbers of HMST having 15 KL Capacity/Each shall be utilized for storage of pasteurized Milk for Buttermilk Preparation.

6.2 Standardized Dahi milk storage tank cum sweet Dahi settling tank for Lassi (VMST type) with agitator:

| Quantity | 04 Nos. |
| Capacity | 5 KL |
| Type     | Vertical (The Diameter and Height of the tanks shall be considered as per the proposed installation location at Buttermilk Section) |
| Material | a) Inner shell 3 mm- AISI 304 |
|          | b) Outer cladding 2.0 mm - AISI 304 |
| Finish   | 150 grit |
Agitation: Top mounted mechanical agitator to ensure uniform mixing of the buttermilk without any adverse effect on the contents.

Ports and fittings: Top Inlet / Bottom Side outlet, breather, CIP spray ball, Top mounted side openable manhole door, sanitary type sampling cock, Thermo well for RTD fittings.

Insulation: EPS Insulation of suitable thickness to ensure temp. Rise / decrease do not exceed 1 Deg. C in 24 hours time in all seasons. The moisture barrier then mineral wool mattress then EPS shall be provided. Vendor can also consider the PUF Insulation.

Instruments: RTD for the milk temperature to be indicated on by digital temp indicator on Curd Settling tanks’ control panel.

1.1 FUNCTIONAL REQUIREMENT:
The VMST will be used to store the Pasteurized Dahi milk at 4º C temperature for culturing of milk to make Dahi in the same at 42º C.

1.2 DESIGN REQUIREMENTS:
Capacity: 5,000 L, The volume of the tank should be such that after filling it up to the rated capacity, the level would be 100 mm below the line where cylindrical shell joins the conical top.

Constructional Features: Double walled, insulated and welded construction of sanitary design.

Slope: The bottom of the tank shall have standards slope towards outlet for free and complete drainage of liquid.

Metal contact: The only metal to metal contact between the inner and the outer shells shall be at the places where fittings for the tank are provided. At the places where mild steel spray galvanized stiffeners are provided insulated padding shall be fixed between the inner stainless steel shell and stiffeners.

Finish: All welding joints are to be ground smooth. All Stainless Steel surface are to be polished to 150 grits.

Joint curvature: The radii of all welded and permanent attachment joints should be at least 6 mm. where the conical top and flat bottom join the cylindrical shell the radii should not be less than 25 mm.

Drawing: You will submit a detail drawing with technical specifications along with the supply of tank (For our Reference and Record)
1.3 SCOPE OF SUPPLY:

- Inner Cylindrical Body: The inner shell and conical ends & flat bottom should be fabricated from 3 mm thick stainless steel plates respectively conforming to AISI 304.
- Outer cylindrical body: The outer shell and conical ends should be fabricated from 2.0 mm thick stainless steel plates respectively conforming to AISI 304.
- Insulation: The entire inner shell (Conical ends) should be insulated in three layers as follows:
  - First layer: Aluminum foil of 42 SWG (0.1 mm thick) to be applied with CPRX compound on the outer surface of inner shell.
  - Second layer: 25-mm thick layer of LRB MATTRESS (Light Resin Bond) of density 100 – 130 kg/m³ applied radially with chicken wire netting.
  - Third layer - 75 mm thick PUF of density 24 Kg/m³ applied radially with bitumen.
  - Fourth layer - 50 micron Alkhathine sheet to be applied as fourth layer before outer cladding as vapour barrier.
- The insulation shall be applied in staggered joints. All joints shall be sealed with bitumen.
- The insulation shall ensure temperature rise does not exceed 10°C in 24 hours time in all seasons when silo is filled to capacity.

1.4 ACCESSORIES:

- Inlet & Outlet separately: inlet 51 MM & outlet 51 mm dia. Cup type outlet with SS 304 butterfly valve (AISI 304) flanged valve ending in compete stainless steel union. 1 No.
- Air vent: Stainless steel (AISI 304) 150 MM dia. / 130 mm Air vent to prevent formation of partial vacuum during CIP and pressure during filling and pressure during filling. 1 No.
- Man Way: Oval shape stainless steel (AISI 304) man way of dimensions approximately 550 X 405 provided with leak proof hinged insulated stainless steel (AISI 304) door with tightening and locking device. The man way door should be side openable and man way door shall be light weight so that it can easily open and close. The gasket should be of neoprene rubber of food quality. - 1 No.
- Sand Blasted Level Mark: It should be calibrated at 500 L intervals and provided on the inner shell at opposite side of the manhole.
- Agitator: (Top mounted) It should be in stainless steel (AISI 304) construction completed with geared motor of adequate capacity and should be able to uniformly mix milk in the tank within 10 minutes. The agitator shaft & fin should be SS 304. - 1 Set.
- Spray Ball: Removable stainless steel (AISI 304) cleaning device located at the apex of the conical top to provide flooding of liquid over the complete interior surface during CIP. It should have stainless steel union at the outer end connection. 1 Set.
- Sampling Cock: The sanitary type sample cock shall be provided on bottom area near to outlet nozzle (but not at outlet pipe). 1 No. Alfa level make
- Legs: Conical (SS legs) and stainless steel ball feet (ball fit SS 316 solid) at the bottom of the tanks. The ball feet should have provision for height adjustment of 50 mm. The legs should be supported from inner shell of the tank with proper SS pad arrangement. - 4 Nos. The legs of tanks shall be mounted on suitable size floor plate/Base plates. Leg height shall be finalized with consideration of room height and the height of manual valve cluster arrangement at outlet of tank from floor level.
- Thermo well with RTD: 200 mm long stainless steel (AISI 304) inclined pocket suitable for mounting stem type dial thermometer should be suitably located near manhole It should have 21 mm BSP male threads.
• Drain Hole: The outer shell should be provided with one or more drain holes at the lowest point. Any aperture in the shell should be designed so as to prevent ingress of moisture.

• Toe guard: Toe guard of 100 mm shall be provided.

• Lifting Lugs: Stainless steel (AISI 304) lifting lugs should be provided at top. 3 Nos.

• PAINTING:
  All the mild steel stiffeners used in the construction of the Tank should be painted with two coats of epoxy primer after through de-rusting.

• TESTS:
  The following tests should be conducted by the manufacturer at its works.
  Dye penetration test for welding joints.
  Water fill-up test of inner vessel for water tightness.
  When man way is closed and cover tightened without gasket then the gap at any place between the man way neck and cover should not exceed 0.5 mm.

6.3 VMST tanks’ SS 304 Platform

<table>
<thead>
<tr>
<th>Quantity</th>
<th>: 01 set (For 04Nos.VMST)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type</td>
<td>: As required</td>
</tr>
<tr>
<td>MOC</td>
<td>: SS 304</td>
</tr>
<tr>
<td>Materials</td>
<td>: RHS SS 304, 50X50X2.5 mm, RHS SS304, 100X50X3mm, SS304 pipe of 38 &amp; 25 mm and SS304 dimple or chequred plate of 4mm thick.</td>
</tr>
</tbody>
</table>

SS 304 structural platform & railing with SS 304 ladder 01 no connecting to structural platform should be considered from Ground level to man hole approachable height with Dimple type plate or chequred plate with 100 mm safety guard at walk area side of railing.

The location of VMST tanks’ platform will be at back side of tanks i.e. between wall and tanks.

The width of ladder/staircase and platform shall be 650 mm minimum.

Vendor can fix the supports of platform from floor or from ceiling of Buttermilk section as per convenience.

6.4 Centrifugal Milk Pump: (PUMP-P1)

<table>
<thead>
<tr>
<th>Capacity</th>
<th>: Suitable</th>
</tr>
</thead>
<tbody>
<tr>
<td>Quantity</td>
<td>: 01 No.</td>
</tr>
<tr>
<td>Duty</td>
<td>: For transferring of pasteurized Milk from VMST to 5 KL Curd settling tank through Dahi Milk PHE Heater.</td>
</tr>
<tr>
<td>Location</td>
<td>: Between Existing 15 KL HMST and 5 KL VMST Tanks (Near to 15 KL HMST)</td>
</tr>
<tr>
<td>Discharge Head</td>
<td>: As required</td>
</tr>
<tr>
<td>Type</td>
<td>: Centrifugal</td>
</tr>
<tr>
<td>Fittings</td>
<td>: Quick opening sanitary fittings</td>
</tr>
</tbody>
</table>
Material: AISI 316 (Impeller)
Mounting: Free standing with adjustable SS ball feet
Shaft sealing: Mechanical shaft seal
Gasket: Nitrile rubber
Shroud: AISI 304
Motor: 415V, AC, 3 phases, 50 Hz. Squirrel cage induction motor with TEFC/IP 55 Enclosure

6.5 Dahi Milk PHE Heater/Dahi milk Thermization heater with CIP Arrangement including PUMP-P2:

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Capacity</td>
<td>5 KLPH</td>
</tr>
<tr>
<td>Quantity</td>
<td>01 Set</td>
</tr>
<tr>
<td>Temp. Range</td>
<td>From 70°C to 44°C</td>
</tr>
<tr>
<td>Material</td>
<td>Plate Heat Exchanger (PHE)</td>
</tr>
<tr>
<td>Frame</td>
<td>Free standing SS-304 cladded carbon steelframe on SS304 ball feet</td>
</tr>
<tr>
<td>Finish</td>
<td>150 grit</td>
</tr>
<tr>
<td>Duty</td>
<td>3 to 50°C plus minus 1°C</td>
</tr>
<tr>
<td>Services</td>
<td>Low pressure steam @3.5 Kg/cm²</td>
</tr>
<tr>
<td>Milk to Steam ratio</td>
<td>suitable</td>
</tr>
<tr>
<td>Plate Thickness</td>
<td>0.6 MM</td>
</tr>
<tr>
<td>No. of Plates</td>
<td>As required</td>
</tr>
<tr>
<td>Total Heat Transfer Area</td>
<td>as required</td>
</tr>
<tr>
<td>Hot water Generator unit</td>
<td>Suitable capacity with Tubular Heating system (THE) with controller. Customer is preferring THE. Vendor can also consider the PHE for hot water generation system but Hot water generation system shall be independent i.e. milk PHE heater and Hot water generation system shall not be in one frame set.</td>
</tr>
<tr>
<td>APT</td>
<td>As required capacity with necessary arrangement to transfer the condensate to boiler feed water tank which is situated at same floor level.</td>
</tr>
</tbody>
</table>

Process Control: Digital Temp. Controller

- Type: PID controller
- Accuracy: 0.001 %
- Make: Yokogawa or equivalent
- Auto / Manual tuning + Fuzzy Logic
- Input: Universal / 0.4-20 mA / RTD Pt-100 etc
- Output: 4 to 20 mA

Configurable O/p with potential free Switching: Low/High/ Very High.

Supplier has to consider the Auto Temperature Control/Correction system of PID based only i.e. PID Temp Controller with Auto Steam Control valve and Auto Water make up system for Hot water generation system.
CIP arrangement: Vendor has to consider the CIP arrangement for Curd PHE Heater and for that separate CIP Circulation pump (PUMP-P2) and balance tanks shall be provided for making efficient CIP in circuit of PHE heater.

Thermo well provision for RTD: At Hot water Inlet
- At Hot water Outlet
- At Milk Inlet
- At Milk Outlet

Line Connections: Size of Product and Media connections shall be considered to achieve the requisite temp of milk without fail.

6.6 **High Efficiency Three stage Sheer Pump: (PUMP-P3)**

- Capacity: Suitable
- Quantity: 01 No.
- Duty: To make Homogeneous mixture of curd slurry and transfer to curd settling tank to Buttermilk pasteurizers’ Balance tank. It is also to be used in place of Two stage homogenizer in case of sudden breakdown of Homogenizer i.e. Can be work of Homogenizer.
  - Location: Between Curd Settling tanks and Inlet of Buttermilk Pasteurizer. (Near to 5 KL VMSTs)

- Discharge Head: As required
- Type: Centrifugal
- Fittings: Quick opening sanitary fittings
- Material: AISI 316 (Impeller)

6.7 **Centrifugal Milk Pump: (PUMP-P4 & PUMP-P5)**

- Capacity: Suitable
- Quantity: 02 Nos.
- Duty: One for Circulating the Curd Slurry within the Curd Settling tanks & second for transferring the Past & chilled water from 5 KL tank to...
Mehsana District Co-operative Milk Producers’ Union Limited  
DSD-PATAN, E- tender document : MDCMPUL/18-19/40/Buttermilk /DSD Patan

Intermediate tank before BM PHE Chiller

Location: Near 5 kl capacity VMST i.e. Curd settling tanks between bottom outlet and top inlet of 5 kl VMSTs.

Discharge Head: As required
Type: Centrifugal
Fittings: Quick opening sanitary fittings
Material: AISI 316 (Impeller)
Mounting: Free standing with adjustable SS ball feet
Shaft sealing: Mechanical shaft seal
Gasket: Nitrile rubber
Shroud: AISI 304
Motor: 415V, AC, 3 phases, 50 Hz. Squirrel cage induction Motor with TEFC/IP 55 Enclosure

Vendor has to install the SS Inline strainer at Suction side of this pump of suitable mesh size to filter the Curd slurry before feeding the same to BM Pasteurizer.

6.8 Buttermilk Pasteurizer:
Skid mounted (skid with SS304 ball feet legs) Buttermilk pasteurizer, complete module with separate hot water generating set (THE/PHE type) etc., would be required for pasteurization of Dahi milk up to 75 deg. C. The hot water section (THE/PHE type) shall be separate. The brief description of milk pasteurizer shall be as given below:

<table>
<thead>
<tr>
<th>#</th>
<th>DESCRIPTION</th>
<th>PARTICULARS</th>
<th>REQUIRED SPECIFICATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Capacity</td>
<td>With connecting objects like homogenizer at the nearest reservoir.</td>
<td>5 KLPH (nearest reservoir is insulated HMST tank of 25 KL capacity. Inlet for Buttermilk at tank will be top inlet.</td>
</tr>
<tr>
<td>2</td>
<td>Product</td>
<td>Curd Slurry</td>
<td>2% Fat &amp; 9% SNF</td>
</tr>
<tr>
<td>3</td>
<td>Inlet temp of Product</td>
<td>Curd Slurry</td>
<td>38 to 40 Deg C (Consider 40 Deg C for Design purpose)</td>
</tr>
<tr>
<td>4</td>
<td>Pasteurization temp.</td>
<td>Temp program: 35--65—77--84--4 °C</td>
<td>65 Deg C/16 Seconds holding</td>
</tr>
<tr>
<td>5</td>
<td>Product outlet temp.</td>
<td>with chilled water 1:1.5</td>
<td>2 - 4 °C</td>
</tr>
<tr>
<td>6</td>
<td>Holding time</td>
<td></td>
<td>16 Seconds</td>
</tr>
<tr>
<td>7</td>
<td>Regeneration Efficiency</td>
<td>Heat recovery</td>
<td>Desired 93% or above. Supplier has to Specify based on their own design.</td>
</tr>
</tbody>
</table>

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| 8 | Process control | Equipped with auto pasteurization temp controls i.e. FDV. Flow will be diverted with alarm if temp is below the Pastn. Temp. Temp. Sequencing of production, sanitation and CIP will be manual. CIP flow rate 1.2 times the production flow rate. Programme Selection facility | Digital Temp. Controller
- **Type:** PID controller
- **Accuracy:** 0.001%
- **Make:** Yokogawa or equivalent
- **Auto / Manual tuning + Fuzzy Logic**
- **Input:** Universal / 0.4-20 mA/ RTD Pt-100 etc
- **Output:** 4 to 20 mA
- **Configurable O/p with potential free Switching:** Low/High/ Very High.
  - Sterilization, Production, CIP and OFF mode Selection switch to be provided to get auto selection set temp in PID Controller.
  - Vendor has to consider tor provision of Tower lamp at top of the panel which indicates to selection mode in different colours. |

| 9 | Plant design | PHE | Placed: Plates should be made from Stainless Steel confirming to AISI – 316 (ALLOY316), 0.6 MM thickness and should be of sanitary design. All water contact and exterior surface should be easily accessible or readily removable for cleaning and inspection purpose.
- Pasteurizer with 4 sections viz. Chilling, Regeneration-I, Regeneration-II & Heating section.
- Design temp: 110°C
- Design pressure: 6 bar
- Test pressure: 8 bar
- Gaskets: NBR, Clip on type (Glue less), Food grade
  - All inlets/outlets from PHE should be of 38 or 52mm as per design requirement, SS 304 mounted with Thermo well and SMS union excluding chilled water inlet/outlet which are of 63 mm
  - MOC: MS Cladded with SS 316L with adjustable Ball feet for height adjustment up to 50 mm
  - PHE carrying bar: It should be appropriate to withstand the weight of PHE itself plus holding volume of milk, chilled water & hot water. |

