NAME OF ITEM / WORK	:	**DESIGN, SUPPLY, ERECTION, INSTALLATION, TESTING AND COMMISSIONING OF 6 TLPD CAPACITY ICE CREAM PLANT AND 10 TLPD CAPACITY FERMENTED PRODUCTS PLANT AT TIRUCHIRAPALLI DCMPU LTD., UNDER DIDF SCHEME**
TENDER REFERENCE NO	:	1111/Proj.4/2022, Dated:28.02.2022

PART - I
TECHNICAL BID

THE TAMILNADU COOPERATIVE MILK PRODUCERS' FEDERATION LTD CHENNAI 600 035

Tender document issued to

M/s._____

Cost of Tender document remitted under receipt No. _____ Date _____

(or)

Tender downloaded from website on _____ at free of cost

The Dy. General Manager (Engg.).

TENDER INFORMATION

1. Name and address of the Purchaser	:	The Dy. General Manager (Engg.), Tamilnadu Cooperative Milk Producers' Federation Ltd., Head Office, Aavin Illam, 3-A, Pasumpon Muthuramalinganar Salai, Nandanam, Chennai – 600 035. E-Mail: aavindgmeng@yahoo.co.in
2. Name and address of the User		The General Manager, Tiruchirapalli DCMPU Ltd.,
3. Name of the Item / Work	:	Design, Supply, Erection, Installation, Testing and Commissioning of 6 TLPD Capacity Ice Cream Plant and 10 TLPD Capacity Fermented Products Plant at Tiruchirapalli DCMPU Ltd.,
4. Tender Reference Number	:	1111/Proj.4/2022
5. Source of Fund		DIDF Scheme
6. Tender Estimated Value	:	Rs.1586.83 Lakhs
7. Earnest Money Deposit (EMD)	:	Rs.15,80,000.00
8. Cost of Tender Document	:	Rs.2,000/- + 18% GST and Rs.100/- extra by post either by cash or demand draft in favour of TCMPF Ltd. payable at Chennai drawn from any Indian Nationalized Bank / Scheduled Commercial Bank. **Alternatively,** Tender documents can also be downloaded from the designated website at free of cost (i.e.) www.tenders.tn.gov.in and www.aavinmilk.com for submission of tender **by post (or) courier /** www.tntenders.gov.in for **e-submission.**
9. Sale of tender documents	:	**From:** 07.04.2022 To 11.05.2022 **Time:** 11.00 AM To 3.00 PM
10. Date of Pre-Bid meeting	:	**Date:** 20.04.2022 **Time:** 11.30 AM
11. Last date and time for submission of the two part tender – both technical and commercial bids.	:	**Date:** 12.05.2022 **Time:** 2.00 PM
12. Date and time of opening of Part I Technical Bid Document.	:	**Date:** 12.05.2022 **Time:** 2.15 PM
13. Date and time of opening of Part II Financial Bid	:	Financial Bid will be normally opened within 60 days from the date of opening of Part I pre qualifications-technical bid. The date of opening of Financial Bid will be informed to the eligible tenderers who are found and declared as qualified as per Part I technical bid.
14. Place of Sale of Tender Documents, Pre- Bid meeting & Part I Technical Bid and Part II Price Bid opening	:	The Dy. General Manager (Engg.), Tamilnadu Cooperative Milk Producers' Federation Ltd., Head Office, Aavin Illam, 3-A, Pasumpon Muthuramalinganar Salai, Nandanam, Chennai – 600 035.

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1.0. TECHNICAL BID – CHECK LIST

PREAMBLE OF TENDER:-

1.1. The Dy. General Manager (Engg.), Head Office, TCMPF Ltd. invites Bids by way of **E-Submission** / **OFF Line** from eligible bidders on behalf of The General Manager, Tiruchirapalli DCMPU Ltd., by two cover system for Design, Supply, Erection, Installation, Testing and Commissioning of 6 TLPD Capacity Ice Cream Plant and 10 TLPD Capacity Fermented Products Plant at Tiruchirapalli DCMPU Ltd.,

1.2. BIDDER TO FILL IN THE CHECK LIST GIVEN BELOW:

(State YES / NO for each item)

Kindly ensure compliance of the under-mentioned requirements, as per Tender Terms and Conditions.

1.3. The tender is offered for:

S.N.	Name of the work		Remarks
1	Whether two covers for each item have been was sealed separately as "Technical bid" & "Commercial bid" (whichever is applicable) and both the covers enclosed in a common overall envelope duly superscribed as "Tender for Design, Supply, Erection, Installation, Testing and Commissioning of 6 TLPD Capacity Ice Cream Plant and 10 TLPD Capacity Fermented Products Plant at Tiruchirapalli DCMPU Ltd.,		Yes / No
2.	Whether the EMD amount as detailed below is enclosed in the technical bid		
Item No.	**Name**	**EMD amount**	
1.	Design, Supply, Erection, Installation, Testing and Commissioning of 6 TLPD Capacity Ice Cream Plant and 10 TLPD Capacity Fermented Products Plant at Tiruchirapalli DCMPU Ltd.,	Rs.15,80,000.00	Yes / No
3.	If so, whether D.D. or Bank Guarantee is attached with the Tender offer - Part I / Tech.Bid		Yes / No
4.	If so, Details of D.D. or Bank Guarantee No. date, Bank on which drawn etc. may be furnished D.D./BG No(s)…….. Dated……. For Rs…… Bank Name and Branch ……. in favour of The Managing Director, TCMPF Ltd. payable at Chennai For E-submission the Earnest Money Deposit specified above may also be paid through online in TN e-Procurement Portal and scanned copy of proof for payment of EMD (ie. e-payment receipt) has to be uploaded.		Yes/No
5.	If EMD exemption is sought for, whether necessary documentary proof/evidence such as EM Part – II as per MSMED Act 2006 for SSI Certificate / Udyog Aadhar enclosed		Yes / No

SIGNATURE OF THE TENDERER WITH SEAL

	in the technical bid for tenderers from the state and if from outside the state (Tamilnadu) whether NSIC certificate enclosed	
6.	Whether details of infrastructural facilities such as equipment / man-power / financial statement (FY – 2018-19, 2019-20 & 2020-21) details etc., are enclosed.	Yes/No
7.	Whether details of past experience (i.e) Purchase order copy(s) for same capacity (or) above of Ice Cream and Fermented Products Plants	Yes/No
8.	Whether satisfactory performance certificate from client(s) for the above such supply with features mentioned in the technical specification tendered are enclosed	Yes/No
9.	If so, whether necessary supportive documents such as attested copies of Supply Order / Work order, delivery challans, enclosed.	Yes / No
10.	Whether copies of attested GST Registration certificates enclosed	Yes / No
11.	Whether copy of attested PAN card enclosed	Yes / No
12.	Whether the Minutes of Pre-Bid meeting duly signed and sealed has been enclosed along with Technical Bid Part-I	Yes/No
13.	Whether all the pages in the tender documents – Part I (Tech. Bid) and Part II (Commercial Bid) have been duly signed by authorized signatory	Yes / No
14.	Whether the Commercial bid is filled in detail in the prescribed format for break-up, equipment-wise and for abstract	Yes/No
15.	Whether these two sealed covers for Part - I "Technical Bid" and Part II – "Commercial Bid" – put in a larger cover duly superscribed, addressed and wax sealed at appropriate places.	Yes/No

Note: Please ensure that all the relevant boxes are marked YES / NO against each column.

Important Note: Bidders must ensure that all the required documents indicated in the tender document are submitted without fail. Bids received without supporting documents for the various requirements mentioned in the tender document are liable to be rejected at the initial stage itself.

SIGNATURE OF THE TENDERER WITH SEAL

2. TWO PART TENDER APPLICATION

TECHNICAL (PRE-QUALIFICATION) BID & PRICE BID APPLICATION

From

M/s.

To

The Dy. General Manager (Engg.),
TCMPF Ltd.,
Head Office, Aavin Illam, 3-A,
Pasumpon Muthuramalinganar Salai,
Nandanam, Chennai – 600 035.

Sir,

Sub: Two Part tender – Design, Supply, Erection, Installation, Testing and Commissioning of 6 TLPD Capacity Ice Cream Plant and 10 TLPD Capacity Fermented Products Plant at Tiruchirapalli DCMPU Ltd., – Submission of Documents – Regarding.

<><><>

Having examined the two part tender documents consisting of Part I technical bid pertaining to pre-qualification and part II commercial bid with price quote, I/We hereby submit all the necessary documents and relevant information for bidding the above mentioned tender.

The application is made by me/us on behalf of ……. in the capacity of ……. duly authorized to submit this two part tender offer.

Necessary evidence admissible in law in respect of authority assigned to me on behalf of the bidding firm is herewith attached.

I submit the documents herewith taking into consideration of all the instructions, terms and conditions in the detailed two part tender notice.

I/We understand that The Dy. General Manager (Engg.), TCMPF Ltd., Chennai reserves the right to reject any tender offer fully or partly without assigning any reasons thereof.

I/We hereby agree to hold the tender offer valid for acceptance for a period of 120 days from the date of opening of Part – I – Technical bid.

Signature of the Applicant
Including title capacity

(NAME IN BLOCK LETTERS)

Enclosures:

1. Evidence of authority to sign
2. Latest brochures if any
3. Part I pre-qualification – Technical bid in separate sealed cover
4. Part II commercial bid with price quote in separate sealed cover.

3. INSTRUCTIONS TO THE TENDERERS

This two part tender document consists of:
Part I – Technical Bid for Pre-Qualifying
Part II – Commercial bid for price-quote schedule.

3.1 Read all the terms and conditions of the two part tender before to start filling up.

3.2 The tenderers are to submit the **original set** of the two part tender (both Part – I – Technical Bid and Part II Commercial Bid) duly filled in, attach necessary documents and are advised to retain the duplicate set of documents for records.

3.3 The part I – Technical Bid for Pre-qualification consisting of pages……and the Part II – Commercial bid for price-quote schedule consisting of pages……. should be submitted in two different covers duly superscribed as "Tender for the Design, Supply, Erection, Installation, Testing and Commissioning of 6 TLPD Capacity Ice Cream Plant and 10 TLPD Capacity Fermented Products Plant at Tiruchirapalli DCMPU Ltd.," and again put both the sealed technical bid cover and commercial bid cover in a larger wax sealed cover duly superscribed as "Design, Supply, Erection, Installation, Testing and Commissioning of 6 TLPD Capacity Ice Cream Plant and 10 TLPD Capacity Fermented Products Plant at Tiruchirapalli DCMPU Ltd.," and addressed to "The Dy. General Manager (Engg.), TCMPF Ltd., Head Office, Aavin Illam, 3-A, Pasumpon Muthuramalinganar Salai, Nandanam, Chennai – 600035." either in person or by post so as to reach on or before the time and date specified. Tenders received after the specified date and time shall be summarily rejected.

3.4 The tenderer shall submit tenders in person or by post or courier or by electronic submission through the designated website www.tntenders.gov.in as provided in the TNTT Rule 18 (1) and 18 (3).

3.5 a).If the envelope is not sealed and super-scribed as instructed, no responsibility will be assumed for any misplacement of tender or premature opening of the envelope or parcel.

b). Telegraphic / FAX Tenders will not be accepted.

c). E-Tendering facility is available for this tender.

3.6 The quantities mentioned in the tender document are approximate. The tender accepting authority shall be permitted to vary the quantities finally ordered and execute the work through the contractor to the extent of 25% (Twenty five percent) either way of the requirements.

I agree to abide by the above instructions

SIGNATURE OF THE TENDERER

3.7 **Go through the check slip given and ensure compliance of the terms and conditions.**

3.8 The tenderer is specifically informed that all the pages in both Part I – Technical Bid and part II – Commercial Bid should be signed at the bottom of each page without any omission by the authorized signatory with name and seal of the firm.

3.9 The signatory of the tender should indicate his/their status in which he/they have signed and submit necessary documentary proof admissible in law in respect of such authority assigned to him/them by the firm.

3.10 If the Qualification application is made by a FIRM in partnership, it shall be signed by all the partners of the firm with their full names and current address or by a partner authorized by the firm (either as per Articles of the Deed of Partnership / by power of attorney)- for signing in Tenders, Agreements etc. In which case, certified copy of the registered deed of Partnership along with the current address of all the partners and a certified photocopy of the Registered Power of Attorney issued in favour of the Signatory, should be produced.

3.11 If the Qualification Application is made by a Limited Company or a Limited Corporation, it shall be signed by a duly authorized person holding the Power of attorney for signing the application, in which case, the certified copy of the power of attorney shall accompany the qualification application. Such limited company or corporation shall also furnish satisfactory evidence of its' existence along with the Qualification schedule.

3.12 **The tenderer who are downloading the document from the web site are instructed to check the web site for corrigendum after the date of pre-bid meeting, for any amendments (pre-bid – minutes) (if any issued) They are instructed to down load the above amendments and enclose it along with the technical bid document duly authenticating while submitting without fail. Failure to submit the pre-bid minutes will lead to rejection of the tender offer.**

3.13 The tenderer shall provide Raw material test certificates, Manufacturer Test Certificates and also arrange to provide instrument for identification of material to conform as per technical specification during the inspection.

3.14 Detailed evaluation done on the basis of the Documents / Records / Evidences / Certificates produced by the Applicant in the Technical Bid.

I agree to abide by the above instructions

SIGNATURE OF THE TENDERER

4.0.GENERAL TERMS & CONDITIONS

4.1. Tender under sealed **two part tender system** (i.e.) Technical Bid (Prequalification) & Price Bid (item rate tenders) are invited for and on behalf of The General Manager, Tiruchirapalli DCMPU Ltd., by The Dy. General Manager (Engg.), Head Office, TCMPF Ltd. for the Design, Supply, Erection, Installation, Testing and Commissioning of 6 TLPD Capacity Ice Cream Plant and 10 TLPD Capacity Fermented Products Plant at Tiruchirapalli DCMPU Ltd.,

4.2

4.2.1.The tenderer should be a sole bidder / lead bidder or consortium partner (maximum two consortium partner is allowed)

4.2.2.The term tenderer / bidder in this document refers to sole bidder / lead bidder or consortium partner

4.2.3.The tenderer should be manufacturer / supplier of Ice Cream and Fermented Products Plants

4.2.4. The tenderer should have previous experience in having designed, supplied, installed and commissioned same capacity (or) above of Ice Cream and Fermented Products Plants, in India either to any cooperative institution or reputed dairies / firms.

4.2.5. The tenderer should have designed, supplied, installed and commissioned same capacity (or) above of Ice Cream and Fermented Products Plants, for which tender called for, and enclose copies of purchase order / supply order within a period of 5 years.

4.2.6.The performance certificate for above such supply for which Purchase Order / Supply order furnished as per 4.2.5 from the reputed purchaser shall be enclosed in the technical bid part – I. The performance certificate received from purchaser / client should be of within a period of 3 years.

4.2.7.The Tenderer should have minimum experience of 5 Years in the manufacturing, design, supply, installation and commissioning of Ice Cream and Fermented Products Plants. Copies of Registration of firms with list of activities/GST registration certificate etc. should be enclosed as supporting document.