| 10 | Thermo well | Thermo wells of SS 304 are to be provided at every inlet / outlets for | Product inlet to plant
- Product outlet from Regeneration-I
- Product outlet from Regeneration-II |
<p>| | | |</p>
<table>
<thead>
<tr>
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</tr>
</thead>
<tbody>
<tr>
<td><strong>11</strong> Sensors Type : RTD</td>
<td><strong>12</strong> Digital Temp. Scanner</td>
<td><strong>13</strong> Feed Pump</td>
</tr>
<tr>
<td>Simplex/Duplex as per requirement.</td>
<td>Digital type temp Scanner</td>
<td>Centrifugal Pump</td>
</tr>
<tr>
<td>RTD sensors (Duplex RTD require at milk outlet from heating section &amp; milk outlet from chilling section)</td>
<td>➢ RTD Sensor: Head Type Pt-100, As per din 43760 standard class A accuracy, mineral insulated Length: 150mm Sheath Dia : 06 mm Nos. of wire: 06 wire</td>
<td>➢ Centrifugal pump of reputed Make all wetted parts in SS316L, SMS connections with single shaft seal with motor of Crompton/ABB/SIMENS make.</td>
</tr>
<tr>
<td></td>
<td>Digital Temp. scanner</td>
<td></td>
</tr>
<tr>
<td></td>
<td>➢ No. of Channels = 12 nos. ➢ Make: Yokogawa or Equivalent. ➢ Accuracy : 0.1 % ➢ Input : RTD / Pt-100 / 3 wire ➢ Display Output : LCD – Fluorescent Red of 8 mm ➢ Front side Auto / manual selector switch ➢ switch for channel selection ➢ Range: 0 to 150 Deg. C. ➢ Power Supply: 230 VAC +/- 10 % / 50 Hz.</td>
<td>➢ MOC: SS 304 ➢ Material: 2 mm thick SS 304 ➢ Capacity: 200 lit. ➢ With removable SS top cover with proper grip and three legs. (with adjustable ball feet) ➢ SS float valve to withstand 3 Kg/cm² pressure. ➢ Provision of inlets for product at bottom of tank. FDV, water &amp; plant circulation from side of the Balance Tank ➢ Outlet will be cup type at bottom. ➢ Over flow line at side top of Balance Tank ➢ On line strainer at inlet line to BT ➢ Two way butterfly type SS valve</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>14</strong> Milk balance tank with float valve</td>
<td></td>
<td></td>
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</tr>
</tbody>
</table>
| 15 | Flow controller | ➢ Mechanical type NRV, MOC: SS 304 with SMS union (at both ends) to be provided at delivery of Pasteurizer feed pump.  
➢ Manual flow regulating valve (with marking) for regulating milk flow manually to plant. MOC SS 304 with SMS union at both ends to be provided at delivery of feed pump & after NRV.  
➢ Vendor has to install Inline strainer i.e. pipe in pipe filter at Inlet of feed pump. Y type SS strainer will be suitable. The strainer mesh size shall be 40 Mesh. |
| 16 | Hot water generation system | ➢ PHE based with SS 316 imported plates, EPDM gaskets.  
➢ Inlet/outlets of Hot water PHE should be of 51 mm dia.  
➢ Expansion chamber, Air vent & Safety valve imported with proven workability.  
➢ Pneumatically controlled steam control valve (Samson make) with Positioner & I/P converter Make: Moore only  
➢ Air filter/ Pressure regulator unit of standard makes.  
➢ Water make up valve internals in SS 304, Lergis make with NRV  
➢ Centrifugal pump: all wetted parts in SS316L, SMS connections with single shaft seal with motor. (Coupled type pump with motor). Supplier can also consider vertical pump of Grundfos make of suitable capacity.  
➢ PRV (Spirex-marshall make) for steam pressure control  
➢ Steam trap(Spirex-marshall make)  
➢ By pass steam line with valve.  
➢ Supplier can consider THE (Tubular Heat Exchanger) for hot water generation system also. |
| 17 | Control panel | ➢ Control panel should be equipped as Control Connection Panel & Power connection panel (Control connection part & power connection part should be separate inside the panel board)  
➢ MOC:SS 304, Front door opening, Duly pre-wired and tested, self supported, bottom entry and consists of following instruments & controls  
➢ Temp indicating PID controller.  
➢ Temperature Scanner with 12 Channels  
➢ Alarm/Hooter with ‘reset’ switch to announce diversion of milk  
➢ Manual/Auto switch for operating flow |
<table>
<thead>
<tr>
<th>No.</th>
<th>Item Description</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>18</td>
<td>Automatic Flow diversion Valve</td>
<td>Imported Sanitary designed FDV, remote controlled valve with wetted parts in SS 316, EPDM seat</td>
</tr>
<tr>
<td></td>
<td>Flow Diverion valve at outlet of pasteurizer</td>
<td>Vendor has to consider the Flow diversion valve mechanism with suitable instrumentation (PID) at outlet of plant for auto forward flow and recirculation during Production, CIP and Sterilization.</td>
</tr>
<tr>
<td>19</td>
<td>Interconnecting pipes and fittings</td>
<td>All pipes and fittings are to make the internal welding surfaces smooth and hygienic with SS 304 SKID FRAME</td>
</tr>
<tr>
<td>20</td>
<td>Auto Chilled Water supply system.</td>
<td>Temp of to be supplied Chilled water will be 3 Deg C. maximum. Vendor has to consider the Chilled water supply to PHE with Auto water control system For Chilled water auto regulating system vendor has to consider PID control system with Auto water control valve installation at Chilled water inlet line. At control panel PID temp indicator cum controller to be provided with Auto/manual switch also. At present this system is already available at Milk Pasteurizer of Patan Plant and vendor can consider the same design for Chilled water auto control system. At chilled water outlet line vendor has to install NRV of suitable pipe size.</td>
</tr>
<tr>
<td>21</td>
<td>Sampling cock</td>
<td>1 No of SS Sampling cock at plant outlet(Pastd chilled Buttermilk outlet)</td>
</tr>
<tr>
<td>22</td>
<td>CIP</td>
<td>The plant should run min 6 hours between CIP – CIP in present product and utility condition. Vendor has to Install online digital Conductivity meter between outlet of feed pump and Inlet of Pasteurizer. Conductivity meter is able to show the Conductivity and</td>
</tr>
<tr>
<td></td>
<td></td>
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</tbody>
</table>
| **Mehsana District Co-operative Milk Producers’ Union Limited**  
DSD-PATAN, E- tender document : MDCMPUL/18-19 /40/ Buttermilk /DSD Patan** |

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</tr>
</thead>
</table>
| **23** | **Pressure gauge** | Of suitable type & size with siphon tube  
➢ 1 No for steam line  
➢ 1 No. for Chilled water inlet line  
➢ 1 No. for Pastd chilled milk outlet line  
Above sizing are indicative. Supplier should provide their standard design to establish the required performance. |

<p>| | | |</p>
<table>
<thead>
<tr>
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<th></th>
<th></th>
</tr>
</thead>
</table>
| **24** | **Erection & Commissioning** | Supplier should complete the commissioning trial & fulfill the following parameters as per PO :  
➢ Capacity  
➢ Regeneration efficiency  
➢ Temperature program  
➢ Duration between CIP with / without separator.  
➢ The flow ratio for hot water / chilled water flow with respect to Soft water flow.  
➢ Pump capacity.  
➢ Workmanship  
Erection & commissioning in supplier scope. Supplier is supposed to provide most economical flow ratio to meet the given parameters. Appropriate instruments that required for the commissioning purpose should be arranged by supplier to authenticate successful commissioning. |

<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
</table>
| **25** | **Performance Criteria** | Supplier is requested to provide details of their designed pasteurizer offered to evaluate performance.  
➢ Heat transfer area per plate  
➢ Heat transfer area per section  
➢ Holding volume of PHE in product circuit  
➢ Utility consumption per hour of operation I e Chilled water,Steam,Air  
➢ Electricity consumption for one hour working on product & for CIP of the plant |

<p>| | | |</p>
<table>
<thead>
<tr>
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<th></th>
</tr>
</thead>
</table>
| **26** | **Commissioning Modalities** | Capacity  
2 bar discharge head should be available at the outlet of Pasteurizer so that the 5 KLPH capacity is available at Buttermilk storage tank.  
Efficiency  
Pasteurizer shall be run regeneration efficiency of 93%. |
### Fouling Factor

Running time and temp. Shall be taken as index of fouling factor.

a) Adequate surface area should be provided in heating section to avoid early fouling time span should be minimum 6 hours between two CIP’S.
b) Temp difference between hot water & to be Past. Hot water should not be more then 10 °C at any point of time. During 6 hours of operation.

### Modalities of commissioning

Various parameters (capacity, Reg. efficiency, running time) shall be proven during the commissioning process as mentioned above. You shall give commissioning trial for 6 cycles for “regeneration efficiency”

### 6.9 Two Stage Homogeniser:

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Capacity</td>
<td>5 KLPH</td>
</tr>
<tr>
<td>Quantity</td>
<td>01 No.</td>
</tr>
<tr>
<td>Product</td>
<td>Fresh standardized Dahi Slurry</td>
</tr>
<tr>
<td>Viscosity</td>
<td>&lt; 50 CPs</td>
</tr>
<tr>
<td>Maximum Particle Size</td>
<td>&lt; 50 microns (in feed)</td>
</tr>
<tr>
<td>Operating Temperature</td>
<td>&lt;140 °C</td>
</tr>
<tr>
<td>Execution</td>
<td>Sanitary</td>
</tr>
<tr>
<td>Version</td>
<td>ENERGY</td>
</tr>
<tr>
<td>Capacity</td>
<td>5 KLPH</td>
</tr>
</tbody>
</table>

**Homogenizing Stage**: Two stage

- Normal Working Press: (First stage 150 bar and second stage 50 bar for high efficiency machine)
- Max Back Pressure: 5 bar
- Min in Feed Pressure Range: 4 - 5 bar
- Motor Kw: Suitable
- Electrical Supply: 3ph/415V/50Hz
- Auxiliary Circuits: 24V DC
- Water Supply: Potable at required pressure and quantity
- Air Supply (Pneumatic): 0.1 NM3/hr at 6 bar
- Cleaning Temperature: < 90°C
- Cleaning Time*: 30 min
- Sterilization Temperature*: 140°C
- Sterilization Time*: 30 min
- Local Conditions: Temperature +5 / +40 °C - R.H. max 90% - Height above sea level: 1000m

The machine, manufactured according to the directive 98/37/CEE and following
Mehsana District Co-operative Milk Producers’ Union Limited  
DSD-PATAN, E-tender document: MDCMPUL/18-19 /40/ Buttermilk /DSD Patan

updates, includes:
Compression Block with:
- 3 nos. carbide detonated plungers with Kevlar plunger seals
- Satellite poppet type pump valves & tapered field replicable suitable valve seats for the product
- Sanitary design analog pressure gauge
- Safety overpressure relief valve set at
Homogenizing valve with: pneumatic adjustment of the pressure locally on the machine
Special heavy duty cast - iron body housing transmission parts.
Lubrication System forced type with electro-pump, including pressure switch
Transmission Drive with AC motor
Frame with stainless steel removable panels

INCLUDED IN SCOPE OF SUPPLY:
Two stage High Efficiency Nano Valves
Automatic & instant unloading of homogenizing pressure on feed pressure failure / power tripping
Inlet Pressure Transducer with low alarm
Air Solenoid Valve at the inlet of the pneumatic circuit
Plunger lubrication control
Solenoid Valve on water circuit
Flow Switch on pistons lubrication water circuit
Homogenizer outlet pressure
Electric Power and Control panel in stainless steel cabinet, with IP-65 Protection.
Includes Start/delta starter for main motor, DOL starter for Aux motors electrical protections for all motors and auxiliary circuits, hour meter, alarm lamps, tagged components and cables terminal board for EPB/machine interface machine RUN contact, electrical diagrams and components list. Siemens/Rockwell logo PLC for machine control
Assembled according to IEC and CE standards.
The supply includes start/stop pushbuttons & alarm lamp on machine front panel
Vendor has to install sanitary type sampling cock at Inlet and Outlet milk lines of homogenizer to release the air during processing of milk at suitable location without fail. If sampling cock at Inlet and outlet of homogenizer, the part of homogenizer then no issue.
Please also note that the Capacity of the Two Stage Homogenizer must be 5 KLPH against the homogenizing pressure i.e. 200 to 250 Bar Pressure requirement. Vendor has to provide the Chart for Capacity against the Homogenizing pressure

6.10 Intermediate Balance Tank:

<table>
<thead>
<tr>
<th>Capacity</th>
<th>: 200 Liter.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Quantity</td>
<td>: 01 No.</td>
</tr>
<tr>
<td>Duty:</td>
<td>Buttermilk/Dahi slurry/Past. Water will be diverted to this tank before sending to Buttermilk storage tank.</td>
</tr>
<tr>
<td>Type:</td>
<td>Vertical round Balance Tank with Inlet outlet port and top cover</td>
</tr>
<tr>
<td>Material</td>
<td>: SS-304</td>
</tr>
<tr>
<td>Design</td>
<td>: Balance Tank with Ball feet legs and top cover</td>
</tr>
<tr>
<td>Finish</td>
<td>: 150 grit</td>
</tr>
</tbody>
</table>

6.11 Centrifugal Milk Pump: (PUMP-P6)
**Mehsana District Co-operative Milk Producers’ Union Limited**  
DSD-PATAN, E-tender document: MDCMPUL/18-19/40/Buttermilk/DSD Patan

<table>
<thead>
<tr>
<th>Capacity</th>
<th>10 KLPH</th>
</tr>
</thead>
<tbody>
<tr>
<td>Quantity</td>
<td>01 No.</td>
</tr>
<tr>
<td>Duty</td>
<td>For supplying/transferring of Pastd. Buttermilk or Pastd.Chilled water to Buttermilk Storage Tank through Buttermilk PHE Chiller.</td>
</tr>
<tr>
<td>Location</td>
<td>At outlet of Intermediate Balance tank to Buttermilk PHE Chiller.</td>
</tr>
<tr>
<td>Discharge Head</td>
<td>As required</td>
</tr>
<tr>
<td>Type</td>
<td>Centrifugal</td>
</tr>
<tr>
<td>Fittings</td>
<td>Quick opening sanitary fittings</td>
</tr>
<tr>
<td>Material</td>
<td>AISI 316 (Impeller)</td>
</tr>
<tr>
<td>Mounting</td>
<td>Free standing with adjustable SS ball feet</td>
</tr>
<tr>
<td>Shaft sealing</td>
<td>Mechanical shaft seal</td>
</tr>
<tr>
<td>Gasket</td>
<td>Nitrile rubber</td>
</tr>
<tr>
<td>Shroud</td>
<td>AISI 304</td>
</tr>
<tr>
<td>Motor</td>
<td>415V, AC, 3 phases, 50 Hz. Squirrel cage induction Motor with TEFC/IP 55 Enclosure</td>
</tr>
</tbody>
</table>

### 6.12 BUTTERMILK PHE CHILLER:

<table>
<thead>
<tr>
<th>Capacity</th>
<th>10 KLPH</th>
</tr>
</thead>
<tbody>
<tr>
<td>Quantity</td>
<td>01 Set</td>
</tr>
<tr>
<td>Temp. Range</td>
<td>From 12°C to 4°C</td>
</tr>
<tr>
<td>Type</td>
<td>Plate Heat Exchanger (PHE)</td>
</tr>
<tr>
<td>Material</td>
<td>SS 316 plates with EPDM clip ON gaskets</td>
</tr>
<tr>
<td>Frame:</td>
<td>Free standing SS-304 cladded carbon steelframe on SS304 ball feet</td>
</tr>
<tr>
<td>Finish</td>
<td>150 grit</td>
</tr>
<tr>
<td>Duty</td>
<td>To Re-chill the Buttermilk from 10°C to Maximum 4°C before transferring to Buttermilk Storage Tank.</td>
</tr>
<tr>
<td>Services</td>
<td>Chilled water supply at 3 Deg C.</td>
</tr>
<tr>
<td>Milk to Chilled water ratio</td>
<td>1:1.5</td>
</tr>
<tr>
<td>Plate Thickness</td>
<td>0.6 MM</td>
</tr>
<tr>
<td>No. of Plates</td>
<td>As required to achieve the requisite temperature.</td>
</tr>
<tr>
<td>Total Heat Transfer Area</td>
<td>as required</td>
</tr>
<tr>
<td>CIP arrangement</td>
<td>Vendor has to consider the CIP arrangement for PHE Chiller with Buttermilk Pasteurizer.</td>
</tr>
<tr>
<td>Thermo well provision for RTD</td>
<td>At Chilled water Inlet</td>
</tr>
<tr>
<td></td>
<td>At Chilled water Outlet</td>
</tr>
<tr>
<td></td>
<td>At Buttermilk Inlet</td>
</tr>
<tr>
<td></td>
<td>At Buttermilk Outlet</td>
</tr>
<tr>
<td>Line Connections</td>
<td>Size of Product and Media connections shall be considered to achieve the requisite temp of Buttermilk without fail.</td>
</tr>
</tbody>
</table>

### 6.13 Horizontal Buttermilk Storage Tank:
**Mehsana District Co-operative Milk Producers’ Union Limited**  
DSD-PATAN, E-tender document: MDCMPUL/18-19/40/Buttermilk/DSD Patan

<table>
<thead>
<tr>
<th>Quantity</th>
<th>01 Nos.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Capacity</td>
<td>25 KL</td>
</tr>
<tr>
<td>Type</td>
<td>Horizontal Pastd. Buttermilk Storage Tank (The Diameter, length and Height of the tanks shall be considered as per the proposed installation location at Buttermilk Section)</td>
</tr>
</tbody>
</table>

**Material**
- a) Inner shell 3 mm - AISI 304
- b) Outer cladding 2.0 mm - AISI 304

**Finish**
- 150 grit

**Agitation**
- Top mounted mechanical agitator to ensure uniform mixing of the buttermilk without any adverse effect on the contents (Vendor has to decide the number of Agitator to be installed at this tank for uniform mixing/agitation of Buttermilk to be stored)

**Ports and fittings**
- Top Inlet / Bottom Side outlet, breather, CIP spray balls, manhole door, sanitary type sampling cock at manhole door, Thermo well for RTD fittings.

**Insulation**
- EPS Insulation of suitable thickness to ensure temp. Rise / decrease do not exceed 1 Deg. C in 24 hours time in all seasons. The moisture barrier then mineral wool mattress then EPS shall be provided. Vendor can also consider the PUF Insulation.

**Instruments**
- RTD for the milk temperature to be indicated on by digital temp indicator on Panel of Buttermilk Section.
  - Hydrostatic Level transmitter set with Digital Level indicator cum controller shall be provided to tank. The digital level indicator shall be provided at panel of Buttermilk Section.
  - Vendor has to install only Level indicator of this tank at Pouch Packing section also.

**6.13.1 FUNCTIONAL REQUIREMENT:**
The HMST will be used to store the Pasteurized Buttermilk at 4º C temperature for pouch packing.

**6.13.2 DESIGN REQUIREMENTS:**
Capacity: 25,000 L, The volume of the tank should be such that after filling it up to the rated capacity, the level would be 100 mm below the line of cylindrical top portion.

Constructional Features: Double walled, insulated and welded construction of sanitary design.

Slope: The bottom of the tank shall have standards slope towards outlet for free and complete
drainage of liquid.

Metal contact: The only metal to metal contact between the inner and the outer shells shall be at the places where fittings for the tank are provided. At the places where mild steel spray galvanized stiffeners are provided insulated padding shall be fixed between the inner stainless steel shell and stiffeners.

Finish: All welding joints are to be ground smooth. All Stainless Steel surface are to be polished to 150 grits.

Joint curvature: The radii of all welded and permanent attachment joints should be at least 6 mm. where the conical top and flat bottom join the cylindrical shell the radii should not be less than 25 mm.

Drawing: You will submit a detail drawing with technical specifications along with the supply of tank (For our Reference and Record)

6.13.3 SCOPE OF SUPPLY:
- Inner Cylindrical Body: The inner shell and conical ends & bottom should be fabricated from 3 mm thick stainless steel plates respectively conforming to AISI 304.
- Outer cylindrical body: The outer shell and conical ends should be fabricated from 2.0 mm thick stainless steel plates respectively conforming to AISI 304.
- Insulation: The entire inner shell (Conical ends) should be insulated in three layers as follows:
  First layer: Aluminum foil of 42 SWG (0.1 mm thick) to be applied with CPRX compound on the outer surface of inner shell.
  Second layer: 25-mm thick layer of LRB MATTRESS (Light Resin Bond) of density 100 – 130 kg / m³ applied radially with chicken wire netting.
  Third layer - 75 mm thick PUF of density 24 Kg/m³ applied radially with bitumen.
  Fourth layer - 50 micron Alkhathine sheet to be applied as fourth layer before outer cladding as vapour barrier.
  The insulation shall be applied in staggered joints. All joints shall be sealed with bitumen.
  The insulation shall ensure temperature rise does not exceed 1°C in 24 hours time in all seasons when silo is filled to capacity.

6.13.4 ACCESSORIES:
- Inlet & Outlet separately: inlet 63 MM & outlet 63 mm dia. Cup type outlet with SS 304 butterfly valve (AISI 304) flanged valve ending in complete stainless steel union. 1 No.
- Air vent: Stainless steel (AISI 304) 150 MM dia. / 130 mm Air vent to prevent formation of partial vacuum during CIP and pressure during filling and pressure during filling. 1 No.
- Man Way: Oval shape stainless steel (AISI 304) Insulated man way shall be provided with leak proof arrangement with tightening and locking device. The gasket should be of neoprene rubber of food quality. - 1 No.
- Sand Blasted Level Mark: It should be calibrated at 1000 L intervals and provided on the inner shell at opposite side of the manhole.
- Agitator: (Top mounted) It should be in stainless steel (AISI 304) construction completed with geared motor of adequate capacity and should be able to uniformly mix buttermilk in the tank within 10 minutes. The agitator shaft & fin should be SS 304. Number of Agitator set shall be decided by Vendor.
• Spray Ball: Removable stainless steel (AISI 304) cleaning device located at the apex of the top to provide flooding of liquid over the complete interior surface during CIP. It should have stainless steel union at the outer end connection. 2 Sets.

• Sampling Cock: The sanitary type sample cock shall be provided at manhole door. 1 No.

• Legs: Conical (SS legs) and stainless steel ball feet (ball fit SS 316 solid) at the bottom of the tanks. The ball feet should have provision for height adjustment of 50 mm. The legs should be supported from inner shell of the tank with proper SS pad arrangement. The legs of tanks shall be mounted on suitable size floor plate/Base plates. Legs height shall be finalized with consideration of room height and the height of manual valve cluster arrangement at outlet of tank from floor level. Number of Legs: 08 Minimum & Height of leg as per site situation.

• Thermo well with RTD: 200 mm long stainless steel (AISI 304) inclined pocket suitable for mounting stem type dial thermometer should be suitably located near manhole. It should have 21 mm BSP male threads.

• Drain Hole: The outer shell should be provided with one or more drain holes at the lowest point. Any aperture in the shell should be designed so as to prevent ingress of moisture.

• Ladder arrangement: Vendor has to provide the ladder arrangement at front part of tank with suitable steps.

• Watch glass and light glass provision shall be considered at front part of tank.

• Lifting Lugs: Stainless steel (AISI 304) lifting lugs should be provided at top. 4 Nos.

• PAINTING:
  All the mild steel stiffeners used in the construction of the Tank should be painted with two coats of epoxy primer after through de-rusting.

• TESTS:
  The following tests should be conducted by the manufacturer at its works.
  Dye penetration test for welding joints.
  Water fill-up test of inner vessel for water tightness.
  When man way is closed and cover tightened without gasket then the gap at any place between the man way neck and cover should not exceed 0.5 mm.

### 6.14 Centrifugal Milk Pump (PUMP-P7):

<table>
<thead>
<tr>
<th>Capacity</th>
<th>10 KLPH</th>
</tr>
</thead>
<tbody>
<tr>
<td>Quantity</td>
<td>01 No.</td>
</tr>
<tr>
<td>Duty</td>
<td>For Supplying/transferring of Pastd. Buttermilk from Buttermilk storage tank to pouch buttermilk Buffer tanks.</td>
</tr>
<tr>
<td>Location</td>
<td>At outlet of 25 KL BM storage tank to Pouch BM Buffer tanks i.e. Near to 25 KL BM Tank.</td>
</tr>
<tr>
<td>Discharge Head</td>
<td>As required</td>
</tr>
<tr>
<td>Type</td>
<td>Centrifugal</td>
</tr>
<tr>
<td>Fittings</td>
<td>Quick opening sanitary fittings</td>
</tr>
</tbody>
</table>
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Material: AISI 316 (Impeller)
Mounting: Free standing with adjustable SS ball feet
Shaft sealing: Mechanical shaft seal
Gasket: Nitrile rubber
Shroud: AISI 304

The Pump ON/OFF control for this pump shall be provided at Pouch section as well as at BM Section.

6.15 POUCH BUTTERMILK BUFFER TANKS:
Buttermilk Buffer Tank (For Pouch Packing M/c HMST type) with high, medium & low level probe facility.

<table>
<thead>
<tr>
<th>Quantity</th>
<th>02 Nos.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Capacity</td>
<td>5 KL/Each</td>
</tr>
<tr>
<td>Inner Shell Thickness</td>
<td>3MM</td>
</tr>
<tr>
<td>Outer Shell Thickness</td>
<td>2MM</td>
</tr>
<tr>
<td>MOC</td>
<td>AISI 304</td>
</tr>
</tbody>
</table>

6.15.1 FUNCTIONAL REQUIREMENT:

The HMST for storage of Pastd. Buttermilk at 2º to 4º C temperature.

6.15.2 DESIGN REQUIREMENTS:

Capacity: 5,000 L, The volume of the tank should be such that after filling it up to the rated capacity the level would be at least 100 mm below the bottom end of the sight / light glass.

Constructional Features: Double walled, insulated and welded construction of sanitary design.

Slope: 1: 15 towards the outlet at the bottom of the tanks. (Outlet 63 mm size)

Metal contact: The only metal to metal contact between the inner and the outer shells should be at the places where fittings for the tank are provided. At the places where mild steel stiffeners are provided insulated padding should be fixed between the inner stainless steel shell and stiffeners.

Finish: All welding joints are to be ground smooth. All Stainless Steel surface are to
Joint curvature: The radii of all welded and permanent attachment joints should be at least 6 mm. where the conical top and flat bottom join the cylindrical shell; the radii should not be less than 25 mm.

Drawing: You will submit a detail drawing with technical specifications along with the supply of Tanks (For our reference).

6.15.3 SCOPE OF SUPPLY:

6.15.3.1 Inner Cylindrical Body: The inner shell and conical ends should be fabricated from 3 mm thick stainless steel plates respectively conforming to AISI 304.

6.15.3.2 Outer cylindrical body: The outer shell and conical ends should be fabricated from 2 mm thick stainless steel plates respectively conforming to AISI 304. Stiffeners between inner and outer shell of Mild Steel to be provided.

6.15.3.3 Insulation: The entire inner shell with both endconicals should be insulated in three layers as follows:

First layer: Aluminum foil of 42 SWG (0.1 mm thick) to be applied with CPRX compound on the outer surface of inner shell.

Second layer: 25-mm thick layer of LRB MATTRESS (Light Resin Bond) of density 100 - 130 kg / m³ applied radially with chicken wire netting.

Third layer: 25 mm thick PUF of density 24 Kg/m³ applied radially with bitumen.

Fourth layer: 50-mm thick thermo coal EPS of density 16-20 Kg / m³ applied longitudinally with Bitumen.

Fifth layer - 50 micron Alkathine sheet to be applied on fourth layer before outer cladding as vapour barrier.

The insulation shall be applied in staggered joints. All joints shall be sealed with bitumen.

The insulation shall ensure temperature rise does not exceed
10C in 24 hours time in all seasons when silo is filled to capacity.

6.15.4 ACCESSORIES:

6.15.4.1 Inlet Cum Outlet : 76 mm dia. Cup type inlet cum outlet with two way plug type stainless steel (AISI 304) flanged valve ending in compete stainless steel union. -- 1 No.

6.15.4.2 Air vent: Stainless steel (AISI 304) 150 MM dia. Air vent to prevent formation of partial vacuum during CIP and pressure during filling. -- 1 No

6.15.4.3 Man Way: Oval shape stainless steel (AISI 304) man way of dimension approximately 550 X 405 and provided with leak proof hinged insulated stainless steel (AISI 304) door with tightening and locking device. The man way door should open inward but at the same time it can be taken out when necessary. The gasket should be of neoprene rubber of food quality. -- 1 No.

6.15.4.4 Sight Glass: Stainless steel (AISI 304) sight glass assembly should be provided with toughen glass. It should be provided in such a way that one can easily read from the lowest level up to the highest level marks. -- 1 No.

6.15.4.5 Sand Blasted Level Mark: It should be calibrated at 500 L intervals and provided on the inner shell at opposite side of the sight glass.

6.15.4.6 Light Glass: Stainless steel (AISI 304) light glass assembly should be provided with toughened glass and stainless steel lamp shade for mounting 24 volt and 100 watt bulb. The lamp holder should be made of brass. -- 1 No.

6.15.4.7 Agitator : It should be in stainless steel (AISI 304) construction completed with geared motor of adequate capacity and should be able to uniformly mix BM in the tank within 10 minutes. The agitator shaft should be a rod. -- 1 Set.

6.15.4.8 Spray Ball: Removable stainless steel (AISI304) cleaning device located at the apex of the conical top to provide flooding of liquid over the complete interior surface during CIP. It should have stainless steel union at the outer end connection. --2 No.

6.15.4.9 Sampling Cock: It should be provided about 300 mm from bottom for easy milk collection and should be stainless steel (AISI 304) construction of sanitary design. Sampling cock shall mount at man way door only. -- 1 No.
6.15.4.10 Level Probe: Two nos. of level probe for high level and low level should be provided. - 2 nos.

6.15.4.11 Legs: Conical Mild steel legs with Stainless Steel (AISI - 304) sheet cladding and stainless steel ball feet at the bottom of the tanks. The ball feet should have provision for height adjustment of 50 mm. The legs should be supported from inner shell of the tank with proper SS pad arrangement. -- 4 nos. Leg height shall be finalized with consideration of room height and the height of manual valve cluster arrangement at outlet of tank from floor level.

6.15.4.12 Thermo well: 200 mm long stainless steel (AISI 304) inclined pocket suitable for mounting RTD-PT100 for Digital Indicator should be suitably located near manhole It should have 21 mm BSP male threads.

6.15.4.13 Drain Hole: The outer shell should be provided with one or more drain hole at the lowest point. Any aperture in the shell should be designed so as to prevent ingress of moisture.

6.15.4.14 Ladder: Stainless Steel (AISI - 304) should be provided for access to the gear motor assembly of agitator. ---1 no.

6.15.4.15 Lifting Lugs: Stainless steel (AISI 304) lifting lugs should be provided at top. --4 Nos.

6.15.5 PAINTING: All the mild steel stiffeners used in the construction of the silo should be painted with two coats of epoxy primer after through de-rusting.

6.15.6 TESTS: The following tests should be conducted by the manufacturer at its works.
- Dye penetration test for welding joints.
- Water fill-up test of inner vessels for water tightness.
- When man way is closed and cover tightened without gasket then the gap at any place between the man way neck and cover should not exceed 0.5 mm.

6.15.7 ACCURACY LEVEL:

The accuracy level of the level indicator should be + or - 0.25%

Other features required:

Duty : To feed Pastd. BM to the balance tanks located on top of the Pouch filling machines.

Accessories : Inlet and outlet openings with valves, high and low level sensors, level transmitter, sight glass, man way with cover, proximity for manhole cover, air vent, agitator(side mounted), spray turbine, sanitary type sampling cock
(mounted of manhole cover), thermo wells, ladder and platform, lifting lugs ball feet and other standard accessories. Vendor has to provide the Level transmitter on both tanks. The control panel of these tanks shall be providing at Pouch milk Section which consist of Digital Level Indicator, Digital Temp Indicator, Agitator ON/OFF system etc.

Note: 1. Vendor can consider the design and accessories of these tanks as per existing pouch milk buffer tanks which are available at DSD-Patan.
2. Top anti splash type inlet to be considered
3. Cup type outlet to be considered.
4. For Inlet and outlet connection vendor has to use plug valves or BFV for piping work of these tanks.
5. Level and temperature Panel of these tanks inclusion of 25 KL BM storage tank shall be installed at Pouch Section at suitable location.

6.16 Electronic Weigh Scales with SS Tables
Duty : For off line check weighing of 500 ML and 1 Lt. BM pouches
Capacity : 0 - 3 Kg.
Quantity : 02 Nos.
MOC of SS : SS 304
Thickness of Material (Top) : 2MM Minimum with suitable size for 1 Lit. Pouch

6.17 Electronic Weigh Scale with SS Table
Duty : For off line check weighing of 6 Lt.BM pouches
Capacity : 0 - 10 Kg.
Quantity : 01 No.
MOC of SS : SS 304
Thickness of Material (Top) : 2MM Minimum with suitable size for 6 Lit. Pouch.

6.18 Empty & Filled Pouch crates manual conveyor system:
Please note that the BM Pouch packing machines to be installed at Existing Milk Pouch packing section only so vendor has to use existing pouch crates conveying system from crate washer to Pouch cold store.

Existing crate washer shall be used for washing and supply of empty crates for BM filling also.

Important note: At present we are having two numbers of Milk Pouch packing machines at Pouch section of DSD-Patan. For installation of new high speed machine of 500 ML packing, vendor has to shift the existing pouch packing machine towards crate washer side and new machine to be installed near to existing pouch machine no.2 i.e. at Process section side. For shifting of existing machine supplier has to modify the all connected lines, platform etc. If require vendor has to also change the location of existing pouch...
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Panel of pouch section for easy use of the same.

The six liter single head pouch packing machine to be installed at back side of to be installed new machine and vendor has to design the suitable type floor mounted, self standing filled crates conveyor for this machine. The conveyor of this machine will be connected with existing filled crate conveyor of pouch packing section.

The Location of 6 Ltr Pouch Packing machine shall be selected such that in future High Speed machine of 500 ml capacity can be easily installed and the same conveyor can be utilized for to be installed machine in future.

The empty crates for six liter machine will be provided at filling point manually.

6.19 HIGH SPEED POUCH PACKING MACHINE FOR 500 ML AND 1 LITER BM POUCH PACKING (Mechanical Cam Operated) WITH TWIN HEAD.

Quantity: 01 Number

**Specification of 500 ML BM Pouch Packing Machine (From, Fill & Seal)**

<table>
<thead>
<tr>
<th>Particulars</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>(A) Specification :</td>
<td>Model : Suitable As per supplier</td>
</tr>
<tr>
<td>Type</td>
<td>Mechanical cam operated(Double head), Servo driven</td>
</tr>
<tr>
<td></td>
<td>Fully Automatic with Electronic controls</td>
</tr>
<tr>
<td>Product</td>
<td>Buttermilk</td>
</tr>
<tr>
<td>Feeding System</td>
<td>Gravity Filler</td>
</tr>
<tr>
<td>Dosage</td>
<td>Up to 1000 ml.</td>
</tr>
<tr>
<td></td>
<td>Minus zero, plus 0.50% on 500 ml. to 1000 ml. under optimal working condition.</td>
</tr>
<tr>
<td>Packing Size</td>
<td>125 ml to 1000 ml</td>
</tr>
<tr>
<td>Average Output</td>
<td>7200 to 7800 FOR 1000ML pouches / hour / machine. 9000 to 10000 FOR 500ML pouches / hour / machine.</td>
</tr>
<tr>
<td>Accuracy</td>
<td>± 0.5 % for volume delivery i.e. 5ml for 1000 ml. under ideal</td>
</tr>
</tbody>
</table>
Working condition.

Max. Permissible Leakage = 1 in 400 for 1000 ml Pouches
1 in 100 for 500 ml pouches
Max. Permissible bag length = 145 mm ± 2 mm in 500 ml
230 mm ± 2 mm in 1000 ml

Packing Material : Virgin Film 324 mm ± 2 mm width
Film Micron : 45 to 55 Microns
Core Size : 70 mm Inside diameter
Type of Seal : Vertical – Overlap, Horizontal – Seal & Cut, Impulse Type

Electrical Supply : 415 ± 1 %, 50 Hz , 3 Phase, Neutral & Ground

Water Supply Temperature: Min. 7 ºC Max. 15 ºC
: Pressure: 2 Kg/cm"55 PSI (Min.)
 : Flow rate- 400 liter/hr

Machine body (MOC): The Machine must have Stainless Steel 304 body built on a treated aluminum chassis having rugged and robust gauge of SS 304 Plate.

Tool Kit: Machine must accompany with Two Sets of Tool Box (Including Ink. Coding M/C Maintenance Kit etc.)

SS CIP Nozzle/cup to be provided for each head.

Trial Phase Consumables: The Trial Phase consumables like electrodes, Teflon clothes and taps, Rubber O-Rings and stripes, Ink Rollers etc.

( B )Additional Accessories:

Ink coding shall be provided for 12 characters, having size of 3 mm height and facility to accommodate the digits. Ink coding shall be a Mechanical Type.
Each Machine should be supplied with renowned sturdy make Frequency converted able to operate at all pack size.
Machine have two separate balance tanks are required for individual heads. (both heads are having separate balance tank)
Photo cell based eye marked film cutting facility: For all types of bag Lengths, i.e. for 125 ml pack size to 1000 ml pack size. With Clutch and Break Units.
(C) Other Feature:
No air should be needed to run the machine.
No Film – No Filling (When sealing does not take place in any of the sealing jaws i.e. vertical or horizontal sealing in this case filling must stop itself at once) and it should give some sort of annunciation/ alarm / hooter)
The cause of the machine failure / break down should come in display as an annunciation which would help operator locate the problem instantly and rectification thereof. On single machine it should be convenient to run different pack sizes on individual heads, say head ‘A’ is running on 500 ml at the same time head ‘B’ Should be possible to run on 1000 ml without any adverse implication on weight or otherwise. The machine should automatically stop if any obstacle comes in between the horizontal jaws. Extra Emergency switch to stop the machine is to be provided on the backside of the machine. Static current eliminator of appropriate capacity should be accompanied with the machine on both the heads.
Machine door safety should be provided – if any of the doors is open the machine should not run. Both the horizontal and vertical jaws’ sealing temperature should be controlled through PID Controller and should be adjustable by operators. This temp. Readings should be continuously displayed on the front panel.
Dews dripping from the injection tube-causing problem in sealing and pulling should be taken care by providing appropriate device.