4.2.8.If the tenderer is an authorized dealer / supplier of original equipment manufacturer (OEM), the tenderer shall furnish the authorization letter from the original equipment manufacturer (OEM) for supply of Ice Cream

Noted and agreed to the above

SIGNATURE OF THE TENDERER

and Fermented Products Plants. The original equipment manufacturer (OEM) can authorize only one dealer / supplier

4.2.9. If the tenderer is an authorized dealer / supplier for Ice Cream and Fermented Products Plants then the experience of the manufacturer for supply of Ice Cream and Fermented Products Plants, their performance and sales turnover shall be taken for evaluation of technical bids, even if the supply has been made either by the manufacturer directly or through other agencies.

4.3.

4.3.1 PART I TECHNICAL BID, wherein the pre-qualification, based on various factors such as supply, capacity etc., suitability and eligibility of the tenderer will be evaluated, considered and decided prior to opening of commercial Bids under PART II of the tender.

4.3.2. THE PART I technical bid shall be opened on **12.05.2022 at 02.15 PM**. in the presence of the tenderers or their authorized representative who opt to be present during the opening.

4.4.

4.4.1. The PART II Commercial Bid of the tenderers who do not satisfy any/all the terms and conditions specifically so mentioned under PART I technical, shall not be considered and shall not be opened as non responsive.

4.4.2. PART II Commercial Bid, wherein the rates tendered by those who qualify for and are selected as per the terms and conditions prescribed in PART I TECHNICAL BID only will be considered and decided for the award of the contract for the Design, Supply, Erection, Installation, Testing and Commissioning of 6 TLPD Capacity Ice Cream Plant and 10 TLPD Capacity Fermented Products Plant at Tiruchirapalli DCMPU Ltd.,

4.5. The Part II commercial bids shall normally be opened within 60 days from the date of opening of the Part I pre-qualification/ technical bid in the presence of tenderers or their authorized representatives who opt to be present. The date of such opening of commercial bid will be informed separately to those who qualify in the PART I technical bid.

4.6. The tenderer is specifically informed that all the pages in both Part I – Technical Bid and Part II – Commercial Bid should be signed at the bottom of each page without any omission by the authorized signatory with name and seal of the firm.

4.7. The tender forms are not transferable or assignable.

4.8. The signatory of the tender should indicate his/their status in which he/they have signed and submit necessary documentary proof admissible

Noted and agreed to the above

SIGNATURE OF THE TENDERER

in law in respect of such authority assigned to him/them by the firm. If the tender opening day is declared as a holiday, the tenders shall be received and opened immediately on the next working day at the same time and place.

4.9 E.M.D. PAYABLE:

4.9.1 Tender must be accompanied with the prescribed amount of EMD along with tender, **if e-tender, the EMD DD should be dropped in the tender box before closure time or may be paid through online in TN e-Procurement Portal and scanned copy of proof for payment of EMD (ie. e-payment receipt) has to be uploaded**

4.9.2 EMD Payable is as detailed below:-

Sl. No.	Name of equipment	Qty.	EMD amount
1	Design, Supply, Erection, Installation, Testing and Commissioning of 6 TLPD Capacity Ice Cream Plant and 10 TLPD Capacity Fermented Products Plant at Tiruchirapalli DCMPU Ltd.,	1 Job	**Rs.15,80,000.00**

The EMD amount to be drawn by means of the **Demand Draft or it shall be submitted by means of Bank Guarantee for the period of 12 months and extendable as and when required** from any Indian Nationalised Bank or Scheduled Bank drawn in favour of the "Managing Director, TCMPF Limited," Payable at Chennai. **IT SHALL BE ENCLOSED WITH THE PART I TECHNICAL BID ONLY. For e-Submission the EMD amount paid through online in the TN e-Procurement Portal. *No other form of remittance shall be accepted.***

4.9.3.SSI Units claiming exemption from the payment of EMD,

1. Shall enclose a copy of EM Part II as per MSMED Act 2006 for SSI Certificate obtained from the General Manager, District Industries Centre / Udyog Aadhar, in respect of items manufactured by them for which tenders have been called for alone will be granted exemption from payment of EMD.
2. In respect of SSI units located outside the state (Tamilnadu), such of these units registered with NSIC in respect of items manufactured by them for which tenders have been called for alone will be granted exemption from payment of EMD.

Noted and agreed to the above

SIGNATURE OF THE TENDERER

4.9.4.<u>Tenders not accompanied with Demand Draft or Bank Guarantee or Online Payment towards the prescribed EMD or the relevant documentary proof for the exemption thereon shall be summarily rejected.</u>

4.9.5. The EMD remitted by the tenderer shall be forfeited in full.

1).If the tenderer submit fresh offer / revises offer in case of any omission subsequently after opening.

2).If withdraws his tender or backs at before the expiry of validity period or after acceptance.

3).If revises any of the terms quoted during validity period.

4.9.6. MODIFICATION AND WITHDRAWAL OF BIDS

4.9.6.1. No Tenderer shall be allowed to withdraw the tenders after submitting the tender.

4.9.6.2 A Tenderer may submit a modified Tender before the last date for receipt of tender: Provided that where more than one Tender is submitted by the same Tenderer, the lowest eligible financial tender shall be considered for evaluation.

4.9.6.3 Each bidder's modification notice shall be prepared, sealed, marked and delivered with the outer and inner envelops additionally marked MODIFICATION as appropriate.

4.9.6.4 No bid may be modified after the deadline for submission of Bids.

4.9.7 Bidders shall submit offers that comply with the requirements of the bidding documents, as indicated in the technical specifications. **"Alternatives will not be considered"**.

4.9.8 Communication to the unsuccessful Bidders will be sent after the communication sent to the successful Bidder. Within 90 (Ninety) days from the date of the receipt of refund vouchers duly stamped and signed from the unsuccessful Bidder, refund of Earnest Money Deposit will be made.

4.10.<u>PAN/GST REGISTRATION/CLEARANCE CERTIFICATE:</u>

4.10.1.Tenderers shall furnish attested Photostat copies of valid GST Registration Certificates along with the tender technical bid Part-I.

4.10.2.Tenderers shall furnish attested Photostat copy of PAN Registration Certificates along with the tender technical bid Part-I.

4.10.3.Tenderers have to furnish the latest valid S.T. Clearance Certificate before issuance of final orders.

Noted and agreed to the above

SIGNATURE OF THE TENDERER

4.11. ENCLOSURES: The tenderer should submit the following documents **duly attested by Notary Public** along with the Part – I technical bid.

1). Purchase orders as supportive documents to show the past supply having supplied to any of the reputed dairies / firm(s) /coop(s) in India.

2). Satisfactory performance certificate from client(s) for the above equipments tendered.

3). If the tenderer is an authorized suppliers of a manufacturer, the tenderer shall furnish the authorization letter from the manufacturer for supply of Ice Cream and Fermented Products Plants

4). Photostat copies of valid GST Registration Certificate, PAN Certificate.

5). Infrastructure facilities – Capacity of Firm / Supplier:-

(i). Structure and Organization with details of Technical Personnel etc. – Annexure – A

(ii). Financial Capability Statement – Annexure – B

(iii). Building, Plant and Equipments

(iv). Details of Abandonment of work Litigation / debarring done – Annexure – C

(v). Affidavit – Annexure – D

(vi). Credit Facilities – Bank Certificate – Annexure – E

4.12. SECURITY DEPOSIT

The successful tenderers would be required to sign an agreement and furnish a Security Deposit of 5% of the order value, drawn by means of Demand Draft or it shall be submitted by means of Bank Guarantee for the period of 18 months and extendable as and when required from any Indian Nationalised Bank or Scheduled Bank drawn in favour of "Managing Director, TCMPF Ltd" payable at Chennai within 15 days of notifying them. The EMD already paid along with tender shall be adjusted against SD to be paid by the successful tenderer.

No exemption will be given from payment of Security deposit under any circumstances as per TNTT Act and the same should be remitted by above means. Any other form of remittance will not be accepted.

4.12.1.The security deposit will be refunded only after the expiry of 6 months from the date of satisfactory completion of the contract satisfactorily complying to the specification of the equipment to take care of the workmanship of the agency.

4.13. AGREEMENT:

Noted and agreed to the above

SIGNATURE OF THE TENDERER

The successful tenderer has to execute an agreement on Rs.100/- non-judicial stamp paper incorporating the terms and conditions of the contract and the specification within 15 days from the date of intimation of the acceptance of the tender. In case of default of either of the conditions (i.e) remitting the security deposit or execution of the agreement within the time allowed, the EMD paid is likely to be forfeited by the Federation.

4.13.1. If the contractor fails to execute the contract satisfactorily at the tendered rate, the security deposit will be forfeited by the Federation.

4.13.2. If the Federation incurs any loss / additional expenditure due to the negligence of the contractor in connection with the work during the period of contract, the same shall be recovered together with all charges and expenses from the contractor.

4.13.3. The breakages or damages, if any, caused by the contractor to the property of the Federation, the cost will be recovered from the contractor.

4.13.4. **RATES AND PRICE:** This is a fixed price contract. Price adjustment clause (to account for raise or fall in the money value / statutory taxes during the contract period) is not operatable for this contract. However any variation in the statutory levies and Taxes by State Government / Central Government shall be effected on the end price to the benefit of either the contractor or Federation as the case it may be.

4.13.5. No interest shall be paid on Earnest Money Deposit/Security Deposit.

4.13.6. The Agreement in Rs.100/- non-judicial stamp paper shall be signed and returned within 15 days of receipt of the Design, Supply, Erection, Installation, Testing and Commissioning order along with the D.D. for Security Deposit.

4.14. DELIVERY SCHEDULE:-

4.14.1. Supply	:	5 – 6 months from the date of receipt of purchase order (or) 1 month from the readiness of site whichever is later
4.14.2. Erection, Installation, Testing and Commissioning	:	2 – 3 months from the readiness of site (or) receipt of Materials at site whichever is later.

Noted and agreed to the above

SIGNATURE OF THE TENDERER

4.15. PAYMENT TERMS:

4.15.1. SUPPLY:

a). If the single order of any successful tenderers is over Rs.1 crore., an advance payment of 10% of the basic value of the order will be considered against irrevocable bank guarantee for a period till completion of entire supply of Ice Cream and Fermented Products Plants Machinery / Equipments and such advance shall be recovered with interest applicable at the time of recovery from the bills payable at the time of release of 70% basic price + taxes and other charges.

(OR)

70% of basic price + taxes and other charges shall be released on receipt of the Ice Cream and Fermented Products Plants Machinery/Equipments wise in good condition at site.

b). The remaining 30% payment shall be released after the Erection and satisfactory commissioning of the Ice Cream and Fermented Products Plants Machinery/Equipments wise at site.

(OR)

If the site is not ready due to unavoidable circumstances for carrying out the Erection, Installation, Testing and Commissioning of the equipments within 3 months period, then the balance 30% payment on supply will be considered for release on submission of irrevocable Bank Guarantee for a value equal to 30% of supply order value, for one year and extendable for another one more year with an agreement on a non-judicial stamp paper to a value of Rs.100/- (Rupees hundred only) for execution of project subsequently without altering the Erection, Installation, Testing and Commissioning charges.

4.15.2. ERECTION, INSTALLATION, TESTING AND COMMISSIONING:

a). 70% of the Erection, Installation, Testing and Commissioning charges shall be released on satisfactory completion of the Erection, Installation, Testing and Commissioning of the Ice Cream and Fermented Products Plants

b). Balance 30% of Erection, Installation, Testing and Commissioning charges shall be released after 3 months from the date of satisfactory commissioning and performance of the Ice Cream and Fermented Products Plants.

N.B: NO OTHER TERMS OF PAYMENT WILL BE ENTERTAINED.

Noted and agreed to the above

SIGNATURE OF THE TENDERER

PENALTY CLAUSE:

4.15.3. If the tenderer / Contractor fails in his due performance of the contract within the time fixed in the schedule accompanying the order or extension of time granted:-

(a) Liquidated damages will be levied at 1% per month for the number of days that the supply / work has been delayed for the contract value less than Rs.50,00,000/- (Rupees fifty lakhs) as below subject to:-

(i). The Liquidated Damages be imposed on the value of undelivered / delayed supply of materials / machineries instead of total value of contract, if the tender is for the Design, Supply, Erection, Installation, Testing and Commissioning of two or more number of machineries and where the materials / machineries can be put into use separately.

(OR)

(ii). The Liquidated Damages be imposed on the total value of the contract for delayed supply / completion of material / work as per the milestone fixed in the tender (i.e) turnkey job inclusive of Civil work, supply of Mechanical/Electrical item, Erection etc., since the machineries partly supplied could not be put into operation and affect the functioning of system and other accessories as per plan.

(b). The Liquidated Damages be imposed for the delayed supply / Erection, Installation, Testing and Commissioning at 0.5% per month, if the contract value is more than Rs.50.00 Lakhs (Rupees fifty lakhs).

4.15.4. Time being the essence of contract no variation shall be permitted in the delivery time as prescribed in the delivery schedule. If the tenderer fails to supply and execute the work in full or part of the order as per the delivery schedule, the Federation shall reserve the right to cancel the order besides forfeiture of Security Deposit.

4.15.5. Notwithstanding anything contained in the tender schedule, no obligation rests on the Federation to accept the lowest tender and the Federation shall also have the right to accept or reject any or all the tenders fully or partly without assigning any reasons.

4.15.6. For violation of any of the terms and conditions of the contract, the Federation reserves the right to terminate the contract, with or without notice as applicable.

Noted and agreed to the above

SIGNATURE OF THE TENDERER

4.15.7. On termination of contract, the Security Deposit is liable to be forfeited and any of the resultant loss beyond Security Deposit will be recovered from the contractor by legal means apart from forfeiture of any amount due to the contractor.

4.15.8. (a). If the tenderer defaulted in any of the previous tenders to execute agreement or to pay Security Deposit or to supply ordered quantity either in part or full will not be eligible from participating in this tender.

(b). If the successful tenderer either in federation TCMPF or in the DCMPU defaulted to execute agreement or to pay Security Deposit or to supply ordered quantity either in part or full shall be debarred from participating in the subsequent tenders for a period of 3 years.

4.16. WARRANTY:

A warranty certificate shall be furnished on the workmanship, parts and performance of the Ice Cream and Fermented Products Plant for a period of 18 months from the date of supply or 12 months from the date of satisfactory commissioning whichever is later. If any defects are noticed in the equipments during the warranty period the same should be rectified at site at free of cost and charges.

4.17. FORCE MAJEURE:

Failure or delay in the part of tenderer for supply due to force majeure causes enumerated here under shall be considered, provided the supplier produces documentary evidence.

a. Any cause which is beyond the reasonable control of the tenderer.
b. Natural phenomena, such as floods, drought, earthquakes and epidemics.
c. Act of any Govt. Authority, domestic or foreign, such as wars declared or undeclared quarantines, embargoes licensing control on production or distribution restrictions.
d. Accident and disruptions such as fire, explosion, increase in power cut with respect to date of tender opening etc.,
e. Strikes, slow down and lockouts.