6.20: NORMAL SPEED POUCH PACKING MACHINE FOR 6 LITER BM POUCH PACKING (Mechanical Cam Operated) WITH SINGLE HEAD.

Quantity: 01 Number

Specification of 6 LT. BM Pouch Packing Machine (From, Fill & Seal)

<table>
<thead>
<tr>
<th>Particulars</th>
<th>Specifications</th>
</tr>
</thead>
<tbody>
<tr>
<td>(B) Specification</td>
<td>Model: Suitable As per supplier</td>
</tr>
<tr>
<td></td>
<td>Type: Mechanical cam operated, Servo driven (Fully Automatic with Electronic</td>
</tr>
<tr>
<td></td>
<td>controls (Single head)</td>
</tr>
<tr>
<td></td>
<td>Product: Buttermilk</td>
</tr>
<tr>
<td></td>
<td>Feeding System: Gravity Filler</td>
</tr>
<tr>
<td>Dosage</td>
<td>Up to 6000 ml.</td>
</tr>
<tr>
<td></td>
<td>: Minus zero, plus 0.50% on 5000 ml. to 6000 ml. under optimal working condition.</td>
</tr>
<tr>
<td>Packing Size</td>
<td>5 liter or 6 liter Pillow pack</td>
</tr>
</tbody>
</table>
Average Output : 400 Pouch per Hour

Accuracy : 0.4 % for volume delivery i.e. 24ml for 6000 ml. under ideal Working condition.

Max. Permissible bag length = 405 mm in 5000 ml

425 mm in 6000 ml

Packing Material : Virgin Film 590 mm ± 2 mm width

Film Micron : 110 +/- 7 Microns

Weight of Pouch roll : 20 to 22 Kg.

Type of Seal : Vertical –Overlap, Horizontal – Seal & Cut, Impulse Type

Electrical Supply : 415 ± 1 %, 50 Hz , 3 Phase, Neutral & Ground

Water Supply

Temperature: Min. 7 ºC Max. 15 ºC

: Pressure: 2 Kg/cm² = 55 PSI (Min.)

: Flow rate- 400 liter/hr

Machine body (MOC): The Machine must have Stainless Steel 304 body built on a treated aluminum chassis having rugged and robust gauge of SS 304 Plate.

Tool Kit: Machine must accompany with Two Sets of Tool Box (Including Ink. Coding M/C Maintenance Kit etc.)

SS CIP Nozzle/cup to be provided for each head.

Trial Phase Consumables : The Trial Phase consumables like electrodes, Teflon clothes and taps, Rubber O-Rings and stripes, Ink Rollers etc.

(B) Additional Accessories :

Ink coding shall be provided for 12 characters, having size of 3 mm height and facility to accommodate the digits. Ink coding shall be a Mechanical Type.

Each Machine should be supplied with renowned sturdy make Frequency converted able to operate at all pack size.

Photo cell based eye marked film cutting facility: For all types of bag Lengths, i.e. 405 mm in 5000 ml and 425 mm in 6000 ml with Clutch and Break Units.

(C) Other Feature :

No air should be needed to run the machine.

No Film – No Filling (When sealing does not take place in any of the sealing jaws i.e. vertical or horizontal sealing in this case filling must stop itself
at once) and it should give some sort of annunciation/alarm/ hooter)

The cause of the machine failure / break down should come in display as an annunciation which would help operator locate the problem instantly and rectification thereof. The machine should automatically stop if any obstacle comes in between the horizontal jaws. Extra Emergency switch to stop the machine is to be provided on the backside of the machine. Static current eliminator of appropriate capacity should be accompanied with the machine.

Machine door safety should be provided – if the door is open, the machine should not run. Both the horizontal and vertical jaws’ sealing temperature should be controlled through PID Controller and should be adjustable by operators. This temp. Readings should be continuously displayed on the front panel.

Dews dripping from the injection tube-causing problem in sealing and pulling should be taken care by providing appropriate device.

**Important Note:** Vendor has to make following arrangement with Pouch Packing Machines.

**Food grade hose fittings, FDA approved (crimped fittings) for CIP Return line of machine/head**

The existing jaw cooling water system for pouch packing machines shall be used for new BM Pouch machines also.

The existing CIP System shall be used for new Pouch packing machines also.

**6.21: Pouch Filling Machines Platform (Overhead)**

Quantity : 01 set (For 02 Nos. of new Pouch Packing Machines)
Capacity : suitable
MOC : SS 304
Design : As per existing Pouch filling machine platform. Minimum width of SS platform shall be 650 mm.

SS 304 structural platform & railing with SS 304 ladder 01 no connecting to structural platform should be considered from Ground level to Pouch Packing M/c top.

Note: Vendor has to interconnect the existing platform with new platform i.e. Existing platform, Platform for high speed machine and platform for Six liter machine shall be interconnected and existing ladder shall be utilized for entire platform.

**6.22: SS Chute, milk collection tray, Crate Stacking table & Working Table for Two Machines**

SS Pouch collection tray with table of suitable size.

SS Crate stacking/holding table near pouch collection tray of suitable size.
SS seating table with foam top for pouch workers of suitable size: 04 Numbers.

MOC : SS 304
Quantity : 02 set & 04 Numbers of working/seating table

6.23: Leaky Pouch Dump Tank

Duty : Leaked pouches shall be dumped in this tank for recovery of BM. The pouches shall be manually cut. However, there shall be suitable arrangement to prevent any cut film mixing with milk.

Capacity : 200 Liters
Design : AISI 304, 2 mm thick, rectangular with SS perforated tray/jali, bottom/side outlet, valves inline strainer etc. with adjustable ball feet legs.
Quantity : 01 No

6.24: Leaked Pouch BM Transfer Pump(PUMP-P8)

Duty : For pumping recovered BM from leaked pouches or during machines operation to buttermilk recovery system. Vendor has to lay the appropriate size SS pipeline for transferring of Buttermilk of Leaky pouch dump tank from Pouch Section to Balance tank of BM Pasteurizer with BFV and drain line arrangement without fail.

Capacity : Suitable
Design : Stainless steel of grade AISI 304 with ball feet legs
Quantity : 1 No.
Location : Pouch Packing Section

Vendor has to install the suitable mesh size SS inline strainer at Suction side of this pump to filter the to be recovered BM from Leaky Pouches

The BM recovered in the dump tanks shall be pumped to the balance tank of Buttermilk Pasteurizer. Vendor has to consider the suitable size line laying work for the same. The Pump ON/OFF control for this pump shall be provided at Pouch section as well as at BM Section.
6.25: CIP Return Pump (PUMP-P9& PUMP-P10)

<table>
<thead>
<tr>
<th>Capacity</th>
<th>Suitable</th>
</tr>
</thead>
<tbody>
<tr>
<td>Quantity</td>
<td>01 No.</td>
</tr>
<tr>
<td>Type</td>
<td>Self priming, centrifugal.</td>
</tr>
<tr>
<td>Duty</td>
<td>To return CIP solution from PPM &amp; HMST&amp; From Tanks of BM Section</td>
</tr>
<tr>
<td>MOC</td>
<td>Liquid contact parts in SS 316</td>
</tr>
<tr>
<td>Head</td>
<td>As per requirement</td>
</tr>
<tr>
<td>Location</td>
<td>Pouch Packing Section&amp; Buttermilk Processing Section</td>
</tr>
</tbody>
</table>

Please note that the new CIP return Pump shall be interconnected with existing CIP return pump of Pouch packing Section & HMST Section. The pumps ON/OFF control shall be placed at existing Auto CIP Section of DSD-Patan.

6.26: SS Pipes, Valves & Fittings (For Entire BM Project)

6.26.1: SS Pipes

**Type:** TIG welded; annealed and de-scaled tubes shall be manufactured as per the standard ASTM-A270. Outer surface of the tubes should be with dairy finish and inner surface should be pickled as per dairy standard.

**Material of construction and thickness:**

1. All the pipes unless otherwise stated shall confirms to AISI 304. The average wall thickness of tubes should be 1.6 mm up to 76 mm OD and 2.0 mm for diameters above 76 mm OD. The wall thickness at any point shall not vary more than 5% over and under from the average wall thickness specified. The ovality on the open ends shall be within the permissible limit specified in the ASTM A270.
2. Support pipes/ RHS shall have wall thickness of 2.5 mm up to 50 mm dia. pipe and 3 mm for higher size.
3. **Testing:** The supplier is required to furnish the test certificate of the tubes with respect to chemical composition, tensile test and mechanical test.

**Note:** All Product Pipes SS 304 & All dedicated CIP & Condensate pipes & Fittings SS 316L only must be considered.

6.26.2 SS 304 Fittings

Required number of valves to be finalized during detail engineering as per tender/functional requirement & standard engineering practice.

**a) Manual butterfly Valve:** The butterfly valve shall be of sanitary design and all liquid contacting parts shall confirm to AISI 304. The valve sealing gasket shall be EPDM /Nitrile rubber material suitable for hot water sterilization temperature of 100 Deg. Celsius and hot acid and lye solution of 2% concentration at 85 Deg.
Celsius. The valve shall be provided with SS handle. The valve shall be with plain ends shall be suitable for direct welding on the pipes.

b) **SS Plug Valves:** The SS Plug Valves shall be of sanitary design and all liquid contacting parts shall confirm to AISI 304. The valve sealing gasket shall be EPDM/Nitrile rubber material suitable for hot water sterilization temperature of 100 Deg. Celsius and hot acid and lye solution of 2% concentration at 85 Deg. Celsius. The valve shall be provided with SS handle.

c) **Non Return Valve:** The non return valve shall be of sanitary design and all liquid contacting parts shall confirm to AISI 304. The valve sealing gasket shall be EPDM/Nitrile rubber material suitable for hot water sterilization temperature of 100 Deg. Celsius and hot acid and lye solution of 2% concentration at 85 Deg. Celsius. The non return valve shall be with plain ends shall be suitable for direct welding on the pipes.

d) **Unions:** All the parts unless otherwise specified shall be made out of investment casting using AISI 304 material. The union shall be complete with liner, male part, nut and sealing ring (neoprene food grade rubber gasket). The liner and male parts should be suitable for expansion joints. All the inside as well as outside surface of the union shall be with dairy finish.

e) **In-line Sight Glass:** The in-line sight glass should be complete with SMS unions at both ends having toughened heat resistant glass and protective stainless steel cover. It should have quick replacing arrangement for replacement of glass by flange and bolts. The material of construction shall be AISI 304 unless otherwise specified. All the inside as well as outside metal surfaces shall be with dairy finish.

f) **Bend, Tee, Elbow:** These fittings shall be made out of AISI 304 unless otherwise specified, process tube, TIG welded, annealed, de-scaled having outer surface mirror polished and inside pickled, manufactured as per ASTM A270. The thickness of the fittings made from the tube section should not be less than 1.6 mm up to 63.5 mm dia and should not be less than 2.0 mm for above 63.5 mm dia. The wall thickness at any point shall not vary more than 12.5% over and under from the average wall thickness specified. Bends and elbows shall be free from wrinkles. Tee shall have uniform flaring on the branch connection. The ovality on the open ends shall be within the permissible limit specified in the ASTM A270.

g) **Pipe Clamp:** Shall be quick open able type of sturdy design.

### 6.26.3 Sanitary Pneumatic Seat valves

**Type:** Two way / three way pneumatically operated sanitary valves of mix-proof (self cleaning), ON-OFF seat valves, flow diversion valves, shall be provided with ASI connectivity. All the valve battery valves shall be of self cleaning type mix proof valves having 3 solenoid (each).

**Material:** AISI 316/304

**Sealing:** Positive

**Controls:** Electrically/electronically operated

The Pneumatic valves shall have the following features to cater to fulfill the above functional requirements:
Housing shall be ball shaped for the ideal flow characteristics to ensure 100% clean ability by CIP. Housing closed by cover plates should not create a sump or dead corners. Housing interconnections shall be by detachable type clamp connection. The seals such as housing seals, stem seals and disc seals shall be flush mounted.

Digital valve Positioner shall be suitable for two way digital communication based on field run bus technology (ASI or equivalent open network), this shall ensure real time notification of current and potential valve and instrument problems.

Valves shall have low/very low susceptibility for the pressure surge. The valve shall have the short leakage outlet to recognize the leakage immediately.

Valve shall have open lantern installed between the actuator and the product area of the valve to assure that leakages occurring at the stem seal shall be immediately visible and also shall act as a protection against overheating of the actuator.

The bidder to quantify the number of transmitters required, based on the tender as well as functional requirement & offer accordingly.

All pneumatic connections from the header up to individual valves shall be of SS-304 through suitable SS-304 distribution headers connected with FRL units/moisture separator etc. 500 mm pneumatic flexible tubing to be considered at control unit side for all valves.

The pneumatic valves should have required diagnostic features, to be monitored from HMI & recorded in the system. The valves should also be configurable from the HMI/operator console.

6.26.4 SS FLOW PLATES:

| Quantity   | : 01 Lot       |
| No. of connection | : As required |
| MOC        | : SS 304      |

If require vendor can consider the Flow plates for interconnection the product and CIP piping. Vendor has to consider the swing bends for flow plates' port connections as suggested by of user

As far as possible vendor has to make product and CIP piping work with SS Butterfly valves and SS Plug valves for easy operation of the entire plant. Vendor has to provide the water collection tray below the ports with drain pipe. SS 304 Dummy/End nuts shall be provided with SS chain for all ports for closing of ports when idle or not in use as per ISO norms.

6.27: Washing points – Steam & Water mixing batteries

Battery shall consist of Steam & water mixing facility to get hot water of desired temperature with15meter heavy duty hose. LP steam shall be used from the nearest header & raw water from overhead storage tank shall be utilized in parallel. Details to be enclosed with tender.

| Hose Length | : 15 m       |
6.28: SS structure for Platform & supports:

- **Quantity**: 04 Nos. (Three numbers at BM Section & one number at Pouch packing section)

RHS:
- SS 304 RHS shall have wall thickness of 2.5 mm up to 50 mm dia. pipe and 3 mm for higher size pipes / RHS.

Checker Plate:
- SS 304 Checker plate shall have thickness of 4 mm

Floor plate:
- SS 304 floor plate shall have thickness of 8 to 10 mm

Anchor fasteners:
- SS 316 Hilty Make only (Other make has not accepted)

6.29 Utility lines of various size:

6.29.1 SS 316 pipes for RO Water, GI for Soft water, Raw water, Chilled water supply & return, Compressed air supply:

- **Quantity**: 01 Lot

**Materials for Piping**

**Raw, Soft & chilled water distribution lines**: Galvanized steel (ERW) IS1239, 3589, 3601, 4736 (medium duty)

**RO water line**: SS 316 only, Schedule 10, suitable size branch line to BM Section from existing main header of RO water as per requirement.

**Vendor has to provide the availability of Soft water as well as RO water at Balance tank of Buttermilk Pasteurizer.**

**Flanges/counter flanges shall be as per BS tables**:
- Table D/E for water

**Piping & support**

As per general description given in basis of design. All raw, RO, soft & chilled water pipe supports inside the plant shall be of SS-304 box section.

- **Quantity**: 01 Lot

**Low pressure steam lines, valves, & accessories shall be as per IBR guidelines.**

<table>
<thead>
<tr>
<th>Service</th>
<th>Size</th>
<th>Specification</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>LP steam</td>
<td>15 mm to 40 mm</td>
<td>CS body, 13% Cr trim 800#, Lift Check valve with SW ends (NRV)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>CS body, SS ball, special PTFE seats, 800# with SW ends ball valve</td>
<td>Pressure &lt; 3.5 Kg/cm²</td>
</tr>
<tr>
<td></td>
<td>50mm to 300mm</td>
<td>CS body, 13% Cr trim 150#, Globe valve with flanged ends</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>CS body, 13% Cr trim 150#, flanged</td>
<td></td>
</tr>
</tbody>
</table>
Mehsana District Co-operative Milk Producers' Union Limited
DSD-PATAN, E-tender document: MDCMPUL/18-19/40/Buttermilk/DSD Patan

<table>
<thead>
<tr>
<th>Water / Air</th>
<th>swing check (NRV)</th>
<th>Pressure</th>
</tr>
</thead>
<tbody>
<tr>
<td>15mm to 40mm</td>
<td>CS body, SS ball, PTFE seats, 800# with SW or SCD ends ball valve</td>
<td>&lt; 3.5 Kg/cm²</td>
</tr>
<tr>
<td>50mm to 300mm</td>
<td>CI body 13% Cr disc, 125# wafer type butterfly</td>
<td></td>
</tr>
<tr>
<td>NRV (all sizes)</td>
<td>CS body 13% Cr trim, wafer type check</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Chilled water</th>
<th>swing check (NRV)</th>
<th>Pressure</th>
</tr>
</thead>
<tbody>
<tr>
<td>15mm to 40mm</td>
<td>CS body, SS ball, PTFE seats, 800# with SW or SCD ends ball valve</td>
<td>&lt; 3.5 Kg/cm²</td>
</tr>
<tr>
<td>50mm to 300mm</td>
<td>Wafer type butterfly type flanged Construction.</td>
<td></td>
</tr>
<tr>
<td>NRV (all sizes)</td>
<td>CS body 13% Cr trim, wafer type check</td>
<td></td>
</tr>
</tbody>
</table>

Note: all above sizes – NB based

Flanges/counter flanges shall be as per ASA 150 tables:

- Table F for LP steam

LP Steam Distribution Pipes & supports

As per general description given in basis of design. All steam pipe supports inside the plant shall be of SS-304 box section. Pipe supports outside the plant shall be of Galvanized MS section.

Note-1: The payment shall be paid ON LOT BASIS for all pipes and valves. The cost of accessories like flanges, counter flanges, bolts, nuts, bends, tees, gaskets, pipe clamps, structural supports, anchor fasteners for fixing pipe supports, etc, are to be included.