The cause of force majeure condition will be taken into consideration only if the supplier notifies within 30 days from the occurrence of such eventualities.

Noted and agreed to the above

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The purchaser shall verify the facts and grant such extension as the facts justify. For extension due to force majeure conditions, the supplier shall submit his representation with documentary evidence for scrutiny by the purchaser and decision of the purchaser shall be binding on the time.

4.18. DISPUTES AND ARBITRATION:

In case of disputes arising out of this tender, an arbitrator as mutually acceptable to the tenderer and Federation will be appointed by the Managing Director, TCMPF Limited. The arbitrator's decision shall be final, conclusive and binding on both the parties.

4.19. LEGAL JURISDICTION

In case if either party to the tender is aggrieved by the award of the arbitrator so appointed as per clause 4.18 or otherwise, they can appeal to Court of Deputy Registrar (Dairying), Thiruvallur. The legal jurisdiction will be only Deputy Registrar (Dairying), Thiruvallur Court.

4.20. PERFORMANCE GUARANTEE:

If the value of supply order is Rs.50 lakhs or more, the contractor shall provide a performance guarantee at the time of getting 70% payment for the 10% of the supply order value of the Ice Cream and Fermented Products Plant ordered as Bank Guarantee from a Nationalized Bank / Scheduled Banks for a period of one year and extendable to one more year if needed.

4.21. INSPECTION:

After issue of purchase order to L1 Firm, the material inspection will be conducted at Supplier's site and Purchaser's by TCMPF Ltd., / Third Party agency as the case it may be.

Noted and agreed to the above

SIGNATURE OF THE TENDERER

5.0. PRE QUALIFICATION CRITERIA – TECHNICAL BID (PART-I)

The pre-qualification tender/PART-I technical bid will contain the under mentioned aspects pertaining to the prospective suppliers about their suitability, capacity, financial status, antecedents, past performance etc. The conditions are:-

5.1. Tenders not accompanied with Demand Draft or Bank Guarantee or Online Payment towards the prescribed EMD or the relevant documentary proof for the exemption thereon shall be summarily rejected

5.1.1. The tenderer should be manufacturer / supplier of Ice Cream and Fermented Products Plants

5.2. The tenderer should have previous experience in having designed, supplied, installed and commissioned same capacity (or) above of Ice Cream and Fermented Products Plants, in India either to any cooperative institution or reputed dairies / firms.

5.3. The tenderer should have designed, supplied, installed and commissioned same capacity (or) above of Ice Cream and Fermented Products Plants, for which tender called for, and enclose copies of purchase order / supply order within a period of 5 years..

5.4. The performance certificate for above such supply for which Purchase Order / Supply order furnished as per 5.3 from the reputed purchaser shall be enclosed in the technical bid part – I. The performance certificate received from purchaser / client should be of within a period of 3 years.

5.5. The Tenderer should have minimum experience of 5 Years in the manufacturing, design, supply, installation and commissioning of Ice Cream and Fermented Products Plants. Copies of Registration of firms with list of activities/GST registration certificate etc. should be enclosed as supporting document

5.6. If the tenderer is an authorized dealer / supplier of original equipment manufacturer (OEM), the tenderer shall furnish the authorization letter from the original equipment manufacturer (OEM) for supply of Ice Cream and Fermented Products Plants. The original equipment manufacturer (OEM) can authorize only one dealer / supplier.

5.7. If the tenderer is an authorized dealer / supplier for Ice Cream and Fermented Products Plants, then the experience of the manufacturer for supply of Ice Cream and Fermented Products Plants, performance and sales turnover shall be taken for evaluation of technical bids, even if the supply has been made either by the manufacturer directly or through other agencies.

5.8. The tenderer who are downloading the document from the web site are instructed to check the web site for corrigendum after the date

Noted and agreed to the above

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of pre-bid meeting, for any amendments (pre-bid – minutes) (if any issued) They are instructed to down load the above amendments and enclose it along with the technical bid document duly authenticating while submitting without fail. Failure to submit the pre-bid minutes will lead to rejection of the tender offer.

5.9. **FINANCIAL:** The tenderer shall have ***average annual sales turn-over for the last three financial years (2018-19, 2019-20 & 2020-21) equal to the tender estimated value and minimum annual sales turn-over in each of the last three financial years (2018-19, 2019-20 & 2020-21) shall not be less than 50% of the tender estimated value***

5.10. VALIDITY OF PRICE TENDER:

a). The tender offer shall be kept for acceptance for a period of 120 days from the date of opening of Part – I Technical bid. The offers with lower validity period are liable for rejection.

b). Further the tenderer shall agree to extend the validity of the bids without altering the substance and prices of their bid for further period, if any required by Federation (i.e) The Price Bid shall be valid for a period of at least 90 days (Ninety Days) from the date, notified for opening of Price Bid.

5.11. DEVIATION:

a). The offers of the tenderers with deviations on technical / commercial terms of the tender will be rejected.

b). No alternate offer will be accepted.

5.12. Even though the bidders meet the above qualifying criteria, they are subject to be disqualified if they have:

a). Made misleading or false representations in the forms, statements and attachments submitted in proof of the qualification requirements; and/or

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

c). Participated in the previous bidding for the same work and had quoted unreasonably high bid prices and could not furnish rational justification to the employer.

5.13.The bidder should submit the proposed tentative P and I drawing, General plan for the above Ice Cream and Fermented Products Plants in the Technical bid.

Noted and agreed to the above

SIGNATURE OF THE TENDERER

Annexure – A

STRUCTURE AND ORGANISATION

1	Name of the Applicant	:	
2	Status	:	
	Individual contractor	:	
	Sole Proprietary Firm	:	
	Firm in Partnership	:	
	Private Limited Company	:	
	Public Limited Company	:	
3	Head Office/Registered office address with phone / Telex / Fax Number	:	
4	Contact Person Name Address Mobile No Email Address	:	
5	Regional Office address with Phone / Telex / Fax Number	:	
6	Local office (if any) address with Phone / Telex / Fax Number	:	
7	Field of activity of the Applicant as per deed of Partnership / Memorandum of Association / Articles of associates (Civil) Engineering Contractor / General Engineering Contractor / Electrical Items - Engineering Contractor etc, should be specified.)	:	
8	Country and year of incorporation	:	
9	Main line of Business	:	
10	Name, position, status, capacity etc, of the Key personnel/ directors of the company (Attach organization chart showing the structure of the company / firm)	:	
11	Name, capacity and address of the signatory who has Signed the Qualification Application. Attested copy of authorization issued (either by power of attorney or as per articles of Partnership Deed / Memorandum of Association) in favour of the signatory to sign the qualification Application price Tender/ Agreement should be appended.	:	

SIGNATURE OF THE TENDERER WITH SEAL

Annexure – B
FINANCIAL CAPABILITY
(Please Annex self attested copies)

1	Name and address of the Applicant	:			
2	Income Tax Permanent Account No. C.I. H. No.	:			
3	GST Registration No.	:			
4	Annual turn over as per audited statement of account duly certified by the Chartered Accountant during the preceding Three years (Attach attested copy of balance sheets)	:	TAX Year	Figures	Words
		:	2018-19		
		:	2019-20		
		:	2020-21		
5	Financial Position	:			
	I. Cash in hand	:			
	II. Cash in Bank	:			
	III. Current Assets	:			
	IV. Current Liabilities	:			
	V. Working Capital	:			
	VI. Net worth	:			
6	Outstanding value of works already committed and in progress and time left for completion. (Details for each work to be furnished separately)	:			
7	Amount available in capital Account	:			
	I. Paid up share capital of (Partners or Share holders)	:			
	II. Called up and subscribed share capital	:			
	III. Reserves under capital account	:			
	IV. Surplus under capital account	:			

SIGNATURE OF THE TENDERER WITH SEAL

8	Net profit before tax during the proceeding three years	:	TAX Year	Figures	Words
		:	2018-19		
		:	2019-20		
		:	2020-21		
9	Applicant's financial arrangements.	:			
	(a) Own resources	:			
	(b) Bank credits/ Over Draft	:			
	(c) Other source (Specify the source)	:			

SIGNATURE OF THE TENDERER WITH SEAL

Annexure – C

INFORMATION REGARDING CURRENT LITIGATION / DEBARRING / EXPELLING OF APPLICANT OR ABANDONMENT OF WORK BY THE APPLICANT

1. (a) Is the Applicant currently involved in any Arbitration / litigation relating to any contract works Yes/No

   (b) If Yes, Details thereon

2. (a) Has the Applicant or any of it's constituent partners been Debarred/Expelled by any agency during the last Three years Yes/No

   (b) If yes, Details thereon

3. (a) Has the Applicant or any of it's constituent Partners failed to complete, any contract work during the past Three years. Yes/No

   (b) If yes, give details thereon

Dated Signature of Applicant with seal

Note: It any information in this Annexure is found to be incorrect or concealed, the Qualification Application will be summarily rejected & price tender will not be opened.

Annexure – D
AFFIDAVIT

(To be furnished in a Twenty Rupees Non-Judicial Stamp Paper duly Certified by Notary Public)

1). I/We the undersigned solemnly declare that all the statements made in the documents, records etc., attached with this application are true and correct to the best of my/our knowledge.

2). I/We the undersigned do hereby certify that neither my/our firm/company nor any of it's constituent partners have abandoned any work/works of similar nature and magnitude in India, during the Last Three years.

3). I/We the undersigned do hereby certify that any of the contracts awarded to me/us has not been terminated rescinded, due to breach of contract on my/our part, during the last Three Years.

4). I/We the undersigned authorize (s) and request any bank / person / firm / corporation / Government Departments to furnish pertinent information deemed necessary and requested by The Dy. General Manager (Engg.), TCMPF Ltd., Head Office, Aavin Illam, 3-A, Pasumpon Muthuramalinganar Salai, Nandanam, Chennai – 600 035 to verify the statement made by me/us or to assess my/our competence and general reputation.

5). I/We the undersigned, understand(s) that further qualifying information / clarifications on the statement made by me / us may be requested by The Dy. General Manager (Engg.), TCMPF Ltd., Head Office, Aavin Illam, 3-A, Pasumpon Muthuramalinganar Salai, Nandanam, Chennai – 600 035. and agree(s) to furnish such information/ clarification within SEVEN Days from the date of receipt of such request from The Dy. General Manager (Engg.), TCMPF Ltd., Head Office, Aavin Illam, 3-A, Pasumpon Muthuramalinganar Salai, Nandanam, Chennai – 600 035.

Dated Signature of Applicant with Seal:

To be signed by the officer authorized by the Firm/Company to sign on behalf, the Firm/Company with company's seal)

Note: In case of sole proprietary concern, affidavit should be signed only by the sole proprietor.

(Title of the Officer)

(Title of the firm/Company)

(Date)

The above named deponent has understood the contents well and solemnly and sincerely declared and affirmed by the deponent in my presence at……and signed before me on this day of …….. (Seal).

(Signature of the Notary Public)

Annexure – E

SAMPLE FORMAT FOR EVIDENCE OF ACCESS TO OR AVAILABILITY OF CREDIT FACILITIES

BANK CERTIFICATE

This is to certify that M/s …… is a reputed company with a good financial standing.

If the contract for the work, namely, _____ is awarded to the above firm, we shall be able to provide overdraft/credit facilities to the extent of Rs……. to meet their working capital requirements for executing the above contract.

Signature of Senior Bank Manager …….

Name of the senior Bank Manager …….

Address of the Bank ……..

Stamp of the Bank

Note: Certificate should be on the letter head of the bank.

6.0 EVALUATION AND COMPARISON OF THE TENDER OFFERS

6.1. The tenders will be evaluated strictly as per the Tamilnadu Transparency in Tenders Act 1998 and the Tamilnadu Transparency in Tenders Rules 2000 and amendments made thereon in the Act & Rules by the Government.

6.2. The tender offers received will be examined to determine whether they are in complete shape, all required data's have been furnished, properly signed and generally in order and confirms to all the terms and conditions of the specification without any deviation.

6.3. For the purpose of evaluation of tender offers, the following factors will be taken into account for arriving the evaluation price.

a). The quoted price will be corrected to arithmetical errors.

b). In case of discrepancy between the price quoted in words and figures, lower of the two shall be considered.

c). The evaluation of offer will be computed by taking into account Design, Supply, Erection, Installation, Testing and Commissioning put together.

6.4 Bidders should quote their rates both in figures and in words for each item per unit and amount for each item of work for full quantity. Grand total of the whole contract should be furnished without fail in the Price Quote Schedule of Price Bid.

6.5 The bidder shall fill in rates and prices and line item total (both in figures and words) for all the items of the works described along with total bid price (both in figures and words). Items for which no rate or price is entered by the bidder will not be paid for by the purchaser when executed.

6.6 The evaluation for L1 shall be on total end price of all items.

Noted and agreed to the above

SIGNATURE OF THE TENDERER

7.0.SPECIAL CONDITIONS OF CONTRACT

Contents

Noted and agreed to the above

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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 Tamilnadu Cooperative Milk Producers' Federation Ltd., 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

2.1 The Performance Security shall be in the amount of 10% of the Contract price up to sixty days after the date of completion of performance obligations including warranty obligations.

3. Inspection and Tests

3.1 The inspection of the Goods shall be carried out to check whether the Goods are in conformity with the technical specifications attached to the purchase order form and shall be in line with the inspection/test

Noted and agreed to the above

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procedures laid down in the Schedule of Specifications and the Contract conditions.

4. Delivery and Documents

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

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

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

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

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

- The Supplier's invoice showing purchase order no., Goods' description, quantity, unit price, total amount;
- Delivery note/packing list/lorry receipt;
- Manufacturer's/Bidder/Supplier's guarantee certificate;
- Inspection Certificate issued by the nominated inspection agency, and the Bidder/Supplier's factory inspection report;
- Excise gate pass/ Octroi receipts, wherever applicable, duly sealed indicating payments made; and

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- Any other document evidencing payment of statutory levies.
- Single MCE insurance policy shall cover the entire project.

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

5. Insurance

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

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

6. Incidental services

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

7. Spare Parts

7.1 Bidder/Suppliers shall carry sufficient inventories to assure ex-stock supply of consumable spares such as gaskets, plugs, washers, belts, etc. Other spare parts and components shall be supplied as promptly as possible but in any case within three months of placement of order. Basic Spare part list already provided in the technical section which is mandatory to supply.

8. Notices

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

Noted and agreed to the above

SIGNATURE OF THE TENDERER

The Dy. General Manager (Engg.),
Tamilnadu Cooperative Milk Producers' Federation Ltd.,
Aavin Illam, 3-A, Pasumpon Muthuramalinganar Salai,
Nandanam, Chennai – 600 035.

9. SALIENT FEATURES OF SOME MAJOR LABOUR LAWS APPLICABLE TO ESTABLISHMENTS ENGAGED IN BUILDING AND OTHER CONSTRUCTION WORK.

(The law as current on the date or bid opening will apply to the bidder for executing the tendered project)

a) **Workmen Compensation Act 1923**: The Act provides for compensation in case of injury by accident arising out of and during the course of employment.

b) **Payment of Gratuity Act 1972**: Gratuity is payable to an employee under the Act on satisfaction of certain conditions on separation if an employee has completed 5 years' service or more or on death the rate of 15 days wages for every completed year of service. The Act is applicable to all establishments employing 10 or more employees.

c) **Employees P.F. and Miscellaneous Provision Act 1952:** The Act Provides for monthly contributions by the employer plus workers @ 10% or 8.33%. The benefits payable under the Act are:

(i) Pension or family pension on retirement or death, as the case may be.

(ii) Deposit linked insurance on the death in harness of the worker.

(IV) Payment of P.F. accumulation on retirement/death etc.

d) **Maternity Benefit Act 1951:** The Act provides for leave and some other benefits to women employees in case of confinement or miscarriage etc.

e) **Contract Labour (Regulation & Abolition) Act 1970:** The Act provides for certain welfare measures to be provided by the Contractor to contract labour and in case the Contractor fails to provide, the same are required to be provided, by the Principal Employer by Law. The Principal Employer is required to take Certificate of Registration and the Contractor is required to take license from the designated Officer. The Act is applicable to the establishments or Contractor of Principal Employer if they employ 20 or more contract labour.

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f) **Minimum Wages Act 1948:** The Employer is supposed to pay not less than the Minimum Wages fixed by appropriate Government as per provisions of the Act if the employment is a scheduled employment. Construction of Buildings, Roads, Runways are scheduled employments.

g) **Payment of Wages Act 1936:** It lays down as to by what date the wages are to be paid, when it will be paid and what deductions can be made from the wages of the workers.

h) **Equal Remuneration Act 1979:** The Act provides for payment of equal wages for work of equal nature to Male and Female workers and for not making discrimination against Female employees in the matters of transfers, training and promotions etc.

i) **Payment of Bonus Act 1965:** The Act is applicable to all establishments employing 20 or more employees. The Act provides for payments of annual bonus subject to a minimum of 8.33% of wages and maximum of 20% of wages to employees drawing Rs.3500/-per month or less. The bonus to be paid to employees getting Rs.2500/-per month or above upto Rs.3500/- per month shall be worked out by taking wages as Rs.2500/-per month only. The Act does not apply to certain establishments. The newly set-up establishments are exempted for five years in certain circumstances. Some of the State Governments have reduced the employment size from 20 to 10 for the purpose of applicability of this Act.

j) **Industrial Disputes Act 1947:** The Act lays down the machinery and procedure for resolution of Industrial disputes, in what situations a strike or lock-out becomes illegal and what are the requirements for laying off or retrenching the employees or closing down the establishment.

k) **Industrial Employment (Standing Orders) Act 1946:** It is applicable to all establishments employing 100 or more workmen (employment size reduced by some of the States and Central Government to 50). The Act provides for laying down rules governing the conditions of employment by the Employer on matters provided in the Act and get the same certified by the designated Authority.

l) **Trade Unions Act 1926:** The Act lays down the procedure for registration of trade unions of workmen and employers. The Trade

Noted and agreed to the above

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Unions registered under the Act have been given certain immunities from civil and criminal liabilities.

m) **Child Labour (Prohibition & Regulation) Act 1986:** The Act prohibits employment of children below 14 years of age in certain occupations and processes and provides for regulation of employment of children in all other occupations and processes. Employment of Child Labour is prohibited in Building and Construction Industry.

n) **Inter-State Migrant workmen's (Regulation of Employment & Conditions of Service) Act 1979:** The Act is applicable to an establishment which employs 5 or more inter-state migrant workmen through an intermediary (who has recruited workmen in one state for employment in the establishment situated in another state). The Inter-State migrant workmen, in an establishment to which this Act becomes applicable, are required to be provided certain facilities such as housing, medical aid, travelling expenses from home upto the establishment and back, etc.

o) **The Building and Other Construction workers (Regulation of Employment and Conditions of Service) Act 1996 and the Cess Act of 1996:** All the establishments who carry on any building or other construction work and employs 10 or more workers are covered under this Act. All such establishments are required to pay cess at the rate not exceeding 2% of the cost of construction as may be modified by the Government. The Employer of the establishment is required to provide safety measures at the Building or construction work and other welfare measures, such as Canteens, First-Aid facilities, Ambulance, Housing accommodations for workers near the work place etc. The Employer to whom the Act applies has to obtain a registration certificate from the Registering Officer appointed by the Government.

p) **Factories Act 1948:** The Act lays down the procedure for approval at plans before setting up a factory, health and safety provisions, welfare provisions, working hours, annual earned leave and rendering information regarding accidents or dangerous occurrences to designated authorities. It is applicable to premises employing 10 persons or more with aid of power or 20 or more persons without the aid of power engaged in manufacturing process.

Noted and agreed to the above

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10. PROTECTION OF ENVIRONMENT:

The contractor shall take all reasonable steps to protect the environment on and off the Site and to avoid damage or nuisance to persons or to property of the public or others resulting from pollution, noise or other causes arising as a consequence of his methods of operation.

During continuance of the contract, the contractor and his sub-contractors shall abide at all times by all existing enactments on environmental protection and rules made thereunder, regulations, notifications and bye-laws of the State or Central Government, or local authorities and any other law, bye-law, regulations that may be passed or notification that may be issued in this respect in future by the State or Central Government or the local authority.

Salient features of some of the major laws that are applicable are given below:

The Water (Prevention and Control of Pollution) Act, 1974, This provides for the prevention and control of water pollution and the maintaining and restoring of wholesomeness of water. 'Pollution' means such contamination of water or such alteration of the physical, chemical or biological properties of water or such discharge of any sewage or trade effluent or of any other liquid, gaseous or solid substance into water (whether directly or indirectly) as may, or is likely to, create a nuisance or render such water harmful or injurious to public health or safety, or to domestic, commercial, industrial, agricultural or other legitimate uses, or to the life and health of animals or plants or of aquatic organisms.

The Air (Prevention and Control of Pollution) Act, 1981, This provides for prevention, control and abatement of air pollution. 'Air Pollution' means the presence in the atmosphere of any 'air pollutant', which means any solid, liquid or gaseous substance (including noise) present in the atmosphere in such concentration as may be or tend to be injurious to human beings or other living creatures or plants or property or environment.

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The Environment (Protection) Act, 1986, this provides for the protection and improvement of environment and for matters connected therewith, and the prevention of hazards to human beings, other living creatures, plants and property. 'Environment' includes water, air and land and the inter-relationship which exists among and between water, air and land, and human beings, other living creatures, plants, microorganism and property.

The Public Liability Insurance Act, 1991, This provides for public liability insurance for the purpose of providing immediate relief to the persons affected by accident occurring while handling hazardous substances and for matters connected herewith or incidental thereto. Hazardous substance means any substance or preparation which is defined as hazardous substance under the Environment (Protection) Act 1986, and exceeding such quantity as may be specified by notification by the Central Government.
[Employers should note that the Loan Agreement between IBRD and the borrowing country may establish specific measures to be taken during construction of the Works for the protection of the environment. Sub-clause 16.2 should be modified/expanded to take into account such specific measures or other measures considered appropriate by the Employer]

Purchaser

Tamilnadu Cooperative Milk Producers' Federation Ltd.,

Supplier

Bidders to provide details.

Noted and agreed to the above

SIGNATURE OF THE TENDERER

8.0. Special Conditions of Contract for General Erection & Commissioning

Contents

Noted and agreed to the above

SIGNATURE OF THE TENDERER

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 labour position at site and to have determined the prices accordingly.

2. Programme of Installation & Commissioning

2.1 As soon as practicable after the acceptance of the bid, the Bidder/Supplier shall submit to the Purchaser for his approval a comprehensive programmed in the form of bar chart showing the sequence of order in which the Bidder/Supplier proposes to carry out the works including the design, manufacture, delivery to site, Erection, Installation, Testing and Commissioning thereof. After submission to and approval by the Purchaser of such programmed, the Bidder/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 Bidder/Supplier of any of his duties or responsibilities under the Contract. The programmed approved by the Purchaser shall form the basis of evaluating the pace of all works to be performed by the Bidder/Supplier. The Bidder/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 Bidder/Supplier should visit the site to acquaint himself in respect of existing site conditions and to know the details/information required for understanding the nature and type of civil construction works involved in the project. The Bidder/Supplier shall submit to the Purchaser for approval:

- Within the time given in the specification or in the program, such drawings, samples, patterns and models as may be called for therein, and in numbers therein required.
- During the progress of works and within such reasonable times as the Purchaser may require such drawings of the general arrangement and details of the works as the Purchaser may require.

Noted and agreed to the above

SIGNATURE OF THE TENDERER

- During the progress of works and before the start of the erection activities, Supplier to submit the intelligent 3D for entire plant in the freeware software format for the approval to the Purchaser/Consultant

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

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

3.4 Bidder/Supplier shall furnish a list of all necessary drawings, which the Bidder/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.

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

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

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

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

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

3.9 In addition to the information provided on drawings, each drawing shall carry a revision number, date of revision and brief description of revision

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carried out. Whenever any revision is carried out, correspondingly revision number must be updated.

3.10 All dimensions on drawings shall be in metric units.

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

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

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

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

3.15 The Bidder/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.

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4. Superintendence, Team and Conduct

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

4.4 When the Bidder/Supplier or Bidder/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 Bidder/Supplier.

4.5 The Bidder/Supplier shall furnish to the Purchaser a fortnightly labour force report showing by classifications the number of employees engaged in the work. The Bidder/Supplier's employment records shall include any

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reasonable information as may be required by the Purchaser. The Bidder/Supplier should also display necessary information as may be required by statutory regulations.

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

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

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

5. Purchaser's Instructions

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

- Any additional drawing and clarifications to exhibit or illustrate details.
- Variations or modifications of the design, quality or quantity of work or the additions or omissions or substitution of any work.
- Any discrepancy in the drawings or between the schedule of quantities and/or specifications.
- Removal from the site of any material brought there by the Bidder/Supplier, which are unacceptable to the Purchaser and the substitution of any other material thereof.
- Removal and/or re-execution of any work erected by the Bidder/Supplier, which are unacceptable to the Purchaser.

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- Dismissal from the work of any persons employed there upon who shall in the opinion of the Purchaser, misconduct him, or be incompetent or negligent.
- Opening up for inspection of any work covered up.
- Amending and making good of any defects.

6. Right of the Purchaser

6.1 Right to direct works

- The Purchaser shall have the right to direct the manner in which all works under this contract shall be conducted, in so far as it may be necessary to secure the safe and proper progress and specified quality of the works. All work shall be done and all materials shall be furnished to the satisfaction and approval of the Purchaser.
- Whenever in the opinion of the Purchaser, the Bidder/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 Bidder/Supplier.
- If in the judgment of the Purchaser, it becomes necessary at any time to accelerate the overall pace of the plant erection work, the Bidder/Supplier, when directed by Purchaser, shall cease work at any particular point and transfer Bidder/Supplier’s men to such other point or points and execute such works, as may be directed by the Purchaser and at the discretion of the Purchaser.

6.2 Right to order modifications of methods and equipment

- If at any time the Bidder/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 Bidder/Supplier to ensure safety, and increase their efficiency and adequacy and the Bidder/Supplier shall promptly comply with such directives. If at any time the Bidder/Supplier's working force and equipment are inadequate in the opinion of the Purchaser, for securing the necessary progress as stipulated, the Bidder/Supplier shall if so directed, increase the working

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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 Bidder/Supplier of Bidder/Supplier's obligations to secure the quality, the safe conducting of the work and the rate of progress required by the contract. The Bidder/Supplier alone shall be and remain liable and responsible for the safety, efficiency and adequacy of Bidder/Supplier's methods, materials, working force and equipment, irrespective of whether or not the Bidder/Supplier makes any changes as a result of any order or orders received from the Purchaser.

6.3 Right to inspect the work

- The Purchaser's representative shall be given full assistance in the form of the necessary tools, instruments, equipment and qualified operators to facilitate inspection.
- The Purchaser reserves the right to call for the original test certificates for all the materials used in the erection work.
- 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 Bidder/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 Bidder/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.

7. Bidder/Supplier's Functions

7.1 The Bidder/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 Bidder/Supplier finds any discrepancy therein, Bidder/Supplier shall immediately refer the same to

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the Purchaser whose decision shall be final and binding on the Bidder/Supplier.

7.2 The Bidder/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.

8. Variations

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

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

8.2 The Bidder/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 Bidder/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 Bidder/Supplier shall within seven days confirm in writing to the Purchaser

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and the Purchaser shall not contradict such confirmation in writing within 14 days, it shall be deemed to be an order in writing by the Purchaser.

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

8.4 Provided that if the nature or amount of any omission or addition relative to the nature or amount of the whole of the works or to any part thereof shall be such that, in the opinion of the Purchaser, the rate or price contained in the contract for any item of the works is, by reason of such omission or addition, rendered unreasonable or inapplicable, then a suitable rate or price shall be agreed upon between the Purchaser and the Bidder/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.

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

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

8.6 If, on certified completion of the whole of the works, it shall be found that a reduction or increase greater than 15 per cent of the sum named in the Letter of Acceptance results from the aggregate effect of all Variation Orders but not from any other cause, the amount of the contract price shall be adjusted by such sum as may be greed between the Bidder/Supplier and the Purchaser or, failing agreement, fixed by the Purchaser having

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regard to all material and relevant factors, including the Bidder/Supplier's site and general overhead costs of the contract.

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

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

8.9 The work shall be carried out as approved by the Purchaser or his authorized representative/s from time to time, keeping in view the overall schedule of completion of the project. The Bidder/Supplier’s job schedule must not disturb or interfere with Purchaser’s or the other Bidder/Supplier’s schedules of day-to-day work. The Purchaser will provide all reasonable assistance for carrying out the jobs.

8.10 *Night work* will be permitted only with prior approval of the Purchaser. The Purchaser may also direct the Bidder/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 Bidder/Supplier at no extra cost. The Bidder/Supplier should employ qualified electricians and wire-men for these facilities. In case of Bidder/Supplier’s failure to provide these facilities and personnel, the Purchaser has the right to arrange such facilities and personnel and to charge the cost thereof to the Bidder/Supplier.

8.11 In order to enable the Purchaser to arrange for insurance of all items received at the site including the items of supply covered under this contract, the Bidder/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 Bidder/Supplier due to which any item does not

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get covered under the insurance of the Purchaser; the cost of such equipment shall be charged to the Bidder/Supplier.

8.12 The Purchaser shall not be liable for or in respect of any damages or compensation payable at law in respect or in consequence of any accident or injury to any workman or other person in the employment of the Bidder/Supplier or any sub-Bidder/Supplier, save and except an accident or injury resulting from any act or default of the Purchaser, his agents, or servants. The Bidder/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.

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

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

8.14 Whenever proper execution of the work under the contract depends on the jobs carried out by some other Bidder/Supplier, the Bidder/Supplier should inspect all such erection and installation jobs and report to the Purchaser regarding any defects or discrepancies. The Bidder/Supplier's failure to do so shall constitute as acceptance of the other Bidder/Supplier's

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installation/jobs as fit and proper for reception of Bidder/Supplier's works except those defects which may develop after execution. Bidder/Supplier should also report any discrepancy between the executed work and the drawings. The Bidder/Supplier shall extend all necessary help/cooperation to other Bidder/Suppliers working at the site in the interest of the work.