Note-2: Vendor has to note that all utilities headers are at Ground floor lobby. The BM Section to be established at First floor i.e. at existing HMST area so that line size of all utilities lines shall be considered as per required flow rate at BM Section. There shall be not be any drop in flow rate of any utilities while the consumption of any utility is carried out at entire plant of DSD at a time i.e. flow rate of utility shall not drop when consumption of the same is continue/start at ground floor of DSD-Plant. Vendor has to design accordingly the utility piping without fail. In case of any shortage of utility at first floor BM Section, vendor has to replace that utility line with suitable size with free of cost.

6.29.2 Hot & cold insulation of various utilities and product lines:

- Quantity: 01 Lot
- Hot insulation: LRB
- Cold insulation: Puff, 45 Kg/cm²
- Size: as required
- Insulation Cladding: SS304 for all lines to be considered

6.30 Utility fittings of various size:
6.31 Power & control cables & SS cable tray:

6.31.1 Electrical Distributions System:

1. Vendor has to design the MCC panel for Buttermilk Section

   | Quantity | : 01 Number
   | MOC      | SS 304 Panel

Vendor has to consider all the electrical items of Buttermilk Section of first floor and accordingly the designing of MCC panel to be carried out. Vendor has to provide 20% extra items in panel for any addition of electrical items in future. All motors start/ stop PBs / indications shall be part of the LCP. Vendor has to provide the suitable numbers of LCP for easy operation of plant and machineries.

Please note that power for new MCC shall be charged from existing PCC of Electrical Section of DSD-Patan. The supply and laying of main power cable of suitable size from PCC to new MCC will be in scope of vendor only. For this main cable laying work if supply & fixing of cable tray require then vendor has to consider the same.

Customer will provide 3 phase power at existing MCC Panel of Ground floor for two numbers of BM Pouch packing machines, pumps etc. to be installed at Pouch packing Section, power cable laying through cable SS 304 trays. Supplier scope starts from MCC onwards to electrical load in equipment & motors. Vendor has to check the spare switches in the existing MCC panel of DSD-Patan and if any replacements of any electrical part or switch in existing MCC require to make new equipment, then replacement will be in scope of vendor only.

6.31.2 Electrical Items/ Accessories:

   Quantity: 01 lot for entire BM plant project regarding electrification & automation as and where require also.

6.31.3 Push Buttons (PBs):

Push buttons shall be complete with actuator and contact block and shall be generally mounted on doors of the cubicles. Colors shall be as follow:

- Stop/ emergency - Red
- Start - Green

It should have minimum 1 NO + 1 NC contacts. Push buttons shall conform to IP - 65 protections against dust and water ingress.

Quaintly : 01 Lot
6.31.4 Indication Lamps:

All incoming feeders shall be provided with colours shall be as under:

Phases: Red, Yellow & Blue
ON: Red
OFF: Green
TRIPPED: Yellow

Indicating lamps shall be of LED (cluster of high intensity light emitting diodes) type, suitable for 240 V AC supply. These shall be provided with translucent covers of red, green and amber colours as required. These lamps shall be of minimum 22.5 mm dia. Indication lamps to be provided for all feeders.

Quaintly: 01 Lot

6.31.5 Cable Trays SS 304 perforated type for main cable tray & cage type SS cable tray for Skid mounted equipments:

**Functional requirement**: Cable trays are used for laying the power and control cables inside the plant from & MCC to all motors/sub panels and wherever required.

**Fabrication**: These shall be perforated type, heavy duty, return flange or inward bend shape, manufactured from mild steel conforming to IS-226 and hot dip galvanized as per IS-2629/BS-729. Width of cable tray shall be as per the requirement. Height to be minimum 50 mm and thickness of plate to be 1.5 mm up to 300 mm cable tray width. For cable trays having width more than 300 mm, height to be 75 mm and thickness of plate to be 2.0 mm. Cable trays to be supplied to site in standard lengths of 2.5 M. Necessary accessories of cable trays such as coupler side plates for joining cable trays, bends, riser, inside riser, tee etc. must also be factory fabricated. Cable tray for instrument/signal cables shall be separate from power & control cables. The detailed specifications for various electrical items are provided in the Special conditions of contract- Electrical installation.

Quaintly: 01 Lot

6.31.6 Cable Glands, Cable connectors, Cable routes markers, Cable Indicators & Conduits

A.) Cable glands:
These shall be provided at both ends of armoured/unarmored electrical cables. Cable glands shall be manufactured as per performance requirements of BS6121, amended as on date, with brass material accurately machined and nickel-plated. These shall be of heavy duty single compression type for cable conductor sizes
above 35 Sq.mm and weather proof double compression type for cable conductor sizes up to 35 Sq.mm. Single compression cable glands will be complete with check nut, gland body, 3 nos. metal washers, outer seal rubber ring and compression nut. Double compression glands shall be complete with check nut, gland body, neoprene outer ring, armor clamping cone, armor clamping ring, armor clamping nut, skid washer & outer seal nut.

Quaintly : 01 Lot

B.) Cable connectors:
Cable connectors, lugs/sockets, shall be copper/Aluminum alloy, suitably tinned, solder less crimping type.

Quaintly : 01 Lot

C.) Cable routes markers:
These shall be galvanized Cast Iron plate with marking (LT/HT) diameter 150 mm with 600 mm long 25x25 mm HS angle riveted/bolted with this plate.

Quaintly : 01 Lot

D.) Cable Indicators:
These shall be self-sticking type and of 2 mm thick lead strap for overall cable. PVC identification numbers, ferrule shall be used for each wire.

Quaintly : 01 Lot

E.) Conduits
For laying of cables under floor, GI class ‘B’ pipes shall be used. For laying cable in air where cable trays are not being used, GI „B‟ class used. Size of pipe shall depend upon the overall outer diameter of cable to be drawn through pipe. No pipe less than 40 mm dia shall be used for this purpose. In Dairy's process area, all cable (power/control/instrument/signal) drops shall be of SS-304 conduit/pipe 1.2 mm thick shall be used. The open ends of power/control cables at termination shall be protected through SS conduit. Instrument/signal cable/wire drops up to termination point shall be through SS conduits. The automation cables (plant/system/field bus, instrument/signal cables/wires shall be laid in cable trays through GI conduit.

Quaintly : 01 Lot

6.31.7 LT Power cables:
Power cables for use on 415 V system shall be of 1100 volt grade, copper conductor, PVC insulated, (up to 50 sq.mm) & XLPE insulated, PVC sheathed, armoured and overall PVC sheathed strictly as per IS: 1554 (Part I) –1976 or 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.
6.32 Filed instruments, Power & Control Earthing:

6.32.1 Instrument signal Cables:
Quantity: 01 Lot

Instrument cable shall be of multi-stranded annealed plain copper conductor, extruded PVC type A insulated. Overall screened with Al. Un armoured / GI round wire / flat strip armoured. Extruded PVC type ST1 outer sheathed instrument signal cables generally as per BS: 5308 (II) & IS: 1554 (I) shall be provided. Minimum cable size of control cable shall be 0.75 / 1.0 Sq.mm.

6.32.2 Power Earthing (copper)
Quantity: 01 Lot

6.32.3 Control earthing (copper)
Quantity: 01 Lot

Please note that Power Earthing and Control Earthing must be separate from each other and Cable trays for Power and control panel must be separate. No adverse impact of Power shall be affect to any control instruments. Purchaser will not permit for connecting the earthing cables/Patti with existing earthing system. Vendor has to consider the new earthing ports (Chemical earthing only) for their requisite requirement.

6.32.4 Servo Controlled Voltage Stabilizer (SCVS)

Quantity : 03 Nos.
Make : As per bought out items” make
Capacity : as required for 2 Nos. new pouch packing machines 01 for Control instruments of BM Pasteurizer i.e. for control supply.

6.33 Control Panels:

Quantity : 02 Sets. (01No. at BM Section &01 No. at Packing Room)
MOC : SS 304 thickness 2 MM with minor polished finished.
Protection: IP60 prttection
Control cabinet: of reputed brand.
6.34 Installation, Testing & commissioning:
Quantity : 01 Job, The Installation and Commissioning charges of all items shall be entered in given Online Price breakup format only.

6.35 PASSIVATION PROCESS
Please note that after complete installation of plant, vendor has to carry out the Passivation process by suitable chemical as per IS10117 i.e. CODE OF PRACTICE FOR PASSIVATION OF STAINLESS STEEL ARTICLES, INDUSTRIAL EQUIPMENTS AND COMPONENTS INCLUDING PIPELINES The quality of chemicals used in the passivation treatment shall be such that it does not affect the process where the equipment is put to use.
## LIST OF EQUIPMENTS
### SECTION – V

### SUB - SECTION – 7

List of Equipments for Buttermilk Turnkey Project

<table>
<thead>
<tr>
<th>S. No.</th>
<th>Particulars</th>
<th>Capacity</th>
<th>Qty.</th>
<th>Unit</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>6.1</td>
<td>Pasteurized milk storage Tank for pasteurised Milk storage for Buttermilk preparation</td>
<td>15 KL</td>
<td>01</td>
<td>No.</td>
<td>Existing</td>
</tr>
<tr>
<td>6.2</td>
<td>Standardized Dahi milk storage tank cum sweet Dahi settling tank for Lassi (VMST type) with agitator:</td>
<td>5 KL</td>
<td>04</td>
<td>Nos.</td>
<td>New</td>
</tr>
<tr>
<td>6.3</td>
<td>VMST tanks’ SS 304 Platform</td>
<td>As required</td>
<td>1</td>
<td>Set</td>
<td>New</td>
</tr>
<tr>
<td>6.4</td>
<td>Centrifugal Milk Pump: (PUMP-P1)</td>
<td>Suitable</td>
<td>1</td>
<td>No.</td>
<td>New</td>
</tr>
<tr>
<td>6.5</td>
<td>Dahi Milk PHE Heater/Dahi milk Thermization heater with CIP Arrangement including (PUMP-P2)</td>
<td>5 KLPH</td>
<td>1</td>
<td>Set</td>
<td>New</td>
</tr>
<tr>
<td>6.6</td>
<td>Three stage Sheer Pump: (PUMP-P3)</td>
<td>Suitable</td>
<td>1</td>
<td>No.</td>
<td>New</td>
</tr>
<tr>
<td>6.7</td>
<td>Centrifugal Milk Pump: (PUMP-P4&amp; P5)</td>
<td>Suitable</td>
<td>2</td>
<td>Nos.</td>
<td>New</td>
</tr>
<tr>
<td>6.8</td>
<td>Butter Milk Pasteurizer</td>
<td>5 KLPH</td>
<td>1</td>
<td>Set</td>
<td>New</td>
</tr>
<tr>
<td>6.9</td>
<td>Two Stage Homogenizer</td>
<td>5 KLPH</td>
<td>1</td>
<td>No.</td>
<td>New</td>
</tr>
<tr>
<td>6.10</td>
<td>Intermediate Balance Tank</td>
<td>200 LTR.</td>
<td>1</td>
<td>No.</td>
<td>New</td>
</tr>
<tr>
<td>6.11</td>
<td>Centrifugal Milk Pump: (PUMP-P6)</td>
<td>10 KLPH</td>
<td>1</td>
<td>No.</td>
<td>New</td>
</tr>
<tr>
<td>6.12</td>
<td>BUTTERMILK PHE CHILLER</td>
<td>10 KLPH</td>
<td>1</td>
<td>No.</td>
<td>New</td>
</tr>
<tr>
<td>6.13</td>
<td>Horizontal Buttermilk Storage Tank</td>
<td>25 KL</td>
<td>1</td>
<td>No.</td>
<td>New</td>
</tr>
<tr>
<td>6.14</td>
<td>Centrifugal Milk Pump(PUMP-P7)</td>
<td>10 KLPH</td>
<td>1</td>
<td>No.</td>
<td>New</td>
</tr>
<tr>
<td>6.15</td>
<td>POUCH BUTTERMILK BUFFER TANK</td>
<td>5 KL</td>
<td>2</td>
<td>Nos.</td>
<td>New</td>
</tr>
<tr>
<td>6.16</td>
<td>Electronic Weigh Scales with SS Table</td>
<td>0 to 3 Kg.</td>
<td>2</td>
<td>Nos.</td>
<td>New</td>
</tr>
<tr>
<td>6.17</td>
<td>Electronic Weigh Scale with SS Tables</td>
<td>0 to 10 Kg.</td>
<td>1</td>
<td>No.</td>
<td>New</td>
</tr>
<tr>
<td>6.18</td>
<td>Empty &amp; Filled Pouch crates manual conveyor system</td>
<td>Suitable &amp; As required</td>
<td>1</td>
<td>Lot</td>
<td>New</td>
</tr>
<tr>
<td>6.19</td>
<td>HIGH SPEED POUCH PACKING MACHINE FOR 500 ML AND 1 LITER BM POUCH PACKING (Mechanical Cam Operated) WITH TWIN HEAD.</td>
<td>Suitable High Speed machine 5000 LPH Packing Capacity</td>
<td>1</td>
<td>No.</td>
<td>New</td>
</tr>
<tr>
<td>6.20</td>
<td>NORMAL SPEED POUCH PACKING MACHINE FOR 6 LITER BM POUCH PACKING (Mechanical Cam Operated) WITH SINGLE HEAD.</td>
<td>Suitable Single Head Machine. 2400 LPH Packing Capacity</td>
<td>1</td>
<td>No.</td>
<td>New</td>
</tr>
<tr>
<td>6.21</td>
<td>Pouch Filling Machines Platform (Overhead)</td>
<td>Suitable, As required</td>
<td>1</td>
<td>Set</td>
<td>New</td>
</tr>
<tr>
<td>Item</td>
<td>Description</td>
<td>Quantity</td>
<td>Unit</td>
<td>New</td>
<td></td>
</tr>
<tr>
<td>------</td>
<td>-------------</td>
<td>----------</td>
<td>------</td>
<td>-----</td>
<td></td>
</tr>
<tr>
<td>6.22</td>
<td>SS Chute, milk collection tray, Crate Stacking table &amp; Working Table for Two Machines</td>
<td>02 set &amp; 04 Numbers of working/seat ing table</td>
<td>No.</td>
<td>New</td>
<td></td>
</tr>
<tr>
<td>6.23</td>
<td>Leaky Pouch Dump Tank</td>
<td>200 LTR</td>
<td>No.</td>
<td>New</td>
<td></td>
</tr>
<tr>
<td>6.24</td>
<td>Leaked Pouch BM Transfer Pump (PUMP-P8) with leaky buttermilk transferring line.</td>
<td>Suitable</td>
<td>No.</td>
<td>New</td>
<td></td>
</tr>
<tr>
<td>6.25</td>
<td>CIP Return Pump (PUMP-P9 &amp; P10) Type: Self Priming</td>
<td>Suitable</td>
<td>Nos.</td>
<td>New</td>
<td></td>
</tr>
<tr>
<td>6.26</td>
<td>SS Pipes, Valves &amp; Fittings (For Entire BM Project)</td>
<td>As required</td>
<td>Lot</td>
<td>New</td>
<td></td>
</tr>
<tr>
<td>6.27</td>
<td>Washing points – Steam &amp; Water mixing batteries with suitable dia Hose pipe.</td>
<td>Suitable</td>
<td>Nos.</td>
<td>New</td>
<td></td>
</tr>
<tr>
<td>6.28</td>
<td>SS structure for Platform &amp; supports for entire BM Project.</td>
<td>Suitable, As required</td>
<td>Lot</td>
<td>New</td>
<td></td>
</tr>
<tr>
<td>6.29</td>
<td>Utility lines of various size</td>
<td>Suitable, As required</td>
<td>Lot</td>
<td>New</td>
<td></td>
</tr>
<tr>
<td>6.30</td>
<td>Utility fittings of various size</td>
<td>Suitable, As required</td>
<td>Lot</td>
<td>New</td>
<td></td>
</tr>
<tr>
<td>6.31</td>
<td>Power &amp; control cables &amp; SS cable tray</td>
<td>Suitable, As required</td>
<td>Lot</td>
<td>New</td>
<td></td>
</tr>
<tr>
<td>6.32</td>
<td>Filed instruments, Power &amp; Control Earthing</td>
<td>Suitable, As required</td>
<td>Lot</td>
<td>New</td>
<td></td>
</tr>
<tr>
<td>6.33</td>
<td>Control Panels</td>
<td>Suitable, As required</td>
<td>Set</td>
<td>New</td>
<td></td>
</tr>
<tr>
<td>6.34</td>
<td>Installation, Testing &amp; commissioning</td>
<td>As required</td>
<td>Job</td>
<td>New</td>
<td></td>
</tr>
</tbody>
</table>
SECTION - V
SUB SECTION –8
Battery Limits

<table>
<thead>
<tr>
<th>Item</th>
<th>Purchaser’s Scope</th>
<th>Supplier’s Scope</th>
</tr>
</thead>
<tbody>
<tr>
<td>Civil works</td>
<td>Necessary Civil work including foundations, grouting, cut out, Core cutting in RCC structure finishing works, rectification etc for equipment based on the details provided by the equipment supplier</td>
<td>Foundation bolts required for the equipments if any. All equipments/Tanks height must be design keeping consideration of height.</td>
</tr>
<tr>
<td>Milk for BM making</td>
<td>Milk at the outlet of 15 KL HMST Tank existing at 1st floor.</td>
<td>All BM processing &amp; packing lines on the pipe rack as well as long vertical drops above man height (6 feet) shall be insulated with PUF and cladded with All SS Necessary SS fittings work to be carried out at HMST outlet for milk transferring from HMST to BM Section. For Pastd. Chilled water line Vendor has to lay suitable SS line from Pastd. Water storage tank at ground floor to HMST and VMSTs of Buttermilk Section</td>
</tr>
<tr>
<td>CIP lines</td>
<td>CIP flow plate with connection is available at First floor as well as at Pouch Packing Section.</td>
<td>CIP solution (supply &amp; return) lines to various tanks / equipment with pipe lines of SS316L Self Priming CIP return pumps to be considered by vendor. Necessary SS fittings installation to be considered at existing CIP forward and return lines.</td>
</tr>
<tr>
<td>Water lines (All Types)</td>
<td>Filtered, Soft&amp; Raw water main lines available at ground floor lobby. WTP plant available with hydro-flow systems with required pressure and flow rate.</td>
<td>Further distribution of all types of water from main header at process section at ground floor to entire BM processing&amp; storage Section. The usage points for utilities section shall be Tank room, Buttermilk processing &amp; Storage area Pouch Packing area The main pipe line from ground floor</td>
</tr>
</tbody>
</table>
| Compressed Air line | Existing point at main rack header at ground floor at process section | To all the points under the scope of the supplier. As required  
The main compressed air supply line from ground floor to BM Section shall be 1 Inch size minimum. 
Air line shall be painted as per BIS Colour code. |
|---------------------|-------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Chilled water lines | Supply & return header at ground Floor at lobby                 | To all the utility points of BM Section  
Under the scope of bidder (insulated/AL cladded) including necessary isolating valves. 
Insulation cladding for header line will be done by with aluminum cladding  
Chilled water returns from all the utility points in the scope of bidder (insulated/Al cladded) up to main header.  
The main Chilled water supply & return lines from ground floor to BM Section shall be 4 Inch size minimum. |
| Steam & Condensate  | LP Steam header shall be made available at one point in the main rack at lobby of ground floor | To all the utilities points of the BM Section under the scope of supplier. The main steam line from header to BM Section shall be 2.5 Inch minimum. All steam lines shall be make hot insulated & SS304 cladding.  
Condensate from all process equipment shall be collected and fed to boiler feed water tank |
| Power               | PCC & MCC panel shall be provided at electrical panel room at ground floor | Further distribution of power and controls from the respective LCPs up to the consumption points i.e. at BM Section & Packing Section.  
Vendor has to supply and lay main cable from existing PCC to New MCC of BM Section.  
Vendor has to supply and lay cable from existing MCC new to Pouch Packing machines |
| Structural / Pipe Bridge & | -------------- | Milk Tanks, Pouch packing machine, inoculation tanks hanging & as required |
### Supports

Platforms with railing in SS-304 construction.