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

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

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

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

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

- Plant building ready for installation of equipment/items.

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

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

10. Supply of Tools, Tackles and Materials

10.1 The Bidder/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, Installation, Testing and Commissioning.

11. Protection of Plant

11.1 The Purchaser shall not be responsible or held liable for any damage to person or property consequent upon the use, misuse or failure of any erection tools and equipment used by the Bidder/Supplier or any of Bidder/Supplier's Sub-Bidder/Suppliers even though such tools and equipment may be furnished, rented or loaned to the Bidder/Supplier or any of Bidder/Supplier's Sub-Bidder/Suppliers. The acceptance and/or use of any such tools and equipment by the Bidder/Supplier or Bidder/Supplier's Sub-Bidder/Supplier shall be construed to mean that the Bidder/Supplier accepts all responsibility for and agrees to indemnify and save the Purchaser from any and all claims for said damages resulting from the said use, misuse or failure of such tools and equipments.

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

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

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

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

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

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

12. Unloading, Transportation and Inspection

12.1 The Bidder/Supplier shall be required to unload all the materials/equipment from the carriers, those received at site after Bidder/Supplier's team arrives at site. Bidder/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

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Bidder/Supplier for the equipment being supplied by the Bidder/Supplier. The Bidder/Supplier shall plan in advance, based on the information received from the Purchaser, Bidder/Supplier's requirement of various tools, tackles, jacks, cranes, sleepers etc. required to unload the material/equipment promptly and efficiently. The Bidder/Supplier shall ensure that adequate and all measures necessary to avoid any damage whatsoever to the equipment at the time of unloading are taken.

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

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

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

12.5 All the materials/equipment received by the Purchaser prior to arrival of the Bidder/Supplier at site shall be handed over to the Bidder/Supplier and there upon the Bidder/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:

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

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

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

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

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

13. Storage of Equipment

13.1 The Bidder/Supplier shall be responsible for the proper storage and maintenance of all materials/equipment under Bidder/Supplier's custody. Bidder/Supplier shall take all required steps to carry out frequent inspection of equipment/materials stored as well as erected equipment until the same are taken over by the Purchaser. The following procedure shall apply for the same.

13.2 The Bidder/Supplier’s inspector shall check stored and installed equipment/materials to observe signs of corrosion, damage to protective coating to parts, open ends in pipes, vessels and equipment, insulation resistance of electrical equipment etc. The Bidder/Supplier shall immediately arrange a coat of protective painting whenever required. A record of all observations made on equipment, defects noticed shall be promptly communicated to the Purchaser and Purchaser's advice taken regarding the repairs/rectification. The Bidder/Supplier shall there upon carry out such repairs/ rectification at Bidder/Supplier’s own cost. In case the Bidder/Supplier is not competent to carry out such repairs/ rectification, the Purchaser reserves the right to get this done by other competent agencies at the Bidder/Supplier's responsibility and risk and the entire cost for the same shall be recovered from the Bidder/Supplier's bills.

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

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

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

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

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

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

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

14. Approvals

14.1 The Bidder/Supplier shall obtain the necessary approvals of the Boiler Inspector, Electrical Inspector, Weights & Measures Inspector, Explosive

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Inspector and any other state and local authorities as may be required and the cost of obtaining such approvals shall be included in the contract price.

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

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

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

15. Review & Co-Ordination of Erection Work

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

16. Extension of Time for Completion

16.1 Should the amount of **extra** or **additional work** of any kind or any cause of delay referred to in these conditions, or exceptional adverse climatic conditions, or other special circumstances of any kind whatsoever which may occur, other than through a default of the Bidder/Supplier, be such as fairly to entitle the Bidder/Supplier to an extension of time for the completion of the works, the Purchaser shall determine the amount of such extension and shall notify the Bidder/Supplier accordingly. Provided that the Purchaser is not bound to take into account any extra or additional work or other special circumstances unless the Bidder/Supplier has within **twenty eight days** after such work has been commenced, or such

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circumstances have arisen, or as soon thereafter as is practicable, submitted to the Purchaser full and detailed particulars of any **extension of time** to which he may consider himself entitled in order that such submission may be investigated at the time.

Table 1 List of Drawings required Submission but not limited too	
S. No.	**Drawings**
1	GA drawings for All equipment / items to be supplied.
2	Plant Detail Layout Drawings.
3	Detail P&IDs.
4	Histograms for each utility along with the timing/Process Schedule diagram.
5	General Piping layout drawing for the new piping being done in 3D and 2D format. 3D should include the entire plant detailing.
6	Electrical cable, conduit/ cable tray layout, Single line Diagrams
7	Automation Architecture, including Philosophy of Control and written Automation logic of plant.
8	Instrumentation cable, Single line Diagrams, Local panels, instrument locations, Instrumentation routes, etc to be provided
9	The Civil structural, architect drawings required for preparing civil estimate are to be provided

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9.0. SPECIAL CONDITIONS OF CONTRACT FOR MECHANICAL WORKS

Contents

1. Scope

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

1.1 Supply and installation of structural platforms and tables.

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

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

1.4 Interconnections of services and Electrical with equipment.

1.5 Guide line for expansion work.

1.6 Clean up of work site.

1.7 Supply of all cleaning chemicals and lubricants.

1.8 Testing, commissioning and start-up.

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

1.10 Training of personnel.

1.11 Detailed specifications are given in the subsequent clauses.

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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/Bidder/Supplier's drawings. The Bidder/Supplier shall place the equipment and carry out *final adjustment of the foundations including alignment and dressing of foundation surface, embedding and grouting of anchor bolts and bedplates*. The Bidder/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 Bidder/Supplier has checked the alignment and witnessed by the Purchaser. The Bidder/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 Bidder/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 cantering, scaffolding, staging required not only for proper execution and protection of the said work but also for protection of the surrounding plant and equipment. The Bidder/Supplier shall take out and remove any or all such cantering, scaffolding, staging planking etc., as occasion shall require or when ordered to do so and shall fully reinstate and make good all things disturbed during execution of the work, to the satisfaction of the Purchaser. The Bidder/Supplier shall be paid no additional amount for the above.

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2.2 Structural Platforms and Tables

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

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, built-in-bypass, primary elements for flow measurements, control valves and on-line metering equipment.
- The Bidder/Supplier shall perform necessary internal machining of pipes for installing orifices, flow nozzles, control valves etc. The Bidder/Supplier shall install all pipes, valves and specialties being procured from other sources.

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3.4 Testing of Piping

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

3.5 Other Guidelines

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

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such that no material is left on the inner or on outer surfaces, which will affect the serviceability of the pipes.

- Effective precautions such as capping and sealing shall be taken to protect all pipe ends against ingress of dirt and damage during transit or storage. The outside of the steel pipes (black) shall be painted with two coats of **red oxide paint** or as directed by the Purchaser.

4. Special Instructions and Specifications

4.1 Steam Piping

- Steam piping work can be classified into **two categories**:
  - **High-pressure** steam piping when the working pressure of steam is **more** than **3.5 kg/cm^2.**
  - **Low-pressure** steam piping when the working pressure of steam is **up to 3.5 kg/cm^2.**
- All the pipes and fittings used for high pressure steam piping work should conform to **IBR** and they should be IBR certified and also to be **identified with number and mark** showing that they are tested by the Boiler Inspector and supported with duly **authentic certificates** to this effect. ALL HIGH PRESSURE STEAM PIPES SHALL BE **SEAMLESS** TYPE, with required **SCHEDULE of pipe**.
- The high-pressure steam piping work should also include fabrication and installation of **pressure reducing stations** strictly conforming to **IBR**.
- For low pressure, prevailing laws as per IBR/ISO shall be followed.

4.2 Other Piping

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

5. Insulation of Piping and Equipment

5.1 Cold Insulation of Chilled Water/Glycol /Ammonia Pipeline

- All the chilled water, glycol & ammonia pipelines shall be insulated by **PUF** pipe sections. The insulation shall be carried out in the **following manner**:

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

5.2 Insulation of Chilled Water Tank

- The surfaces shall be **cleaned** with the help of brushes to remove any loose particles.
- A coat of **bitumen** of **85/40** or **85/25** conforming to **IS 702@1.0 kg/m²** shall be applied over the **flooring** and **walkathon sheets** shall be press-laid to act as a **vapour barrier.**
- Bitumen shall then be applied on the walkathon sheets and one side and edges of the insulation slabs to ensure total rate of **2.00 kg/m²** between contacting surfaces. The slabs shall then be fixed in position, making sure that there shall be **no joints between slabs**.
- For **double layers** insulation bitumen shall again be applied on all contacting surfaces to ensure a total rate of **1.5 kg/m²** between contacting surfaces.

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- A coat of bitumen at **1.5 kg/m^2** shall be applied over the insulation surfaces.

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

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

5.4 Aluminium Cladding / Armaflex Cladding

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

6.0 Interconnections of Services

6.1 The Bidder/Supplier shall lay service piping and provide connections with the equipment complying strictly with the equipment manufacturers'

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instructions. The Bidder/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 Bidder/Supplier shall also carry out **electrical connections** for equipment with the control panels including equipment lighting as per the wiring diagrams of the equipment Bidder/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.

7.0 Guidelines for Expansion Work

7.1 Shutdowns

Plant shutdown shall be required for making tapings/ interconnections of the new equipment/ piping, to be installed under expansion, with the pending new equipment/piping in case of delay. These shut downs should be planned carefully well in advance to enable the Purchaser to take suitable actions for minimum shutdown period. The details of shut downs, the numbers and duration should be worked out and intimated to the Purchaser for approval. The 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.

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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 + 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 Bidder/Supplier from the site of work for proper disposal.

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

8.0.Cleaning Chemicals and Lubricants

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

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9.0. Testing, Commissioning and Start-up

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

10.0. Trouble shooting during the trial period

10.1 The Bidder/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 a particular equipment is not working properly or not giving rated output the Bidder/Supplier will furnish a

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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 Bidder/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 Bidder/Supplier, then the charges incurred for the manufacturer's representative visit would be debited to the Bidder/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-operation to such representatives in good spirit and in the interest of the work.

10.6 After satisfactory commissioning and start-up the Bidder/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 Bidder/Supplier's representatives should be present at all times during the running and operation of plant and equipment. During this period the Bidder/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.

11.0 Painting

11.1 All the equipment/ machineries like motors, pumps, HT/ LT panel, transformer, switch boards, starters, junction boxes, isolators, storage tanks, supporting structures, pipe supports and MS/ GI pipes and all

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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 Bidder/Supplier.

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

12.0 Training of Personnel

12.1 The Bidder/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.

13.0 Code of Practice for Painting Service Pipe Lines

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

13.1.1. Ground colour to be applied throughout the length of the pipeline.

13.1.2. Colour bands to be applied near every valve and branch connection as well as in every room near the entry.

13.1.3. The 1st band should be 4" wide and the second band should be 1" wide.

13.1.4. On the 1st band a white arrow to be put to indicate the direction of flow.

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13.1.5.The arrows should be put on the bottom of the pipelines so that the same are visible from below in case of horizontal bank of pipes and on sides in case of vertical bank of pipes.

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

13.2 On Insulated Pipeline with Aluminium Cladding

13.2.1.Ground colour to be applied in a length of 500 mm of the pipe all round near every valve and branch connections as well as in every room near the entry. The complete length of the pipeline should not be painted.

13.2.2.**Colour bands** should be applied in the **middle** of every ground colour strip. The **1st Colour** band should be **4"** wide and the **second** band should be **1"** wide.

13.2.3.On the **1st band** a **white arro** is to be put to indicate the **direction of flow** of the fluid.

13.2.4.The **arrows** should be put on the **bottom** of the pipelines, so that the same are visible from below in case of **horizontal** bank of pipes and on **sides** in case of **vertical** bank of pipes.

13.2.5.The valves should be painted with the same colour as the ground colour.

13.2.6 The **ground colours** and the colours of the **1st** and **2nd** colour **bands** have been indicated on the **enclosed list** for the pipelines carrying various types of fluids and gases. The list also indicates the shade nos. of the colours to be used. In case the exact shade is not available, the nearest possible shade in the same colour may be selected.

13.2.7. Only **synthetic enamel paint** should be used for the painting and band markings on the Pipelines and it should be ensured that the finish should be **glossy**.

13.2.8. Where no colour bands have been recommended, only the ground colour is to be applied as per the above procedure. If only one colour band is recommended the same should be 4" wide and applied on the ground colour. In case of 2 nos. colour bands, the 1st band should be 4" wide and second band 1" wide and should be applied on the ground colour.

13.2.9.To avoid mixing of colours, it is recommended to apply the bands only after the ground colour paint is dry and subsequently to apply the arrow only after the 1st band paint is dry.

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

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Table 2 Colour Code For Pipelines as per BIS 2379-1963				
SN	**Services**	**Ground Colour**	**First Band**	**Second Band**
1	Cooling Water	Sea Green 217	French Blue 166	-
2	Boiler Feed Water		-	-
3	Condensate		Light Brown 410	-
4	Hot Water		Light Brown 410	-
5	Drinking Water		French Blue 166	Signal Red 37
6	Treated Water		Light Orange 557	-
7	Cold Water		French Blue 166	Canary Yellow
8	Untreated Water		White	
9	Compressed Air	Sky Blue 101		
10	Vacuum		Black	
11	Steam	Silver Grey 628		
12	Diesel	Light Brown 410	Brilliant 221	
13	Lubricating Oil		Light Grey 631	
14	Drainage	Black		
15	Ammonia	Signal Red 537		

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Table 3 Testing Pressures for Various Pipelines					
Sr No	**Name**	**Test Pressure kg/cm²**	**Test medium**	**Duration of Test (Hour)**	**Allowable pressure Drop (kg/cm²)**
1	H.P.Steam pipe lines	27	Water	½	0
2	L.P.Steam pipe lines	8	Water	½	0
3	Water pipe lines Soft, Raw, Chilled and Glycol	8	Water	½	0
4	LSHS	16	Water	½	0
5	SS pipes for dairy	6	Water	½	0
6	Air	12	Air	8	0.1
7	*Ammonia pipe lines*				
7a	Suction	16	N2	24	0.2
7b	Discharge	24	N2	24	0.2
7c	Vacuum Test of Ammonia Lines	Absolute Zero	Vacuum	48	NIL
8	Molasses pipe lines	16	Water	1/2	0
Engineer-in-charge shall provide water at available supply point from which the Supplier shall connect temporary piping for testing water.					

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10.0.SPECIAL CONDITIONS OF CONTRACT FOR ELECTRICAL WORKS

Contents

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1. Scope

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

2. Standards

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

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

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

3. Equipment and Accessories Specifications

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

3.2 All materials, fittings and appliances to be supplied by the 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

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with the BS or NEMA specifications, if no such BIS are available. In the absence of any specification, the materials shall be as approved by the Owner or his authorized representative.

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

3.4 You must furnish *makes of bought out items*.

4. Power Cables (HT)

4.1 Specifications as per Section V Sub-Section 6

5. Power Cables (LT)

5.1 Specifications as per Section V Sub-Section 6

6. Control Cables

6.1 Specifications as per Section V Sub-Section 6

7. Cable Trays

7.1 Specifications as per Section V Sub-Section 6

8. Cable Glands

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

9. Cable Connectors

9.1 Cable connectors, lugs/sockets, shall be of copper/Aluminium alloy, suitably tinned, soldering less, crimping type. These shall be suitable for

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the cable being connected and type of function (such as power, control or connection to instruments, etc.)

10.Cable Route Markers

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

11.Cable Indicators

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

12.Pipes for Cables

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

13.Motor Isolators

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

14.Control Junction Box

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

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15.Remote Push Button Stations

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

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

15.3 For outdoor installation suitable canopy to be provided.

16. Erection of Equipment

16.1 The cases containing the equipment (being supplied by the purchaser shall be handed over to the 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. Erection and Testing of Motors

17.1 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

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damage due to negligence etc. the Bidder/Supplier shall be responsible to replace/repair at his own cost.

17.2 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.

17.3 **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.

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

17.5 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.

17.6 **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*.

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

18.Installation of Cable Network

18.1 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*.

19.General Requirements for Handling of Cables

19.1 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 Megger.

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

19.3 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.

19.4 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.

19.5 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.

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

19.7 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.

19.8 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.

19.9 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.

19.10 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,

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interference with structures, foundations, pipeline, future expansion of buildings, etc. should be avoided.

19.11 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.

19.12 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.

19.13 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 done.

20. Laying of Cables (Underground System)

20.1 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.

20.2 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.

20.3 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

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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.

20.4 For all underground cables, route markers should be used

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

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

20.7 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.

20.8 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.

21.Laying of Cables under Floors

21.1 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 %.

21.2 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.

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

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

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22.Laying of Cable in Masonry Trenches

22.1 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 Aluminium saddles/ clamps. More than one tier of cables can be provided in the same trench if the number of cables is more. If required cable trays can also be provided in trenches.

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

23.Laying of Cables in Cable Trays

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

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

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

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

24.Laying of Cables on Building Surface/ Structure

24.1 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.

24.2 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.

24.3 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.

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25.Termination & Jointing of Cables

25.1 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.

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

25.3 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.

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

- Strip off the insulation of the cable end with every precaution, not to severe or damage any strand. All insulation to be removed from the stripped portion of the conductor and ends of the insulation should be clean and square.
- The cable should be kept clean as far as possible before assembling it with the terminal/socket. For preventing the ingress of moisture and possibility of re-oxidation after crimping of the aluminium conductors, the socket should be fitted with corrosion inhibiting compound. This compound should also be applied over the stripped portion of the conductor and the palm surface of socket.
- Correct size and type of socket/ ferrule/ lug should be selected depending on size of conductor and type of connection to be made. Make the crimped joint by suitable crimping tool. If after crimping the

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conductor in socket/ lug, some portion of the conductor remains without insulation the same should be covered sufficiently with PVC tape.

26.Dressing of Cable inside the Equipment

26.1 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.

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

27.Identification of Cables/ Wires/ Cores

27.1 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.

27.2 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.

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

28.1 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.

29.Testing of Cables

29.1 Before energizing, the insulation resistance of every circuit shall be measured from phase to phase and from phase to ground. This requires 3

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measurements if one side is grounded and 6 measurements for 3 phase circuits.

29.2 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.

29.3 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.

29.4 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:

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

29.6 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*.

30.Earthing Network

30.1 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.

31.Earth Pit with Electrode

31.1 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

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(code of practices for Earthing). All earth electrodes shall preferably be driven to a sufficient depth to reach permanent moist soil.

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

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

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

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

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

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

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

32.5 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.

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

32.7 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.

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

32.9 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.

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

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

33. 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 2” SS pipes located at convenient points. Level transmitters shall normally be flanged for direct mounting in the tank / equipment.
- Temperature / Pressure Stub on equipment and pipelines shall preferably be of same material or higher grade of material
- Suitable Root Valves shall be provided with every tap-off point.
- Installation of Pressure and Differential Pressure Transmitter shall be as per standard engineering practice incorporating Drain Valves, Isolation Valves, 2/3-Valve Manifold, Syphon etc. as applicable.

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- For instrument air, SS. Pipe shall be used for air distribution from Battery Limit to the designated point of use. Take-off connections to instruments / actuators shall be with suitable size nipples and shut-off valves. Individual air supply shall be provided by 6 mm OD PU tube through an isolating needle valve and air filter regulator.
- Perforated Aluminium Trays (minimum 2 mm thick) shall be utilized for routing of signal tubing / cables in field. All cables / tubes in the supporting trays / channels shall be tagged properly. The loading of the cable trays shall not exceed 60 % of the available space. Proper gap between the electrical trays, as per the voltage level, shall be maintained in the cable tray layout. Tray numbers shall be provided at suitable intervals.
- Rigid and flexible conduits along with necessary fittings shall be used for cable laying from instrument to JB or instrument to trays etc.

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

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

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Table 3 Pro forma for motor testing		
SN	**Test**	**Report**
1	**Name plate details**	
A	Voltage	
B	HP / KW	
C	Mounting	
D	Current	
E	RPM	
F	Frame size	
G	Make	
H	Sr No	
I	Others	
2	**Insulation test (before cable connection)**	
A	Between Phase and Earth (Mega Ohms)	
B	Between each Phase (Mega Ohms)	
3	**Insulation test (after cable connection)**	
A	Between Phase and Earth (Mega Ohms)	
B	Between each Phase (Mega Ohms)	
4	**No load current**	
A	R Phase Amps	
B	Y Phase Amps	
C	B Phase Amps	
5	**Full load current**	
A	R Phase Amps	
B	Y Phase Amps	
C	B Phase Amps	
6	**Temperature rise after 4 hours run**	
A	On no load degree C	
B	On full load degree C	
C	Ambient temperature during test degree C	
7	**Operation of thermal overload relay**	
A	At normal Full Load current of motor	
B	At twice Full Load current of motor trips in seconds	
Signature and seal of Engineer-in-charge of TCMPF Ltd.,		Signature and seal of Engineer-in-charge of Bidder/Supplier

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

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Table 5 Recommended Cables Sizes For Industrial Wiring				
3 Ø 415 V Motor HP	**Aluminium Conductor Cable Size (in mm²)**			
	Rotor Resistance Starter		**Star Delta Starter**	
	Supply side	**Motor Side (2 Cables)**	**Supply side**	**Motor Side (2 Cables)**
10	6	6	6	4
15	10	10	10	4
20	16	16	16	6
25, 30	25	25	25	10
40	35	35	35	16
50	50	50	50	25
60	70	70	70	35
75	95	95	95	50
100	120	120	120	70
125	150	150	150	95
150	225	225	225	120
180	300	300	300	150
215	300	300	300	185
For **DOL Starter up to 10 HP** Motor, **4 mm²** cables should be used.				

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

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11.TECHNICAL SPECIFICATION FOR 6 TLPD CAPACITY ICE CREAM PLANT AND 10 TLPD CAPACITY FERMENTED PRODUCTS PLANT

1. BRIEF DESCRIPTION

The objective of the project is establishing state-of-art 6 TLPD Capacity Ice Cream Plant and 10 TLPD Fermented product plant at Tiruchirapalli Dairy with modern and energy efficient technology, thereby giving optimum value of milk to milk producers and supply of quality products to consumers.

1.1 DESIGN BASIS OF THE PLANT:

The essential sections of the Ice cream and Fermented product plant are:

- Raw / pasteurized Milk, Cream receiving section.
- Mix Preparation and processing of Ice cream mix and storing for ageing.
- Continuous Ice cream freezing and packing in different variants.
- Blast freezing of the packed Ice cream and storage in Deep freezer.
- Curd milk processing, storage, Inoculation, filling in cups and sachets.
- Incubation, Blast freezing and storage of the Curd.
- Lassi and Butter milk preparation, packing and storing.

The plant shall be designed with the following salient features which shall be at par with International Standards:

- ✓ The plant should be designed with latest technology with state of art for design.
- ✓ Hygienic design of the plant to meet stringent Food laws
- ✓ Energy efficient equipments and automated equipments.
- ✓ Low processing cost & minimum losses.

The Tender comprises of design, engineering, supply, installation, testing and commissioning of Ice cream plant of capacity 6 TLPD and Fermented Product plant of capacity 10 TLPD. The design and layout of the facilities, selection of equipment and services, methodology of plant execution, testing and commissioning shall be carefully planned and executed with the knowledge of normal operational & processing routines of Milk Processing plant.

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

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

1.2.REQUIREMENTS OF THE PROCESS PLANT:

Plant basis and Utility basis:

Plant operations	24 hours a day
Electricity Charges	Rs. 8.5/KW unit
Steam Charges	Rs. 4 / Kg of Steam
Source of Water	River
Building	New building.
Raw / Processed Milk	Received through lines from Dairy.

1.3.WORKING CONDITIONS:

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

1.4.PROJECT TIME SCALE:

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

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1.5.SITE CONDITIONS:

Altitude above Mean Sea Level (Meters): Approx. 88 m

Average Ambient Temperature (Deg C) : 28 - 35 max

Minimum Ambient Temperature (Deg C) : Around 24

Relative Humidity (%) : 73

1.6.SITE ADDRESS:

The plant shall be installed in the Tiruchirapalli Dairy, Tiruchirapalli, TamilNadu.

1.7.INSTRUCTIONS TO BIDDER

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

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

1.7.3 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

2.0 BID STRUCTURE OF TECHNICAL SECTION

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

Sub – Section	Subject
1	Introduction
2	Instruction to the Bidders
3	Design Basis
4	Responsibilities
5	Project Management
6	Scope of Supply and Technical Specifications (Tender package)
7	List of Preferred Makes of Major Bought Out Items

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8	Battery Limits
9	Deviations from Technical Requirements
10	Optional Items
11	Drawings, data and Documentation Submission

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

SUB - SECTION 1 INTRODUCTION

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

SUB - SECTION 2 INSTRUCTIONS TO THE BIDDER

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

SUB - SECTION 3 DESIGN BASIS

Preamble

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

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

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

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SUB – SECTION 4 RESPONSIBILITIES

Responsibilities of the Bidder

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

Responsibilities of Client

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

SUB – SECTION 5 PROJECT MANAGEMENT

- **Time Schedule**

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

- **Management Team**

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

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

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

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.

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

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

SUB – SECTION 8 BATTERY LIMITS

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

SUB – SECTION 9 DEVIATIONS

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

SUB – SECTION 10 OPTIONAL ITEMS

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

SUB – SECTION 11 DRAWINGS, DATA & DOCUMENTS SUBMISSION

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

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3.0 DESIGN BASIS:

3.1.INTRODUCTION :

TCMPF Ltd is setting up a 6000 LPD Capacity Ice Cream Plant and 10 TLPD Fermented product plant at Tiruchirapalli Dairy, Tiruchirapalli, Tamilnadu.

3.2.Scope

The Tender comprises of Design, Supply, Erection, Installation, Commissioning and Testing of 6 TLPD Capacity Ice Cream Plant and 10 TLPD Fermented product plant.

The bidder has to design the Ice cream and Fermented product processing plant of the required capacity. Milk Reception, processing, Ice Cream production and packing plant having ice cream production capacity of 6 KL per day, and curd milk processing, Buttermilk and Lassi preparation and packing of capacity 10 TLPD, storage, mechanical structures, utilities, automation required for the process. The available space should be effectively utilized with minimum ground works. The bidder should design the plant with latest processing technology, the design should be energy efficient with minimum handling losses.

The bidder has to prepare necessary drawings for obtaining Factory License, Consent to Establish/ Operate from TNPCB, Explosives License etc as per state and central statutory requirements.

3.3.The scope of work includes:

3.3.1.Ice cream plant:

a) Standardized pasteurized Milk / Cream will be received through pipe lines from old dairy plant and stored in milk tanks and cream tanks respectively. The pasteurized milk in required quantity shall be transferred from the milk tanks to ice cream mix preparation. Left over milk will be sent back to old plant for re-pasteurization.

b) Ice cream mix preparation using pasteurized milk, milk powder, sugar and cream.

c) Ice cream manufacturing, packing in cups & cones/ family/commercial packs.

3.3.2.Fermented Product Plant

a) The Standardized pasteurized Milk / Cream will be received through pipe lines from old dairy plant and stored in milk tanks and cream

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tanks respectively. The pasteurized milk in required quantity shall be transferred from the milk tanks to fermented product preparation. Left over milk will be sent back to old plant for re-pasteurization.

b) The prepared fermented products Curd, Butter milk, Lassi will be packed, incubated, and stored in cold rooms.

d) CIP arrangement for various equipment of ice cream plant and fermented plant including, milk reception line, milk tanks, milk reconstitution equipment, mix recirculation cum storage tanks, mix pasteurizer, homogenizer, ageing tanks, rinse milk recovery tank, flavor mixing tanks, continuous freezers, fruit & nuts feeders, cup & cone filling machines, hardening tunnel, inoculation tanks, curd pasteurizer, settling tanks, pouch and cup filling machines.

e) Process utilities (CWS/CWR/Steam/RW/SW) for the equipment of ice cream plant from the service block as per battery limit.

f) Compressed air generation system with distribution lines up to the consumption points.

g) Condensate collection, storage & arrangement to transfer to boiler feed water tank in the boiler house.

h) Process & CIP MCCs including all cabling, electricals etc.

I) Supply & commissioning of Electrical distribution system with MCCs, power & control/instrumentation cables, cable trays (GI & SS), SS drop conduits pipe in process section, earthing, isolators, RCPs, insulating elastomer mats etc.

The Mechanical scope comprise of following:

1. Design, engineering, supply of Milk, Cream Reception & Mix Processing, Ice Cream Making & Packing Plant, fermented product preparation, packing, storing with all accessories and utilities piping, MCCs and cabling etc.

2. Labour charges and consumables for installation, testing and commissioning of Milk, Cream Reception & Mix Processing and Ice Cream

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Making & Packing Plant, fermented product preparation, packing, storing with all accessories and utilities piping, MCCs and cabling etc.

4.0 BASIS OF DESIGN:

A. Ice Cream Plant

4.1. Pasteurized Milk & Pasteurized Cream Reception

Pasteurized standardized chilled milk (4.5% Fat and 8.5% SNF) shall be received from the existing dairy plant via pipe lines. One number of 10 KLPH milk reception line shall be provided for reception and storing of pasteurized standardized milk.

Milk Tank 10 KL x 1 No. shall be provided on civil foundation having space for installation of one more 10 KL Tank in future.

The pasteurized cream storage tank shall be provided with chilled water circulation facility to maintain the temperature. Magnetic Flow meters shall be provided in the milk and cream transfer lines from old dairy plant to new plant and further to ice cream mix preparation section.

4.2. Ice Cream Making & Packing

The production capacity of various flavours of Ice cream making and packing facility shall be 6000 L per day in cups & cones, Tub, family and bulk packs shall be provided in the new plant. Semi-frozen ice cream coming out of continuous ice cream freezers would be filled in cups/cones, Tubs and family/bulk packs. The filled ice cream cups would be packed in perforated cartons and cones arranged vertically in trays before sending them to hardening tunnel / hardening room.