All pipe line supports for milk/product lines/cable trays inside the plant shall be constructed from SS-304 box sections.

Staircase for all platforms.

Vendor has to make provision for transferring of equipments from ground floor to first floor.

For Installation of equipments necessary all arrangements shall be in vendor scope.

<table>
<thead>
<tr>
<th>Raw Materials and Consumables</th>
<th>Purchaser shall provide raw material (standardized milk) consumables, CIP detergent, pouch film etc. as required for trial runs, commissioning and performance demonstrations.</th>
<th>--------------- Nil -------------------</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dairy Effluent</td>
<td>Collection, transfer and treatment of effluent from the point of generation to ETP. ETP and production of Tertiary water.</td>
<td>Shall be left at the generation points. Vendor has to provide the suitable size ss drain line of all equipments/objects up to Amul Trap available at respective area.</td>
</tr>
</tbody>
</table>

Note: Vendor has to consider all minor fabrication, supply & installation of items, modification works at site which shall be lapsed/ not mentioned in Tender to make the Turnkey Project work very identical.
SECTION -V
SUB-SECTION- 9

EXCLUSIONS FROM SUPPLIER SCOPE

1. Any feed, product, condensate, CIP & utilities (steam, chilling water, soft / RO water, cleaning chemicals) piping outside the battery limits.

2. All civil works including design, foundations, construction, RCC beams, stair case, roof, and weather cover for the plant.

3. Supply of consumables, cleaning chemicals, Laboratory facilities & quality control equipment.

4. Any statutory approvals related to utilities such as Electrical, ETP etc.

5. Plant illumination, lightening arrestor, etc.

6. All types of treatment to effluent, handling and distribution of treated effluent is not within the scope of the offer. The effluent as generated shall be left at the Generation point to be taken in drainage system.

7. D G set of suitable capacity

8. Any item and service not explicitly mentioned in scope of supplies / outside battery limit.
## Section – V
### Sub Section – 10
Makes of Equipments/Bought out Items Make

<table>
<thead>
<tr>
<th>Description</th>
<th>Makes</th>
</tr>
</thead>
<tbody>
<tr>
<td>SS Milk Centrifugal Pumps</td>
<td>ALFA LAVAL / FRISTAM/AVP only</td>
</tr>
<tr>
<td>Electric Motor</td>
<td>SIEMENS / ABB / CROMPTON GREEVES (CG) only</td>
</tr>
<tr>
<td>Hot water Generation Pump</td>
<td>ALFA LAVAL/FRISTAM/APV IF VERTICAL PUMP: GRUNDFOS make only</td>
</tr>
<tr>
<td>Three Stage Sheer Pump</td>
<td>FRISTAM/SWASTIK-PUNE only</td>
</tr>
<tr>
<td>All type of PHE heaters</td>
<td>KELVION / TETRA PAK/ALFA LAVAL/IDMC/SONDEX/APV</td>
</tr>
<tr>
<td>TUBULAR HEAT EXCHANGER (THE)</td>
<td>KELVION/TETRAPAK/ALFA LAVAL/IDMC</td>
</tr>
<tr>
<td>CIP Return Pump (self priming)</td>
<td>ALFA LAVAL / FRISTAM /AVP</td>
</tr>
<tr>
<td>EPS / PUF Insulation Materials</td>
<td>LLOYDS / BEARDSSELL / ICE MAKE</td>
</tr>
<tr>
<td>Resin bonded mineral wool</td>
<td>LLOYD / ROCKWOOL</td>
</tr>
<tr>
<td>Agitator (Top Mounted)</td>
<td>BONFIGOLI / THERMOTECH / ROTOMOTIVE / STELZER/ALFA LAVAL/IDMC/EQUIVALENT</td>
</tr>
<tr>
<td>Homogenizer</td>
<td>GEA/TETRA PAK/SPX / APV-SPX only</td>
</tr>
<tr>
<td>Pouch Packing Machines</td>
<td>SAMARPAN only</td>
</tr>
</tbody>
</table>

### INSTRUMENTATION, CONTROLS & AUTOMATION

<table>
<thead>
<tr>
<th>Description</th>
<th>Makes</th>
</tr>
</thead>
<tbody>
<tr>
<td>VFD</td>
<td>ROCKWELL / DANFOSS/YASKAWA/DELTA/ L &amp; T, SCHNEIDER/ABB/SIEMENS</td>
</tr>
<tr>
<td>Level Transmitter &amp; indicator</td>
<td>E&amp;H / EMERSON/SIEMENS</td>
</tr>
<tr>
<td>Temperature / Pressure Transmitter</td>
<td>E&amp;H / EMERSON/SIEMENS</td>
</tr>
<tr>
<td>Conductivity &amp; pH Transmitter</td>
<td>E&amp;H / EMERSON / YOKOGAWA</td>
</tr>
<tr>
<td>RTD</td>
<td>GIC/ALTOP/RADIX/ EQUIVALENT</td>
</tr>
<tr>
<td>PID Controller</td>
<td>YOKOGAWA only</td>
</tr>
<tr>
<td>Flow Switch</td>
<td>DANFOSS / IFM</td>
</tr>
<tr>
<td>Level Switch (float type &amp;</td>
<td>E&amp;H / EMERSON / SIEMENS ( FOR FORK TYPE ),</td>
</tr>
<tr>
<td>vibrating fork type)</td>
<td>PUNE TECHTROL FOR FLOAT TYPE</td>
</tr>
<tr>
<td>Vortex / Magnetic Flow meter</td>
<td>E&amp;H / EMERSON / FORBES MARSHALL</td>
</tr>
<tr>
<td>Control Valve</td>
<td>SAMSON / AVCON /DEMBLA / ARCA</td>
</tr>
<tr>
<td>Pressures switch / Temp. switch /</td>
<td>DANFOSS / E&amp;H/ SWITZER –for Switch</td>
</tr>
<tr>
<td>Pressure transmitter</td>
<td></td>
</tr>
</tbody>
</table>

Supplier’s Sign & Seal

Page 157 of 207

DUDHSAGAR DAIRY
<table>
<thead>
<tr>
<th>Equipment</th>
<th>Supplier</th>
</tr>
</thead>
<tbody>
<tr>
<td>Temperature transmitter / Thermostat</td>
<td>E&amp;H/Emerson –for PT/TT</td>
</tr>
<tr>
<td>Pressure &amp; Temperature Gauge</td>
<td>WAREE /GIC/WIKA/ EQUIVALENT</td>
</tr>
<tr>
<td>Dual type Pressure / temp gauges</td>
<td>WAREE/ GIC/WIKA/ EQUIVALENT</td>
</tr>
</tbody>
</table>

**ELECTRICALS**

<table>
<thead>
<tr>
<th>Equipment</th>
<th>Supplier</th>
</tr>
</thead>
<tbody>
<tr>
<td>Electric Motors</td>
<td>SIEMENS / CROMPTON (CG) /ABB ONLY</td>
</tr>
<tr>
<td>Starter Overload Relays</td>
<td>L&amp;T / SIEMENS / SCHNEIDER</td>
</tr>
<tr>
<td>Intelligent Motor Protection Relays</td>
<td>L&amp;T / SIEMENS / SCHNEIDER</td>
</tr>
<tr>
<td>Timers Electronic</td>
<td>L&amp;T / SIEMENS / SCHNEIDER</td>
</tr>
<tr>
<td>Switch Fuse Units</td>
<td>L&amp;T / ABB / SCHNEIDER</td>
</tr>
<tr>
<td>MCBs</td>
<td>LEGRAND / MERLIN GERIN(SCHNEIDER) / SIEMENS /L&amp; T</td>
</tr>
<tr>
<td>Push Buttons</td>
<td>TEKNIC / ABB / SCHNEIDER / EQUIVALENT /L&amp; T</td>
</tr>
<tr>
<td>Indicating Lamps (LED)</td>
<td>TEKNIC /L&amp;T / ABB / SCHNEIDER / EQUIVALENT</td>
</tr>
<tr>
<td>Digital Ammeter &amp; Voltmeter</td>
<td>CONZERV / MECO / L&amp;T</td>
</tr>
<tr>
<td>Analog Ammeter &amp; Voltmeter</td>
<td>RISHABH / IMP / MECO / AE</td>
</tr>
<tr>
<td>PVC Conduit &amp; accessories</td>
<td>PRECISION / CLIPSAL / POLYCAB</td>
</tr>
<tr>
<td>Current Transformer</td>
<td>MECO / AE / INDCOIL/BHARTI IMP</td>
</tr>
<tr>
<td>LT Power Cables</td>
<td>GLOSTER/POLYCAB / FINOLEX /HAVELLS ONLY</td>
</tr>
<tr>
<td>LT Copper Control Cables</td>
<td>POLYCAB / FINOLEX / HAVELLS ONLY</td>
</tr>
<tr>
<td>Signal &amp; Instrument cable</td>
<td>POLYCAB / ICON</td>
</tr>
<tr>
<td>Cable Tray</td>
<td>INDIANA / MEK / PILCO / ELCON/SILVERLINE/SWASTIK/NIEDAX</td>
</tr>
<tr>
<td>Isolating Switches</td>
<td>SIEMENS / L&amp;T /SCHNEIDER</td>
</tr>
<tr>
<td>HRC fuses</td>
<td>L&amp;T / SIEMENS / SCHNEIDER</td>
</tr>
<tr>
<td>Plug &amp; Socket</td>
<td>LEGRAND / CLIPSAL / BCH / HENSEL</td>
</tr>
<tr>
<td>Terminal Blocks</td>
<td>WAGO / LAPP INDIA / CONNECT WELL / ELMEX</td>
</tr>
<tr>
<td>Rotary Selector Switch</td>
<td>KAYCEE / SALZER / L&amp;T / SIEMENS</td>
</tr>
<tr>
<td>Cable Glands</td>
<td>LAPP KABEL / COMMET / EX-PROTECta</td>
</tr>
<tr>
<td>Cable Lugs</td>
<td>DOWELS / COMMET</td>
</tr>
<tr>
<td>Mechanical Interlock</td>
<td>L&amp;T / SCHNEIDER / SIEMENS</td>
</tr>
<tr>
<td>Electronic Soft Starter</td>
<td>ROCKWELL / DANFOSS/YASKAWA/DELTA/ L &amp; T/ SCHNEIDER/ABB/SIEMENS/ALLEN BRADELY</td>
</tr>
<tr>
<td>Servo Voltage Stabilizer</td>
<td>SUVIK / HITACHI HI-REL/APC/ SCHNEIDER/ASABA</td>
</tr>
<tr>
<td>UPS</td>
<td>EMERSON-LIEBERT / HI-REL / APC / SUVIK / ASABA</td>
</tr>
<tr>
<td>-----</td>
<td>-----------------------------------------------</td>
</tr>
<tr>
<td>SMF Battery</td>
<td>YUASA-ROCKET / FURUKAWA / EXIDE / AMARON</td>
</tr>
<tr>
<td>Controls valves for refrigeration unit</td>
<td>DANFOSS / MANIK / SUPER FREEZE</td>
</tr>
</tbody>
</table>

**VALVES & PIPES (MS & GI)**

<table>
<thead>
<tr>
<th>Water Valves (Butterfly / Ball)</th>
<th>AUDCO / SAUNDERS / L&amp;T</th>
</tr>
</thead>
<tbody>
<tr>
<td>Water Valves (Diaphragm)</td>
<td>SAUNDERS (CRANE) / BDK / MICON</td>
</tr>
<tr>
<td>Non-return Valve for water</td>
<td>AUDCO / LEADER / BDK / MICON / Expert</td>
</tr>
<tr>
<td>Water Foot Valve</td>
<td>KIRLOSKAR / GG / LEADER</td>
</tr>
<tr>
<td>GI Pipes for water</td>
<td>SAIL / TISCO / TATA / JINDAL</td>
</tr>
<tr>
<td>MS Pipes for air, steam, condensate</td>
<td>SAIL / TISCO / TATA / JINDAL / MSPL</td>
</tr>
<tr>
<td>NRV for Air / Oil Line</td>
<td>AUDCO / LEADER / MICON</td>
</tr>
<tr>
<td>Solenoid Valve for Water line</td>
<td>DANFOSS / AVCON / ROTEX / ARIA</td>
</tr>
<tr>
<td>HP / LP Steam / condensate</td>
<td>SPIRAX / ARMSTRONG, USA / FORBES MARSHAL / KLINGER</td>
</tr>
<tr>
<td>Globe Valves</td>
<td></td>
</tr>
<tr>
<td>HP / LP Steam Valves Piston type</td>
<td>KLINER / SPIRAX / THERMAX</td>
</tr>
<tr>
<td>Steam Pressure Pump</td>
<td>FORBES MARSHALL / ARMSTRONG, USA / THERMAX</td>
</tr>
<tr>
<td>Automatic Pumping Trap System</td>
<td>SPIRAX / ARMSTRONG, USA / FORBES MARSHALL</td>
</tr>
<tr>
<td>Steam relief valve, traps &amp; strainers</td>
<td>SPIRAX / ARMSTRONG, USA / THERMAX</td>
</tr>
<tr>
<td>Expansion bend for steam line</td>
<td>JN MARSHALL / THERMAX / FLEXOTHERM / SIGMAFLEX</td>
</tr>
<tr>
<td>Steam Pressure Reducing Valve &amp; Auto Steam Control valve</td>
<td>SPIRAX / ARMSTRONG, USA / SAMSON</td>
</tr>
<tr>
<td>Steam Pressure Reducing Station</td>
<td>JN MARSHALL (SPIRAX) / ARCA (THERMAX)</td>
</tr>
<tr>
<td>Refrigeration valves &amp; fittings</td>
<td>DANFOSS / FRICK / SUPER FREEZE / IDMC</td>
</tr>
</tbody>
</table>

**SS PIPES & VALVES**

<table>
<thead>
<tr>
<th>SS Pipes</th>
<th>RATNAMANI / APEX TUBES / RENSA Only</th>
</tr>
</thead>
<tbody>
<tr>
<td>SS seat type Pneumatic Valves</td>
<td>GEA TUCHENHAGEN / ALFA LEVEL / IDMC / APV / SWASTIK / INOXPA</td>
</tr>
<tr>
<td>Pneumatic SS Butterfly / Ball type valves</td>
<td>ALFA LAVAL / GEA TUCHENHAGEN / IDMC / APV / SWASTIK / INOXPA / CIPRIANI</td>
</tr>
<tr>
<td>SS Manual Valves &amp; Fittings</td>
<td>ALFA LAVAL / GEA TUCHENHAGEN / IDMC / SWASTIK / INOXPA only</td>
</tr>
</tbody>
</table>

**MISCELLANEOUS ITEMS**

| Geared Motor / Gear Box | ELECON / BON FIGOLIC / Rotomotive Power drives |
### Important Note:

1. **Vendor has to provide the make of Item in Price Breakup without fail.** Please note that after submission of PO, vendor shall not request for any change in bought item make of any item. Vendor will have to supply the Item of same make which will mentioned in bid document only.

2. **To make the turnkey project successful**, vendor are requested to supply good Quality and proven bought out items.

3. **Vendor can consider the existing type and make of equipments of DSD-Patan for Turnkey BM Project.**

4. **All Materials to be used for this project shall be available with all Technical Details as well as supplier details to confirm the receipt of materials as per bought out items list.** All objects, Equipment, Items, machineries shall be installed with Information name plate without fail.

5. **Bidder/Supplier can visit the Existing Buttermilk Section of DSD-Mehsana for better understanding of equipments layout, process etc.**

6. **Please note that vendor/Supplier has to install all items as mentioned in Tender without fail.** Any short cut or shortage of Item, purchaser will deduct the amount as indicated in price breakup.

<table>
<thead>
<tr>
<th>Steam-Water Mixing Battery</th>
<th>SWASTIK/IDMC/VIJAY HOSE/SPIRAX MARSHALL/FORBE MARSHALLEQUIVALENT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Structural Steel</td>
<td>SAIL / TISCO/TATA/JINDAL</td>
</tr>
</tbody>
</table>
SECTION V, Sub-Section 11

Deviations from Technical Requirement
11. DEVIATION FROM TECHNICAL REQUIREMENT

11.1 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. Vendor can suggest the best design and supply for this turnkey project.

11.2 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 in line with the tender document and as per the list of equipment and services.

11.3 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.

11.4 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.

11.5 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>
<thead>
<tr>
<th>Sr. No</th>
<th>Clause Reference</th>
<th>Page No.</th>
<th>Deviation</th>
<th>Remarks (Justification)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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 Authorized Signatory of Bidder/Supplier

NOTE: Where there is no deviation, the statement should be returned duly signed with an endorsement indicating "No Deviation".
SECTION V
Sub- Section 12
Optional Items
12  **OPTIONAL ITEMS:**

12.1 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.

12.2 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.

12.3 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.