4.3. Ice Cream Mix Preparation

Initially predetermined quantity of pasteurized milk at 6 – 8 deg C & cream at 8 – 10^{o} C shall be transferred from storage tanks to ice cream mix preparation (mixing-cum-recirculation) tanks. Ice cream mix

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preparation tank 2 KL x 2 Nos and Kulfi preparation tank 1KL x1 no. shall be provided. Out of 2 nos., one tank can be used for sugar syrup preparation as per requirement. Space shall be provided for addition of one more 1 KL mix preparation tank in future.

The milk shall be recirculated through PHE heater (Δt 25° C) in mixing-cum- recirculation tanks. Once the temperature of milk reaches around 40° C, PHE will be bypassed and skimmed milk powder in pre-weighed quantity will be added through high shear mixer and circulated the mix for approximately 15 minutes. High shear mixer with shear pump 1000Kgs/Hr x 1 No. shall be provided for addition of pre- weighed quantity of SMP and sugar to prepare ice cream mix as per the recipe.

Thereafter, the mix will be heated to 55 – 60° C by circulating through the PHE heater & mix preparation tanks for required duration while adding predetermined quantity of sugar, stabilizer and emulsifier etc. through the shear pump hopper. Cream dosing will be done in the mix preparation tanks to achieve desired percentage of fat in the mix. Final mix TS would be up to 40 - 45%. The cream Pump (lobe type) would be used to transfer cream from cream storage tank to ice cream mix preparation tanks. The entire operation from milk transfer to readiness of final mix at 55 – 60° C (with required retention) should be completed within 50-55 minutes for continuous processing of mix.

Ice cream mix pasteurizer of 1 KLPH x 1 No. shall be provided along with cooling tower and homogenizer. Ice cream mix shall be pasteurized at 90 deg C with a holding time of 40 Sec., homogenized, chilled and transferred to ice cream mix ageing tanks.

Ageing tank 2 KL x 4 Nos with chilled water circulation facility shall be provided. One of the tanks shall be used for sugar syrup storage tank if required in future. Space shall be provided for addition of one more ageing tank in future.

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Two numbers of aged Ice cream mix transfer line shall be provided. In addition to this, one number of sugar syrup transfer line shall be provided from preparation section to ice cream freezing & packing section.

The ice cream mix after ageing shall be taken in smaller batches into flavour mixing tanks for thorough mixing of chocolate slurry/ flavour / colours etc. This mix would then be used for making ice cream in continuous ice cream freezers. The semi frozen ice cream coming out of the continuous freezer would be packed in cups/cones, tubs in the automatic filling machines connected to freezers or family/bulk packs manually. Also, it should be possible to add fresh fruits, dry fruits & ripple to the semi frozen ice cream as per the recipe before sending it for cup/cone/ family/ bulk packing.

The packed Ice Cream would then be hardened in Hardening Room before storing into deep freeze room. Suitable size Hardening Room shall be provided.

4.4. Processing and Ageing of Ice Cream Mix

The ice cream mix at 50^{o} C shall be pasteurised at 90^{o} C in a PHE with flexibility in holding time of 20 seconds & 40 seconds and homogenised at 65 - 70^{o} C after regeneration in pasteurizer and finally cooling down to 5^{o} C (in two stage cooling – first by well water and finally by chilled water) before sending it to ice cream mix ageing tanks.

The ice cream mix would be homogenized at a pressure of 200 Bar and 50 bar for first stage and second stage respectively for breaking and uniform distribution of fat globules below 2 microns in the mix. Homogenization efficiency would be measured as per (Nizo) index should not be less than 90.

After processing, the mix is transferred to mix ageing tanks of capacity 2 KL x 4 nos for ageing of mix at temperature below 6^{o} C. The mix is then aged for at least four hours and usually overnight. This allows time for

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the fat to cool down and crystallize, and for the proteins and polysaccharides to fully hydrate. Ageing of mix is required to improve whipping qualities of mix body & texture of ice cream. Ageing is performed in dimpled jacketed and insulated storage tanks.

4.5. Ice Cream Making (Flavour Mixing and Transfer to Freezers)

The aged mix from ageing tanks shall be transferred in small batches to flavour mixing tanks where chocolate slurry/flavours/colours would be added manually to it as per the requirement of recipe and thoroughly mixed. There shall be 4 nos. of flavour mixing tanks of 600 L should be connected to freezers through flow plate so that any tank can be used for any freezer. Space and suitable arrangement in flow plate shall be provided for installation of 1 no. of 600 L of flavour mixing tank in future.

The mix is then fed through disc type simplex SS strainers (provided in feed line between each set of flavour mixing tank and freezer) to the continuous ice cream freezers for its freezing. The fruit, nuts & ripple would be added on line (as per the requirement of recipe) to the semi frozen ice cream coming out of continuous ice cream freezers.

There shall be interconnectivity between ice cream freezers and flavour mixing tanks so that in case of exigency there is possibility of cross interconnection of freezer & flavour mixing tank through flow plate arrangement.

After the particulates (fruits, nuts & ripple) have been added, the ice cream is packed and placed into hardening room.

One lot of SS tables for manual cartooning and transfer/conveying of filled cartons shall be supplied and installed as a part of this contract.

2 nos. x 600 L continuous ice cream freezers shall be provided - for cone filling machine, cup filling machine, bulk filling.

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Two numbers of rotary cup & cone filling machine 1 x 6000 CPH and 1 x 3000 CPH respectively with ripple pump station, butter scotch / nuts filling and chocolate pencil filler shall be provided. Operation of chocolate pencil filler will be optional.

A automatic candy line of capacity 3000 CPH with two sets of mould, conveyor and wrapping machine shall be provided.

Space shall be provided for addition of one line of ice cream continuous freezer of 600 LPH freezer and Extrusion filling line of 3000 to 4000 Pieces per Hour with tunnel freezer in future.

One no. of Tub filling machine of 1200 TPH shall be provided. Common machine shall be used for Bulk and Tub packing.

2 nos. of Indigenous Fruit and nut feeder suitable for ice cream cup filling and bulk filling machines shall be provided.
One no. of 300 L chocolate preparation tank shall be provided. Jacket for hot water heating arrangement shall be provided in the preparation tank. Ice cream reprocessing and reworking tank of capacity 300 L shall be provided.

Ice cream thawing tank (hot water tank) suitable for two 40 L milk cans shall be provided.

1nos. of Offline dry code printing machine suitable for printing on lids of cups & cones shall be provided.

1no. Ink jet printing machine with conveyor shall be provided for printing over family and bulk cartons before bulk filling line.

Movement of Packed cartons from ante room to deep freeze shall be manual.

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Empty Crates shall be cleaned manually in crate washing area. Crate washing trough will be provided. Steam water mixing battery will be provided in the crate washing area to take hot water in the washing trough.

Level marking shall be provided in the flavour mixing tanks. Level transmitter and indicator shall be provided in the milk silos, cream storage tanks, ice cream mix preparation tanks, ice cream mix ageing tanks

For automation, level transmitters, level switches, flow meters of volumetric type shall be used. All the tanks shall have temperature transmitters and provision to have fix the level transmitter in future

1 No. Metal detectors installed on packing conveyor. Metal detectors shall be positioned after the secondary carton packing. Metal detector shall not be used for packed cone carton.

B Fermented Plant

a) Curd

4.6. Reconstitution and Batch Preparing

The processed milk from Dairy plant shall be received through milk lines and stored in the storage tank of 5 KL capacity. There shall be one magnetic flow meter installed in the milk reception line of fermented section. The Butter milk preparation section consisting of shear pump, PHE shall be used for preparing the curd milk. The prepared milk is stored in the storage tank of capacity 5 KL for further processing.

4.7. Milk Process section

The prepared milk from storage is then taken for processing as per the required product production plan. The milk is homogenized and pasteurized using a 2 KLPH Process line constitute of 2 KLPH Pasteurizer, reconstitution with high shear mixer and shear pump of capacity 0.5 TPH has to be provided with suitable chiller. The pasteurizer should be

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designed in such a way that the milk should be heated to 90 C and holding it for 20 minutes (The holding coil should be designed in such a way that it can also hold only for 10 minutes also).The pasteurizer can also be used as an HTST pasteurizer for flavored milk. Additional holding of 15 sec also may be provided. The milk for curd should be pasteurized and cooled in different cycles as mentioned below.

4 ^{0} C to 90 ^{0} C for 20 minute/10 minutes and 40 ^{0} C

4 ^{0} C to 90 ^{0} C for 20 minutes/10 minutes and cooled to 40^{0} C and storage

The complete process should be automated and controlled through SCADA. The product push and water push should be done with only pasteurized water and provision should be given in the pasteurizer skid.

All the above equipment should be provided with auto CIP arrangements.

4.8. Curd Milk preparation and packing section

The milk stored in STD silo at 4 degree C is preheated using a 2 KLPH PHE with necessary automated heating arrangements through steam. The milk at 45 degree C is fed to the two 500 Liter capacity culture tank where mixing of culture is carried out. The inoculated milk is fed to Cup filling machine of capacity 2500 CPH for packing in cups. The culture tank should have preheating of milk arrangement through steam with necessary tube in tube heating controls. In certain cases the milk will be directly fed to the tank from pasteuriser and inoculated at 45 C in the culture tank.

The milk from pre heater is connected to two 1 KL inoculation tanks for adding culture and connected to a 5000 sachets/hour sachet packing machine to pack in sachets. The incubation tanks should have preheating of milk arrangement through steam with necessary tube in tube heating controls. Smaller quantity of STD milk will be directly fed to the tank and preheated to 45 C in the incubation tanks. There should be facility to pack inoculated milk in both sachet and cups simultaneously. Rotary curd cup filling machine shall be 2400 CPH with change parts for 3 Sizes and shall

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have online inkjet printer & exit conveyor. There should not be any collar fitting and plug valves in the culture inoculated lines. All the lines are TIG welded .There should be facilities like platforms for adding culture in the inoculation tank

Trolley with tray (6nos.) shall be provided for transfer of curd cups to incubation room

Trolley: Size without handle: 1630 mm L x 480 mm W x 730 mm depth

Tray: Size without handle: 720 mm L x 410 mm W x 25 mm height

MOC: SS 304 with perforated trays

All the above equipment should be provided with auto CIP arrangements.

b) Butter milk Section

The pre heated STD milk from 2 KLPH pre heater is fed to a 2 KL inoculation cum incubation tank for adding culture and preparing curd for butter milk. A 2 KL vertical storage tank to store pasteurized water is to be provided and arrangements for mixing the pasteurized water with the curd in the incubation tank through shear pump of 2 KLPH capacity is to be provided. The necessary arrangements to add pasty masala components in the tank are also to be provided.

Thermiser should be provided with suitable chiller. All the above equipment should be provided with auto CIP arrangements.

c) Lassi Section

The STD milk from the pre heater at 45 C is fed to the 2 KL incubation tank for adding culture. A 500 KL capacity sugar syrup preparation and mixing tank with necessary heating arrangements through steam is to be provided. The syrup from this tank is mixed in the incubation tank and uniform mixing is done through Turbo blender of capacity 500 Kgs/Hr and shear pump. A in-line metal detector and bucket type filters shall be installed in the sugar syrup feeding line. The prepared Lassi is stored and sent to packing machine.

All the above equipments should be provided with auto CIP arrangements.

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Flow plates shall be used in all the places where three way valve operations are required.

d) Crate washing:

Empty Crates shall be cleaned through a Crate washer of capacity 600 CPH in crate washing area. Crate washing trough shall be provided. Steam water mixing battery will be provided in the crate washing area to take hot water in the washing trough.

C AUTOMATIC CIP SYSTEM (SINGLE CKT)

The CIP system is used for Ice cream and Fermented product equipments cleaning.

The concentrated acid and lye solution will be received and be unloaded in concentrated acid and lye service tanks of 500 Litres capacity in the CIP system. The chemical transfer pump shall be pneumatically operated double diaphragm type (2 nos.) in SS 316. SS 316 tray shall be provided below concentrated acid & lye tanks, chemical unloading and transfer pumps. Caustic flakes dissolving provision shall be provided with agitator in case the liquid lye is not available in the service tank.

The CIP kitchen shall have 3KL x 4 tank base design with PHE type CIP heater arrangement. All tanks shall have level switches & temperature transmitter, CIP return line shall have conductivity transmitter, flow switch and temperature transmitter. Acid & Lye solution tank will have conductivity transmitter also. CIP return pumps shall be provided at Mix preparation section, Mix ageing section & flavour mixing tanks.

The plant shall have CIP facility for milk reception line, Ice cream processing lines, ageing and flavour mixing tanks, reconstitution and batch preparing line, Milk process line, curd milk preparation and packing lines, butter milk line and Lassi milk line.

Cleaning / Controls / Programme

The CIP system shall generally comprise the following sequence.

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- Rinse with recuperation water
- Hot detergent circulation
- Hot/Cold water rinse
- Hot acid circulation
- Hot/Cold water rinse
- Hot water sterilization etc.

All the operations are to be made from the main control panel. Bypassing of any operation after detergent circulation from the above sequence of program shall be made possible through main control room.

At the end of detergent and acid cleaning, the solution shall be recovered with the help of sensors provided in the return line and sub-standard solution shall be automatically diverted to drain.

Intermediate rinse shall be with plain hot/cold water and this shall be recovered and re-used after acid circulation.

The alkaline/acidic traces shall be removed with the help of cold/hot water. Hot water rinse shall ensure satisfactory cleaning of the lines and equipment. Final rinse water shall be recovered in the recuperation tank.

Concentration of detergent and acid shall be maintained with the help of an automatic dosing system equipped with necessary conductivity probes.

The completion of CIP of every circuit shall be signalled with an audio-visual alarm in the main panel.

The temperature & concentration of cleaning solution will be continuously monitored and corrected automatically. In case of non-compliance of any of the parameters, the sequence shall remain suspended for such time and resume to “NORMAL” when corrected.

The route for CIP circulation shall be pre-programmed. The solution spray in silos/tanks shall be through spray ball or rotary jets. CIP solution shall be returned back to CIP tanks through self-priming CIP return pumps in each route.

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If the program execution stops at particular step due to power failure or some fault, then commencement of program execution, after rectification, should be from the same step where the program was terminated.

Sequence of operation & detergent/acid consumption will be automatically recorded in the HMI and shall be recalled on the screen on demand.

D. Cold Rooms with Package Type Freon Unit

1. Ice cream Hardening Chamber. Temp -25 degree C size. 7m x 3.5m x 4m Capacity 3 KL
2. Ice cream Deep freezer Temp -25 degree C Size. 18m x 8.25x 4m Capacity 30 KL
3. Curd Blast cooler Temp 10 degree C size. 5m x 4m x 4m Capacity.3.5 MT
4. Product cold room Temp 5 degree C size. 10m x 5.25m x 4m Capacity 15 MT

The cold rooms shall be maintained at the desired temperatures. This shall be achieved by installing suitable independent split type packaged Air cooled refrigeration (condensing) unit with matching evaporator suitable for direct expansion using **R-404 A** refrigerant. The Package Unit should equipped with two units of suitable capacity **One Working + One Standby** for the cold stores. And the above units should be able to maintain the desired Room Temperature.