12.4 For any optional Item, Vendor has to give separate Price Break up, it will not included in Total Bid Price.
SECTION V, Sub - Section 13
Drawings, Data & Documents
13.0 DRAWINGS ENCLOSED WITH THE TENDER

A set of site plan drawings is enclosed along with the tender document for bidders’ reference.

13.1 DOCUMENTS REQUIRED FROM THE BIDDER

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

- Site Layout showing proposed services/amenities.
- Proposed machinery layout for all the Sections of the Dairy plant. Machinery layout should also indicate the area and height requirement of the building.
- Product flow diagram including Refrigeration equipment, service and product piping, controls instruments, automation, etc.
- Utilities flow diagram including utility equipment, interconnection piping, controls, instruments, automation, etc.
- Single line diagram for electrical distribution system.
- Control room configuration and layout to suit the space shown in tender drawing.
- Powder storage and movement arrangements, justifying storage space requirement.
- The bid shall include layout, schematic and hydraulic flow diagrams, and general arrangement drawings for the units and equipment.

13.1.2 The Bidder must enclose the following Charts with the Offer:

- Load histograms for:
  a) Electrical Power
  b) Water (soft & raw)

  Each histogram is to be based on 24-hours basis and is to show clearly the hourly consumption, total daily consumption, peak load and average load.

- Hourly equipment wise Time Schedule based on 24-hour time scale.
- Bar chart for project execution including personnel training program.

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

- Category wise staff requirement for various Refrigeration's 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.
SECTION V, Sub-Section 14
Criteria for
Technical Evaluation of Bids
14.0 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:

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

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

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

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

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

14.6 Consumption of consumable materials.

14.7 Space requirement.

14.8 Cost of spare parts.

NOTE: As mentioned in the tender notice preference will be given to the bidders / suppliers who takes up total responsibility of the project on turnkey basis and due consideration would be given in evaluation of the bids.
SECTION V, Sub- Section 15
Performance and Consumption Guarantees
15.1 PERFORMANCE TESTS
15.1.1 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.

15.2 FORMATS OF GUARANTEES:

➢ Guarantees for throughput of various sections of plant.

15.02.1 PERFORMANCE & CONSUMPTION GUARANTEE:

15.02.02 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 clause 1, 2, and 3 below, the action shall be as detailed therein.

15.3 EQUIPMENT PERFORMANCE

15.03.1 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.

15.03.2 If the equipment/processing plant performance are between 95-98% of the rated capacity, penalty will be calculated at 2% of the rupee value of the (contract) equipment/Air handling units, per 1% of shortfall.

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

15.4 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.

<table>
<thead>
<tr>
<th>Utilities Consumption Data</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Power</strong></td>
</tr>
<tr>
<td>Peak Load kW</td>
</tr>
<tr>
<td>Total Load kWh/day</td>
</tr>
<tr>
<td>Tolerance ± 1%</td>
</tr>
<tr>
<td><strong>Steam</strong></td>
</tr>
<tr>
<td>Peak Load Kg/hr</td>
</tr>
<tr>
<td>Total Load Kg/day</td>
</tr>
<tr>
<td>Tolerance ± 1%</td>
</tr>
<tr>
<td><strong>Water(Soft &amp; RO)</strong></td>
</tr>
<tr>
<td>Peak Load Kg/hr</td>
</tr>
<tr>
<td>Total Load Kg/day</td>
</tr>
<tr>
<td>Tolerance ± 1%</td>
</tr>
</tbody>
</table>
a. Financial Guarantee:

15.5.1 The satisfactory performance of the plant will be considered achieved if the plant operates above 99% rated capacity declared by the supplier in the bid.

15.5.2 The purchaser will be free to operate the plant for commercial operation between first commissioning trial and last commissioning trial.

15.5.3 Once the benchmark figures are established for various capacity utilization levels for performance criteria, same will be referred to calculate loss resulting on the actual Refrigeration at various above levels but up to 100% rated capacities of the plant for the two years period from the date of qualifying trial. The bidder and purchaser will maintain the account of Refrigeration data for calculating the amount of money to be paid by bidder/supplier.

15.5.4 While calculating, the saving in any one area will not be used in compensation of loss in any other area.

15.5.5 The extent higher consumption of power & fuel than the consumption figure committed by the bidder at various capacity utilization at the fixed cost of Rs........ Per KWh unit.
SECTION V, Sub-Section 16
Bidders Meetings
16.0 BIDDERS MEETINGS

16.1.1 Details of the proposed pre-bid meeting are contained in instruction to bidder’s Section- II. This will be general meeting at which all purchasers of the tender document may attend.

16.2 Bidders may also request technical discussions with the Dudhsagar Dairy / clients’ project team before the tender closing date. Subjects for discussion at the technical meeting may include:

- Project management
- Technical clarifications
- Scope of supply
- Concept of the design
- Equipment designs
- Equipment suppliers
- Automation
- Plant management
- Existing equipment to be utilized in the job
- Battery limits
- Acceptable alternatives
- Equipment suppliers’ Details

This will be the only opportunity for bidders to discuss the project in detail with Dudhsagar Dairy before the commercial bid opening, and all technical matters should be resolved at meetings only.
Section VI

Bidding Terms Deviation
### Bidding Terms Deviation Statement Form

<table>
<thead>
<tr>
<th>Sr. No</th>
<th>Clause Reference</th>
<th>Deviation</th>
<th>Remarks (Justification)</th>
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<tbody>
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</tr>
</tbody>
</table>

Date:

**Signature of Authorized Signatory of Bidder/Supplier**

**NOTE:**

Above are the particulars of deviations from the requirements of the bidding conditions/ terms taken by the Bidder/Supplier.

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

BID FORM & PRICE

SCHEDULE PROFORMA
Strictly online on n-Procure Website. Hard Copy Price bid submission is not permissible. Price Format is already available online on n-Procure Website
Section VII A

PRICE SCHEDULE FORMAT

Price Format is already available online on n-Procure Website
Section VIII
Qualification Application
Qualification Application Form

Bidders / Suppliers must submit this form (Table 2 and 3), duly filled in, along with the supporting as per following checklist given in Table 1:

<table>
<thead>
<tr>
<th>Supporting Required</th>
<th>Please (√)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Latest Balance sheet filed with (Name of Authority) on (Date)</td>
<td></td>
</tr>
<tr>
<td>Latest Profit &amp; Loss Statement from (date) to (date) filed with (Name of Authority) on (date).</td>
<td></td>
</tr>
<tr>
<td>Audited copies 1 of annual accounts and P &amp; L account of past 3 years</td>
<td></td>
</tr>
<tr>
<td>Certificate of Financial Soundness from Bankers of Bidder/Suppliers</td>
<td></td>
</tr>
<tr>
<td>Income Tax Clearance Certificate (Latest)</td>
<td></td>
</tr>
<tr>
<td>Sales Tax Clearance Certificate (Latest)</td>
<td></td>
</tr>
<tr>
<td>Details of Income Tax Registration</td>
<td></td>
</tr>
<tr>
<td>Details of Sales Tax Registration</td>
<td></td>
</tr>
<tr>
<td>Organization Chart</td>
<td></td>
</tr>
<tr>
<td>Annual Report of last three years</td>
<td></td>
</tr>
</tbody>
</table>

Indigenous Bidder/Suppliers must attach copy of accounts audited under section 44 AB of Income Tax Act. In case the accounts need not be audited, a Charted Accountant or Manager of a Nationalized Bank should attest the information in this statement.
### Table 2
Financial Soundness

<table>
<thead>
<tr>
<th>General Information</th>
</tr>
</thead>
<tbody>
<tr>
<td>Name</td>
</tr>
<tr>
<td>Address</td>
</tr>
<tr>
<td>Phones</td>
</tr>
<tr>
<td>Mobile</td>
</tr>
<tr>
<td>Fax</td>
</tr>
<tr>
<td>E-mail</td>
</tr>
</tbody>
</table>

| Contact Personnel with designation |

<table>
<thead>
<tr>
<th>Financial Information</th>
</tr>
</thead>
<tbody>
<tr>
<td>S N</td>
</tr>
<tr>
<td>-----</td>
</tr>
<tr>
<td>1</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
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<tr>
<td>2</td>
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<tr>
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<tr>
<td>3</td>
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<td>4</td>
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<tr>
<td></td>
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<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
</tbody>
</table>
### Significant Financial Ratios

<table>
<thead>
<tr>
<th>SN</th>
<th>Ratio</th>
<th>Definition</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Current</td>
<td>Current Assets to Current Liabilities</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Acid Test</td>
<td>((\text{Cash} + \text{temporary investment held in lieu of } \text{cash} + \text{current receivable}) / \text{current liabilities})</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Solvency</td>
<td>Total Liability to Net Worth</td>
<td></td>
</tr>
</tbody>
</table>

### Net Profit before Tax

<table>
<thead>
<tr>
<th>SN</th>
<th>Period</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Current period</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>During the last Financial Year</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>During the year before last Financial Year</td>
<td></td>
</tr>
</tbody>
</table>

### Financial Arrangements

<table>
<thead>
<tr>
<th>SN</th>
<th>Resources</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Own</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Bank Credits</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Others (Specify)</td>
<td></td>
</tr>
</tbody>
</table>
### Sales

<table>
<thead>
<tr>
<th>SN</th>
<th>Category of Customers</th>
<th>Value of orders to be executed/anticipated Sales</th>
<th>Current</th>
<th>Next Financial Year</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Government Department</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Commercial</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Others</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Annual Turnover

<table>
<thead>
<tr>
<th>SN</th>
<th>Financial Year (Please begin with current year)</th>
<th>Turnover</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Rate Contracts for the items to be supplied

<table>
<thead>
<tr>
<th>SN</th>
<th>Organization</th>
<th>Items</th>
<th>Valid till</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Directorate General of Supplies &amp; Disposal, Government of India.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>National Cooperative Consumers’ Fe India Ltd</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>KendriyaBhandar</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Central Equipment Stores Purchase Organization for State Governments</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>GCMMF</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Others</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
## Table 3
### Technical Competency

<table>
<thead>
<tr>
<th>SN</th>
<th>Category</th>
<th>Please (✓)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Manufacturer</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Clearing &amp; Forwarding Agent</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Stockiest</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Wholesale Dealer</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Authorized Reseller</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Authorized Service Agent</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Retailer</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>Trader</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>Others (please specify)</td>
<td></td>
</tr>
</tbody>
</table>

### Details on Plant

<table>
<thead>
<tr>
<th>SN</th>
<th>Plant</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Location</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Description</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Type</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Size of building</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Is property on lease or free hold?</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>If on lease, indicate date of expiry of lease in each case.</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Others (please specify)</td>
<td></td>
</tr>
</tbody>
</table>
### Plant Facilities

<table>
<thead>
<tr>
<th>SN</th>
<th>Facilities</th>
<th>Ans</th>
<th>Remark</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Space available for manufacturing (in m²)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Space available for storage (in m²)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Space available for inspection (in m²)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Are buildings fire resistant? (Y/N)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Are premises approved by Municipal fire Department? (Y/N)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Are buildings under Municipal fire protection? (Y/N)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Are power &amp; fuel supply adequate to meet Refrigeration requirements? (Y/N)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>Are adequate transportation facilities available? (Y/N)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>Are safety measures adequate for performance of Proposed contract? (Y/N)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>Is adequate material handling equipment Available? (Y/N)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Testing Facilities

<table>
<thead>
<tr>
<th>SN</th>
<th>Facilities</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>List testing equipment available</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Give details of tests to be carried out on items offered.</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Details of the testing organizations available.</td>
<td></td>
</tr>
</tbody>
</table>

### Quality Control Organization

<table>
<thead>
<tr>
<th>SN</th>
<th>Quality Control Method</th>
<th>Response</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Are goods offered subject to Batch Test, Random Sampling or full 100% test for Quality?</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Are tests carried out by factory Employees or by a separate testing agency?</td>
<td></td>
</tr>
</tbody>
</table>
3 Are independent Quality Control Organization checks made and certificates issued?

<table>
<thead>
<tr>
<th>SN</th>
<th>Description of Equipment</th>
<th>Capacity</th>
<th>Units Manufactured</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Current year</td>
</tr>
<tr>
<td>1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Manufacturing Capacity**

<table>
<thead>
<tr>
<th>SN</th>
<th>Personnel in Numbers in levels</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Managerial</td>
</tr>
<tr>
<td>1</td>
<td>Refrigeration</td>
</tr>
<tr>
<td>2</td>
<td>Marketing</td>
</tr>
<tr>
<td>3</td>
<td>Installation and commissioning</td>
</tr>
<tr>
<td>4</td>
<td>Service</td>
</tr>
<tr>
<td>5</td>
<td>Spare parts</td>
</tr>
<tr>
<td>6</td>
<td>Administrative</td>
</tr>
</tbody>
</table>

**Service Centre nearest to our site location**

<table>
<thead>
<tr>
<th>Location</th>
<th>Phone no</th>
</tr>
</thead>
</table>

**Information required on**

<table>
<thead>
<tr>
<th>SN</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Number of skilled employees</td>
</tr>
<tr>
<td>2</td>
<td>Number of unskilled employees</td>
</tr>
<tr>
<td></td>
<td>Description</td>
</tr>
<tr>
<td>---</td>
<td>----------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>3</td>
<td>Number of engineering employees</td>
</tr>
<tr>
<td>4</td>
<td>Number of administrative employees</td>
</tr>
<tr>
<td>5</td>
<td>List of special repair/ workshop facility available</td>
</tr>
<tr>
<td>6</td>
<td>The storage space available for spare parts (in m²)</td>
</tr>
<tr>
<td></td>
<td>Value of minimum stock of spares available at all the service centers in respective currency</td>
</tr>
<tr>
<td>7</td>
<td>List of the models/ types of equipment serviced by the Centre in last 2 years</td>
</tr>
</tbody>
</table>
### References

<table>
<thead>
<tr>
<th>SN</th>
<th>Name of Organization</th>
<th>Address, Telephone, Fax, Contact Person</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### List of components usually subcontracted

| 1 | |
|---|---
| 2 | |

### Workload for the current and forth coming financial year on quarterly basis

<table>
<thead>
<tr>
<th>SN</th>
<th>Financial Year</th>
<th>Quarterly Workload as % of Total Capacity</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>I</td>
</tr>
<tr>
<td>1</td>
<td>Current Financial Year</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Next Financial Year</td>
<td></td>
</tr>
</tbody>
</table>

### List of major projects of similar size and nature previously executed

<table>
<thead>
<tr>
<th>SN</th>
<th>Name of the client</th>
<th>Project</th>
<th>Year of award</th>
<th>Year of completion</th>
<th>Capacity/ Products</th>
<th>Value (Currency)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>2</td>
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<td>4</td>
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</tr>
</tbody>
</table>

2 Names of two buyers to whom similar equipment are supplied, installed and commissioned in the past and to whom reference may be made by the MDCMPUL regarding
Type of equipment manufactured and supplied (M & S) during last 2 years

<table>
<thead>
<tr>
<th>SN</th>
<th>Equipment</th>
<th>Capacity</th>
<th>Qty</th>
<th>Projects</th>
<th>On Hand Order Qty</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td></td>
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<tr>
<td>3</td>
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<td></td>
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<tr>
<td>4</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Type of equipment manufactured, supplied, installed and commissioned (MSIC)

<table>
<thead>
<tr>
<th>SN</th>
<th>Equipment</th>
<th>Capacity</th>
<th>Qty</th>
<th>Projects</th>
<th>On Hand Order Qty</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td></td>
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<tr>
<td>3</td>
<td></td>
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<td></td>
</tr>
<tr>
<td>4</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Schedules for furnishing technical data and certified drawings after receipt of orders

| 1  |          |          |          |          |
| 2  |          |          |          |          |

Number of weeks required for preparing a bid proposal

Section IX
Appendices - I
(1) Form of BG against Advance Payment

(On the Non-Judicial Stamp Paper as per the Stamp Act of State Government)

Bank Guarantee Number

Date:

In consideration of the Mehsana District Co-operative Milk Producers’ Union Limited (hereinafter called ‘DUDHSAGAR DAIRY’) having agreed to grant to M/s ____________________________ (hereinafter called the said Bidder/Supplier) under the terms and conditions of an contract/purchase order Number __ dated __ made between the DUDHSAGAR DAIRY and M/s __ for the supply/erection and commissioning (hereinafter called the ‘said contract/purchase order’) on Refrigeration of a Bank Guarantee for Rs __ (Rupees __ only). We __ (hereinafter called ‘the Bank’) do hereby undertake to pay the DUDHSAGAR DAIRY an amount not exceeding Rs __ (Rupees __ only) against any loss/damage caused to or suffered would be caused or suffered by the DUDHSAGAR DAIRY by reason of any breach by the said Bidder/Supplier(s) of any of the terms and conditions contained in the said contract/purchase order.

We, __, do hereby undertake to pay the amounts due and payable under this guarantee without any demur merely on a demand from the DUDHSAGAR DAIRY which has to be served on us before the expiry date of Bank Guarantee i.e. __ stating that the amount claimed is due by way of loss or damage caused to or would be caused to or suffered by the DUDHSAGAR DAIRY by reasons of any breach by the said Bidder/Supplier(s) of any of the terms and conditions contained in the contract/purchase order or by reasons of the Bidder/Supplier(s) failure to perform the said contract/purchase order, any such demand made on the Bank shall be conclusive as regards the amount due and payable by the Bank under this guarantee shall be restricted to an amount not exceeding Rs __ (Rupees __ only).

We, __, further agree that the guarantee herein contained shall remain in full force and effect during the period that would be taken for the performance of the said contract/purchase order and that it shall continue to be enforceable till all the dues of the DUDHSAGAR DAIRY, under, or by virtue of the said contract/purchase order discharged or till the DUDHSAGAR DAIRY certifies that the terms and conditions of the said contract/Purchase Order have been fully and properly carried out by the said Bidder/Supplier(s)and accordingly discharge the guarantee unless a demand or claim under this guarantee made on us in writing on or before __, we shall be discharged from all liability under this guarantee thereafter.

We, __, further agree with the DUDHSAGAR DAIRY that the DUDHSAGAR DAIRY shall have the fullest liberty without our consent and without affecting in any manner our obligation hereunder to vary any of the terms and conditions of the said contract/Purchase Order to extend time of performance by the said Bidder/Supplier from time to time or to postpone for any time or from time to time any of the power exercisable by the DUDHSAGAR DAIRY against the said Bidder/Supplier and to forbear or enforce any of the terms and conditions relating to the said contract/Purchase Order and we shall not be relieved from our liability by reason of any such variation, or extension or for any forbearance, act of omission on the part of the DUDHSAGAR DAIRY or any indulgence by the DUDHSAGAR DAIRY to the said Bidder/Supplier or by any such matter or thing whatsoever which under the law relating to sureties would but for this provision have effect of so relieving us.
The Bank agrees that the amount hereby guaranteed shall be due and payable to the DUDHSAGAR DAIRY on serving us with a notice before expiry of Bank Guarantee requiring the payment of the amount and such notice shall be deemed to have been served on the Bank either by actual delivery thereof to the Bank or by dispatch thereof to the Bank by registered post at the address of the Bank.

We, __, lastly undertake not to revoke this guarantee during its currency except with the previous consent of the DUDHSAGAR DAIRY in writing.

We, __, undertake to renew the Bank Guarantee provided the request for the said Bidder/Supplier before the expiry of Bank Guarantee makes renewal.

Notwithstanding anything stated herein before: (i) our liability under this Bank guarantee is restricted to Rs.__ (Rupees __ only) (ii) The Bank Guarantee shall remain in force till ___20___ (BG validate date ) and (iii) The Bank is liable to pay the guarantee amount or any part thereof under this Bank Guarantee only if the DUDHSAGAR DAIRY serves upon the bank a written claim or demand on or before ____ (30 days beyond above validity date).

Signature

Seal

Code Number

Place:

Date:

Notes:

Bidder/Suppliers should ensure that the bankers, before submission of the bank guarantees, put seal and code number of the signatory.

Stamp paper is not required in case of foreign Bidder/Suppliers.

The value of stamp duty should be as per latest stamp act of local state government where the bank guarantee is issued.
(2) Contract Form

(On the Non-Judicial Stamp Paper as per the Stamp Act of State Government)

THIS AGREEMENT made the __ day of __ 2011 between Mehsana District Co-operative Milk Producers’ Union Limited, Mehsana-384002 (hereinafter “the Bidder/Supplier”) of the

WHEREAS the Purchaser is desirous that certain goods and ancillary services should be provided by the Bidder/Supplier, viz. (brief description of goods and services) and has accepted

a. bid submitted by the Bidder/Supplier in res

Reference WR: PUR: ........................................... for the supply of those goods and services in the sum of Rs _ (Rupees ___)

NOW THIS AGREEMENT WITNESSETH AS FOLLOWS:

In this agreement words and expressions shall have the same meaning as in the Terms and Conditions mentioned in Section III and Section IV and in other sections in the above-referred Bidding Document. The following documents shall be deemed to form, read and construe as part of this agreement:

- The offer and the price schedule submitted by the Bidder/Supplier and as accepted by the purchaser;
- The schedule of requirement/ list of items and the technical specifications in the above referred Bidding Document;
- The terms and conditions in the above-referred Bidding Document;
- The Purchasers’ purchase............................................order: Number______dated........

In consideration of the payments to be made by the Purchaser to the Bidder/Supplier as hereinafter mentioned, the Bidder/Supplier hereby covenants with the Purchase to provide the goods and services and to remedy defects therein in conformity in all respects with the Provisions of the Purchaser’s purchase Order and

The Purchaser hereby covenants to pay the Bidder/Supplier in consideration of the provision of the goods and services and the remedying of defects therein, the contract price or such other sum as may become payable under the provisions of the purchase order at the times and in the manner prescribed in the Purchase order and bidding document.

IN WITNESS whereof the parties hereto have caused this agreement to be executed in accordance with their respective laws the day and year first above written.

(Signed, sealed and delivered by the authorized signatory for the Purchaser)

In the presence of:

1.
2

Supplier’s Sign & Seal
**3) Pro forma of Completion Certificate**

*(To be issued by the purchaser after successful commissioning of the supplied goods)*

Reference: 

Subject: Certificate of commissioning of supplied goods/ PLANT

This is to certify that the plant section as detailed below has been received in good condition along with all the standard and special accessories (subject to short supply mentioned) in accordance with the Contract/ Specifications. The same has been installed and commissioned. The Performance Test has been done to our entire satisfaction and operators have been trained to operate the plant. The Bidder/Supplier has fulfilled his contractual obligations satisfactorily (subject to unfulfilled obligations mentioned)

<table>
<thead>
<tr>
<th>S N</th>
<th>Item</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Contract Number &amp; Dated</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Description of the plant</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Quantity</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Bill of Lading/ AWB (for Import Contract)/ LR/ RR &amp; Dated</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Name of the vessel/ transporters</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Consignment Note Number &amp; Dated</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Name of the consignee</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>Date of Commissioning &amp; Performance Test</td>
<td></td>
</tr>
</tbody>
</table>
### Details of short supply and recoveries to be made

<table>
<thead>
<tr>
<th>SN</th>
<th>Description</th>
<th>Amount to be recovered</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Details of unfulfilled contractual obligations

<table>
<thead>
<tr>
<th>SN</th>
<th>Description</th>
<th>Amount to be recovered</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Explanatory Notes for filling up the certificates on contractual obligations of the Bidder/Supplier

- Bidder/Supplier has adhered to the time schedule specified in the contract in dispatching the documents/drawings pursuant to technical specifications.

- Bidder/Supplier has installed and commissioned the plant in time (within the period specified in the contract) from the date of the intimation by the Purchaser in respect of the installation and commissioning of the units.

- Training of personnel as per contractual obligation by the Bidder/Supplier has been done.

- In the event of documents having not been supplied or installation and commissioning of the plant have been delayed on account of the Bidder/Supplier, the extent of delay should always be mentioned.
(4) Form of Bank Guarantee for performance criteria

(On Non-Judicial Stamp Paper as per the Stamp Act of Local State Government)

Bank Guarantee Number: Date:

This Deed of Guarantee made this ___ day of 20 ___(two thousand and ----) by [Name and the address of the bank], hereinafter referred to as the Bank, which shall unless repugnant to the context and the meaning thereof include its legal representatives, successors and assigns

and the Mehsana District Co-operative Milk Producers' Union Limited DAIRY (hereinafter referred to as the DUDHSAGAR DAIRY) which expression shall thereof include

unless repugnant to the context and meaning its legal representatives, Successors and assignees.

Whereas the DUDHSAGAR DAIRY has invited Bids for the supply/ supply & installation of _, by the Invitation to bid number ................................

AND WHEREAS [Name and Address of the Bidder/Supplier] who having submitted their bids (hereinafter referred to as the Bidder/Supplier) and have agreed to deposit to the DUDHSAGAR DAIRY an amount indicated in the Invitation to bid as per the terms and conditions of the Bidding Documents. AND WHEREAS the DUDHSAGAR DAIRY is also willing to accept a Bank guarantee in lieu of payment by demand draft of an amount equivalent to the amount of Bid security required to be deposited by the Bidder/Supplier to the DUDHSAGAR DAIRY and the guarantee shall be kept valid for 120 days after the day of the opening of the bids.

In consideration of the DUDHSAGAR DAIRY having agreed to consider the Bid proposals having submitted by the Bidder/Supplier without depositing the amount of Bid security and against this Bank guarantee, we [name and address of the Bank] hereby undertake and guarantee to make payment to the DUDHSAGAR DAIRY the amount of Bid security or any part thereof not deposited by the Bidder/Supplier to the DUDHSAGAR DAIRY and the guarantee shall be kept valid for 120 days after the day of the opening of the bids.

The Bank further undertakes not to revoke this guarantee during its currency except with the previous consent of the DUDHSAGAR DAIRY in writing and the guarantee shall be continuous and irrevocable guarantee up to a sum of Rs _ (Rupees _ only) provided always that any indulgence or forbearance on the part of the DUDHSAGAR DAIRY to the said Bidder/Supplier, with or without the consent of the Bank shall not prejudice or restrict remedies against the bank nor shall the same in any event be a ground of defense by the Bank against the DUDHSAGAR DAIRY.

In case the DUDHSAGAR DAIRY puts forth a demand in writing on the Bank for the payment of amount full or in part against this bank guarantee, the Bank will consider without demur that such demand by itself is a conclusive evidence and proof that the Bidder/Supplier has failed in complying with the terms and conditions stipulated by the DUDHSAGAR DAIRY in its Bidding Document and payment will be made to the
DUDHSAGAR DAIRY without raising any disputes regarding the reasons for such failure on the part of the Bidder/Supplier.

The Bank shall not be discharged or released from this guarantee by any arrangement between the Bidder/Supplier and the DUDHSAGAR DAIRY with or without the consent of the bank or any alterations in the obligations of the parties or by an indulgence, forbearance shown by the DUDHSAGAR DAIRY to the Bidder/Supplier.

This guarantee shall be in addition to and without prejudice to any other securities or remedies which the DUDHSAGAR DAIRY may have or hereafter possess against the Bidder/Supplier and the DUDHSAGAR DAIRY shall be under no obligations to marshal in favour of the Bank to any such securities or fund or asset that the DUDHSAGAR DAIRY at its absolute discretion may vary, exchange, renew, modify or refuse to complete or enforce or assign any security or instrument.

The Bank agrees that the amount hereby guaranteed shall be due and payable to the DUDHSAGAR DAIRY on serving us with a notice before expiry of Bank Guarantee requiring the payment of the amount and such notice shall be deemed to have been served on the Bank either by actual delivery thereof to the Bank or by dispatch thereof to the Bank by Registered Post at the address of the Bank.

In order to give full effect to the provisions of this guarantee the Bank thereby waives all rights inconsistent with the above provisions and which the Bank might otherwise as a guarantor be entitled to claim and enforce.

The guarantee shall remain in force until _ and the bank undertakes to renew the Bank Guarantee provided the Bidder/Supplier before the expiry of Bank Guarantee makes the request.

Notwithstanding anything stated herein before: (i) our liability under this guarantee is restricted to Rs _ (Rupees _ only) (ii) The Bank Guarantee shall remain in force till _ 20_ and (iii) The Bank is liable to pay the guarantee amount or any part thereof under this Bank Guarantee only if the DUDHSAGAR DAIRY serves upon the bank a written claim or demand on or before _.

Place: SIGNATURE

Seal Code Number.

Note:

Bidder/Suppliers should ensure that the banker before submission of the bank guarantees puts the seal and code number of signatory.

Stamp paper is not required in case of foreign Bidder/Suppliers.

The value of stamp duty should be as per latest stamp act local state government from where the bank guarantee issued.
(5) Bank Guarantees From Foreign and Scheduled Banks

Bank Guarantee from all nationalized banks is acceptable. Other than the Nationalized Banks, BGs from the following banks shall also be acceptable:

1. Foreign Banks, operating in India:
   - City Bank N.A.
   - Standard Chartered Bank
   - ABN Amro Bank
   - Banquet National de Paris, Paribas
   - Hong Kong and Shanghai Banking Corporation
   - Credit Lyonnais

2. Scheduled Banks:
   - IDBI Bank
   - ICICI Bank
   - Axis (UTI) Bank
   - HDFC Bank
Section X
Appendices 2

DSD-PATAN DRAWINGS ATTACHED AS PER FOLLOWS:

1. First Floor Plan (HMST AREA)
2. PROPOSED AREA FOR BM PROJECT DSD-PATAN
3. DSD-PATAN GROUND FLOOR LAYOUT
4. DSD-PATAN SITE LAYOUT
Section XI

BUTTERMILK MANUFACTURING, PROCESSING

&

PACKING FLOW DIAGRAM
Mehsana District Co-operative Milk Producers’ Union Limited
DSD-PATAN, E- tender document: MDCMPUL/18-19/40/Buttermilk/DSD Patan

BUTTERMILK PROCESS FLOW DIAGRAM

1. RAW MILK/RCM RECEIPT AT MILK SILO
   - PASTEURIZATION & STANDARDIZATION WITH 20 KLPH MILK PASTEURIZER
     AT MILK PROCESS SECTION - GROUND FLOOR

2. STORAGE OF PASTED MILK AT 15 KL HMST AT FIRST FLOOR HMST AREA
   - Pasteurized Double toned milk (76-82 °C/16 sec. chilled at 8-10 °C)
     (Fat%:1.7 & SNF%: 9.2)

3. CURD MILK PHE HEATER
   - HEATING OF MILK AT 40 TO 44 °C

4. CURD SETTLING TANK, CAPACITY: 5 KL
   - ADDITION OF DVS CULTURE (HOT MILK CULTURING)

   Preparation of culture (RST-744: Pack size 500 U/5000ltr milk & CHN-11: Pack size 50 U/5000ltr milk)

   Rst-744: Mesophillic/Thermophilic Culture Blend, Freeze dried Lactic Culture for Direct Vat Set (DVS)

   CHN-11: Mesophillic Aromatic Culture, Freeze dried Lactic Culture for Direct Vat Set (DVS)

   Agitation of milk for 15-25 min. after inoculation of culture

   Curd formation (Time taken 6 to 8 hrs) (Acidity 0.70 - 1.00 %)

   Curd slurry preparation in curd tank by Proper Agitation with mechanical agitator facility

   The Dahi breaking activity also may carried out by circulation

   Within the tank by Circulation Pump
Mehsana District Co-operative Milk Producers’ Union Limited
DSD-PATAN, E- tender document : MDCMPUL/18-19 /40/ Buttermilk /DSD Patan

TO BUTTERMILK PASTEURIZER BY THREE STAGE SHERE PUMP

BM PASTEURIZER (PHE TYPE), CAPACITY: 5 KLPH

Plate heat exchanger Heating at 60 - 65 °C & chilling at or below 10 °C

Two stage homogenization, 1st stage 120 kg/cm²-2nd stage 20-30 kg/ cm²

AND

Addition of pasteurized chilled water (80- 85°C for no hold & chilled at ≤10°C)

Addition of Pastd chilled water up to required ratio to make buttermilk of final composition 1.0% fat and 5.5% SNF (The Ratio of DTM & water shall be 60:40)

TO INTERMEDIATE BALANCE TANK

BUTTERMILKPHE CHILLER, CPACITY: 10 KLPH

TO CHILL THE BM LESS THEN 4 DEG C

STORAGE OF BM IN HMST, CAPACITY: 25 KL

(Min.1%fat, Min. 5.5% SNF& Acidity 0.5 – 0.7% LA)

Proper agitation will carried out at this tank with help of mechanical agitator for homogeneous mixing of Curd slurry and water

TO BM POUCH BUFFER TANK, CAPCITY: 5KL

TO OVERHAED BALANCE TANK OF POUCH MACHINE

AT POUCH SECTION GROUND FLOOR BY GRAVITY

PACKING OF BUTTERMILK IN POUCHES BY FFS POUCH PACKING MACHINES

500ML POUCH OR 6 LTR POUCH

POUCH STACKING IN 12 LTR CAPACITY CRATES
24 POUCHES OF 500ML OR 2 POUCHES OF 6 LTR IN ONE CRATE

TO POUCH COLD STORE BY CRATE CONVEYING SYSTEM

BM POUCH STORAGE LESS THEN 5 DEG C AT POUCH COLD STORE

TRANSFERRING OF BM POUCH CRATES IN INSULATED VAN

DISPATCH OF POUCH CRATES IN MARKET
# PRODUCT DETAILS

<table>
<thead>
<tr>
<th>Product Name</th>
<th>SAGAR/AMUL BUTTERMILK</th>
</tr>
</thead>
<tbody>
<tr>
<td>Description</td>
<td>Pasteurized Buttermilk meets the FSSA standards.</td>
</tr>
<tr>
<td>Packing</td>
<td>Poly Pack – 500ml</td>
</tr>
</tbody>
</table>

## PRODUCT SPECIFICATIONS

<table>
<thead>
<tr>
<th>Category</th>
<th>Description</th>
</tr>
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<tbody>
<tr>
<td><strong>Composition</strong></td>
<td></td>
</tr>
<tr>
<td>FAT(%)</td>
<td>1.0</td>
</tr>
<tr>
<td>SNF (%)</td>
<td>5.0</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Nutritional Information</th>
<th>Amount per 100 g</th>
</tr>
</thead>
<tbody>
<tr>
<td>Energy, kcal</td>
<td>26</td>
</tr>
<tr>
<td>Energy from Fat, kcal</td>
<td>9</td>
</tr>
<tr>
<td>Total Fat, g</td>
<td>1</td>
</tr>
<tr>
<td>Saturated fat, g</td>
<td>0.5</td>
</tr>
<tr>
<td>Total Carbohydrate, g</td>
<td>2.3</td>
</tr>
<tr>
<td>Added Sugar, g</td>
<td>0</td>
</tr>
<tr>
<td>Protein, g</td>
<td>2.1</td>
</tr>
<tr>
<td>Calcium, mg</td>
<td>91</td>
</tr>
<tr>
<td>Sodium, mg</td>
<td>30</td>
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<tr>
<td>Phosphorous, mg</td>
<td>79</td>
</tr>
<tr>
<td>Thiamine, mcg</td>
<td>25</td>
</tr>
<tr>
<td>Riboflavin, mcg</td>
<td>73</td>
</tr>
<tr>
<td>Niacin, mcg</td>
<td>61</td>
</tr>
<tr>
<td>Folic acid, mcg</td>
<td>4.5</td>
</tr>
<tr>
<td>Not a signification source of dietary fiber, Vitamin- A,D,C and iron</td>
<td>[ ]</td>
</tr>
</tbody>
</table>

*Approx. values

<table>
<thead>
<tr>
<th>Shelf Life</th>
<th>48 Hours from the date of packing if kept under Refrigeration below 8°C</th>
</tr>
</thead>
<tbody>
<tr>
<td>Storage Condition</td>
<td>Under Refrigeration (Below 8°C)</td>
</tr>
</tbody>
</table>
Product Features:

- It is produced in very hygienic and clean atmosphere.
- Scientific bacterial culture in SAGAR/AMUL Chhash improves digestion.
- It is conventionally packed in pouches and easily available at all milk outlets of Local market.

Product Application:

- Take a glass full in early morning in place of Tea SAGAR/AMUL Chhash will improve the digestive function.
- Replace your soup with SAGAR/AMUL Chhash; it will give you dieting benefits.
- Take a glass of SAGAR/AMUL Chhash after lunch / dinner for better digestion.
- Just give "Tadka" to SAGAR/AMUL Chhash and use it as your "Dal".
- Add some coriander cumin and salt to SAGAR/AMUL Chhash and your guest offering is ready.
- You can prepare Besan Kadhi from SAGAR/AMUL Chhash.

Available In:

- Mehsana Local Market as well as in Ahmedabad Market
End of Tender Document