Package type Air cooled condensing unit shall be provided by specialist with minimum of five years experience in Design, Installation & Service of these Units. The manufacturer shall furnish a warranty on their performance. All the units shall have *identical design and construction* so as to minimize the cost on inventory.

The Air-cooled condensing unit shall be suitable for outdoor installation and shall be designed for versatility & simplicity for easy installation, operation and maintenance. The design of the unit shall incorporate high-pressure controls to eliminate leaks, particularly in the condensing coil and the system piping. The housing cabinet shall be made out of superior material for strength and corrosion protection. The unit to have suitably designed Air cooled condensers for refrigerant condensing temperature not exceeding +50 °C.

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The compressor shall be semi-hermetically sealed reciprocating type. The compressor shall be spring mounted with vibration eliminators. A weather-proof junction box with motor leads terminating for single point wiring.

The motors shall be thermally protected and the ball bearings permanently lubricated. The Air-cooled condensing unit shall be suitable for 415V 3 phases, 50 cycles operation and must be able to operate satisfactorily in the voltage range from 380 V to 440 V.

The unit shall comprise of the following features:

1. Semi-hermetically sealed compressor.
2. Weather proof electrical power distribution panel with access doors. Control panel shall be equipped with all safeties and automatic controls. The panel must have suitable overvoltage and under voltage trip relay so as to trip the incomer supply to the panel when the voltage exceeds or drops below a set voltage. The incomer switchgear of the panel to be selected suitably. The panel shall comprise of starters & protective gears fully wired for single point wiring. Facility also shall be provided to monitor the operational status/alarm conditions of the condensing units.
3. High pressure, low pressure, oil pressure cut–outs.
4. Necessary isolating valves at the inlet and outlet of each equipment such as compressor, condenser, receiver, evaporator etc. Discharge/suction lines vibration eliminators/ mufflers.
5. Crank case heater (automatic operation)
6. Liquid line solenoid valves with filter and drier and sight glass.
7. Suction line accumulators.
8. Oil separator with Non Return valve.
9. Liquid receiver along with inlet/outlet service valve.
10. Real Time based automatic defrost arrangement.
11. Room thermostat for automatic operation of evaporators.

The package type condensing units shall be installed adjacent to Cold rooms or on the roof top as per site condition. The units shall be installed such that the length of piping between the condensing units and evaporators are minimum.

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The cold store (insulation) shall be of prefab panels in an area with RCC roofing. Suitable arrangements including necessary structural framework shall have to be made by the refrigeration contractor for suspending the evaporator units. Suspension members for the units shall incorporate a thermal break within the thickness of the insulation. The detailed arrangement and supply of this is the responsibility of the Bidder, subject to approval, who shall co-operate with the insulation fixer in installing these items. Suspend the evaporators, level and lock suspension nuts.

Evaporators or Forced draft cooler is of direct dry expansion type evaporator using R-404A refrigerant. The evaporators is used to maintain the desired temperature of cold stores & pre cooling room etc. with the help of high velocity fans which shall ensure proper and complete circulation of air within the cold stores & pre-cooling room etc. The unit shall work in conjunction with respective Air cooled packaged type condensing unit located outside,

The evaporator and respective condensing unit shall work automatically based on room temperature with the help of thermostat of appropriate range and type.

Construction:

Forced draft coolers shall be supplied by a specialist with minimum of five years experience in Design, Installation & Service of these Units as fully assembled units. The manufacturer shall warrant performance. HACCP hygiene certificated Units shall be provided.

Cooling coils shall be made of copper tubes with Aluminum fins.

Parallel coils shall be supplied with refrigerant liquid through fixed metering orifices from the liquid supply header to ensure even distribution. Defrost Arrangement Shall be with Electrical Heaters for Coil & Tray.

The casing shall be of Corrosion-resistant aluminium alloy Al Mg , Powder Coated. Refrigerant coils piping shall be fixed to substantial bearers. The manufacturer is responsible, through the Contractor, to ensure that no rattles occur when the unit is operating.

Induced draft fans shall be axial type. Belt drives are not acceptable. Fan & motor assemblies shall be resiliently mounted and effectively guarded.

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The drain tray shall be of Aluminium-magnesium alloy, powder-coated , thermally decoupled, polyamide condensation water drain, G thread with flat sealing compliant, Inner and outer trays hinged and removable for easy cleaning. The drain tray shall be suitably insulated. The outlet shall be vertical.

The evaporators required shall be of ceiling suspended specifically intended to operate with suitable refrigerant in conjunction with the respective condensing unit located outside (preferably over the terrace). Fixing of the unit shall be by adequate number of suspension rods attached to substantial lugs on the casing.

To each evaporator supply and install a Thermostatic Expansion Valve as per the functional requirement and shall ensure proper oil return.

Piping and electrical services penetrating the wall shall be designed and installed:

- To avoid forming a thermal bridge from outside to inside that could cause sweating on the outside.
- To prevent infiltration of air.
- To preserve the integrity of the insulation vapour barrier.

UTILITY

5. COMPRESSED AIR SYSTEM

Compressed air system shall supply oil free compressed air to Ice cream plant and fermented product plant which is part of scope of tender. Two number of Screw type non-lubricated air compressor of capacity 300 CFM one working and one spare as per BOQ for the generation of oil & moisture free air suitable for instruments. The compressor shall have control system for capacity control and for performance. The compressor shall have advanced control system for capacity control and for performance monitoring with VFD operated high efficiency motor. Cooling air duct would be required for proper functioning of the air compressor. The hot air exhaust duct (as recommended by OEM) shall be fabricated from GI sheet material and shall be considered in the scope of supply. The ducting for each compressor would be independent.Necessary oil filter is to be provided for oil free air.

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Integrated/standalone refrigerated Air Dryers of matching the capacity of the air compressor for ensuring the quality of air suitable for instrumentation, a common MS air receiver (capacity and qty as per BOQ) with automatic moisture separator and automatic drain valve is included in the scope of work. The scope also includes additional receivers near the major consumption areas as required.

The compressed air shall be distributed up to various sections as per battery limits. The headers and pipelines from receiver to all area shall be of SS-304 (with 1.6 mm thickness) with isolation diaphragm valves for servicing. Flexible piping shall be used for maximum 1.5 meter.

Necessary valves, piping, controls and instrument Pressure/ temperature sensors etc. shall be in scope of supply. Every branch should have the separate valves to control the airflow.

The distribution network for compressed air shall be designed in such a way so as to maintain uniform required pressure at all consumption points to meet the flow rate without any hammering in pipeline. Preferably ring main system may be considered. The main header size will be calculated considering future expansions also.

5.1. Specifications

5.1.1 Screw, Lubricating oil free Type Air compressor with Frequency Drive with integrated/Standalone Refrigerated Type Air Dryer

Quantity : As per BOQ

Capacity : As per BOQ

Type: Screw Type, lubricating Oil Free, Air- cooled design

Controls : Suitable for automatic operation with variable frequency drive & necessary Instruments for energy saving.

Accessories : Pre - filter, after cooler, VFD and control panel, ducts for hot air and fresh air, terminal filters, bird guard etc.

The compressor should have all controls for auto operation and data transmission of air Consumption and pressure monitoring to DCS.

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5.1.2 Air Receiver (SS)

Capacity : As per BOQ

Quantity : As per BOQ

Material : Stainless-steel

Type : Vertical cylindrical

Mounting : Self-supporting

Accessories : Inlet & outlet nozzles, auto drain valves, pressure transmitter, pressure & temp gauge, safety valves, condensate drain pipe etc.

5.1.3 Compressed air distribution piping & supports

Quantity : 1 Lot

Complete air distribution shall be through SS 304 pipe line From main line, a line should be tapped for particular sections and accessories considered are isolating valve, air filter regulator and distribution plate. From distribution plate, nylon tube should be provided to connect to the utility points.

Instruments tubing more than 1 meters should be laid in protective flexible hose.

6.0 WATER TREATMENT AND DISTRIBUTION SYSTEM

The raw water and soft water shall be supplied from the Dairy plant to the OH tank in the top of the Ice cream block. The RO Water Treatment Plant (WTP) of 1 KLPH capacity is to be designed, supplied, erected and commissioned for feeding RO water to the Ice cream and fermented production area for various applications..

Water treatment plant shall include following:

- R.O water hydro flow system
- Raw and soft water distribution piping

Raw water from over head tank shall be used mainly for floor cleaning and general purpose. Soft water shall be used for the entire plant process, milk/product pushes/purges, tanker flushing CIP & hot water generation for milk pasteurizers, etc. RO water shall be used for preparation of reconstituted milk, Butter milk etc,.

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The bidder has to supply RO plant of 1 KLPH capacity to carry out the treatment of the raw water and necessary SS 304 storage tanks of 5KL capacity is to be supplied for storing and distribution

Pumping of filtered raw water to distribution of raw/ soft water through hydro flow/ pressure pumping systems up to various utility points included in the scope including headers up to utilities along with necessary MCC & other electrical/automation is included in the scope of the work. Incomer of this MCC shall be fed power from Sub - PCC supplied by bidder. Refer electrical scheme given.

Water distribution piping up to all the consumption points for the new plant along with isolation valves is included in the scope of work. Water distribution header sizes shall be designed for Ice cream plant, fermented plant and related Utilities and other miscellaneous/general use. The header shall be designed keeping in mind the future requirements of the new plant also. The distribution network for raw/ soft water shall be designed in such a way so as to maintain uniform required pressure at all consumption points to meet the flow rate without any water hammering. Ring main system (or additional diaphragm tank) may be considered if necessary.

All water line drops (for Raw and soft) from headers for distribution in reception & process area and other areas shall be of SS-304 with manual isolation valves.

Necessary valves, piping, controls and instrument including flow meters etc. for the entire Water distribution system shall be in scope of supply. All the water pumps shall be of high efficiency type & selected based on best efficiency available for the duty with **Eff.-4** motors.

Raw and soft water shall be made available at OH tank. Further distribution up to consumption point with flow meters shall be in scope of tenderer. The main header size will be calculated considering future expansions also.

7.0 STEAM DISTRIBUTION AND CONDENSATE RECOVERY

Steam Boilers are already available in the boiler house at the site. Bidder has to visit the premises and envisage the steam distribution requirements and required work.

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Steam Distribution to various duty points as per Good Steam Engineering practices (IBR Standards) is part of this scope. Necessary steam pressure reducing stations (PRS) as per process requirement are to be included in the supplier's scope.

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

HP Steam shall be made available at one point inside the Ice Cream block. Further distribution up to consumption point with flow meter shall be in scope of tenderer. The main header size shall be calculated considering future expansions also.

The bidder has to get approval from the Boiler Inspectorate for the steam line installation in the Ice cream and Fermented product block. The statutory fees remitted shall be reimbursed on submission of the original bill.

8. CONDENSATE RECOVERY SYSTEM

Maximum recovery & utilization of steam condensate from all process equipment shall be made. The system shall consist of facilities for receiving condensate in collection/buffer tank(s) with centrifugal pump(s) and pumping to an overhead condensate storage tank of capacity 2 KL. From the overhead condensate storage tank, condensate water to be transferred through gravity/pumping to boiler feed water tank of boiler house.

The condensate collection lines from various steam traps to be led & connected with adjacent header lay on pipe rack for transferring to collection tank by centrifugal pump. The pumping traps of all water heaters/ CIP heaters etc. shall be of **compact design**. The milk / curd pasteurizer steam traps shall be selected to ensure complete clearing of condensate with the help of minimum quantity of motive steam against back pressure without effecting process heat requirement. Similarly, the TD-3 trap assembly for all steam headers/distribution lines shall be of **compact design/single piece**. Wherever possible the condensate from main steam headers/ distribution lines would be recovered for utilization. MOC of all condensate transfer piping shall be SS316 with hot insulation.

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9.0 ELECTRICAL DISTRIBUTION

Purchaser shall provide electrical power at one point in the new block. The scope of the Bidder starts from the laying of cable from the plant Feeder in the PCC to new MCC panels. From there on it shall be responsibility of the Bidder to design a suitable electrical system as per the latest IS specification, Indian electricity rule, including special requirements of concerned state electricity Inspectorate. The system shall be designed to receive, control & distribute electrical power to all prime movers & other consumption points with all necessary controls for the plant at 415V, 50Hz AC. The acceptable variation in voltage is +/- 5% & frequency is +/-3%.

The scope would consist of design, supply, installation, testing and commissioning of Motor Control Centres with complete switchgears. Incomer feeder, all outgoing non-motorized feeder & all ancillary panels with complete switchgears & electrical shall be non- intelligent type.

Required quantity of armoured power cable with GI ladder cable tray (Overhead cable trays) , steel braided copper conductor flexible power cable (outgoing)/control cable, steel braided flexible copper instrument cable, SS cage trays (for drops from overhead cable trays) for power/control/instrument cables (separate tray for instrument cable), plate type earth pit (GI for power & Copper for electronic), earthing network/earthing conductors (GI for power & Copper for electronic), Motor Isolators, Emergency PB station near motors for emergency isolation, DBs. for panels etc. shall be provided. Power cables shall be suitable for use on 415 V system, shall be of 1100 V grade. PCC to all MCC, power cable shall be Aluminium conductor HR PVC/ XLPE insulated, armoured and overall PVC sheathed strictly as per IS 1554 / 7098 (Part -I, 1976 - Amended up to date). Power (up to 70 sq.mm) & control cable from MCC to all motors & other panels shall be Steel Braided copper power cable. The outgoing power & control cables shall be Rodent proof FR type.

The installation of the electrical shall be carried out as per respective clause of the tender (chapter electrical installation of the tender-part IV). The detailed specification of the required electrical system is provided in subsequent sections.

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Note :

All the electric motors shall be energy efficient IE-4 motors. However, in case of OEM equipment, where IE-4 is not available, IE-3 motor can be accepted as minimum standard. All the VFD driven motors shall be designed for inverter duty.

9.1 MOTOR CONTROL CENTRE

Following MCCs are envisaged for the plant. The feeders in each MCC shall be as per the functional /design requirement:

9.1.1 MCC – I FOR ICE CREAM PLANT

9.1.2 MCC – II FOR FERMENTED PRODUCT PLANT

The Bidder shall provide XLPE/HR-PVC insulated armoured aluminum power cable from PCC to MCCs. The Bidder shall terminate the cables at both ends i.e., at PCC & MCCs. Bidder shall provide the electric load details for each MCC.

The motor control centre shall be completely dust & vermin proof conforming to IP 42 standard. The MCC shall be fabricated, as per detailed specification. The MCCs would receive, control & distribute electrical power at 433 V, 50 Hz AC to all electrical loads.

The entire panel boards (MCCs) are to be fabricated by the panel builder whose sample panel boards have been type tested and approved by CPRI. Necessary proof (short circuit test temperature rise test and ingress protection test reports) to this effect are to be submitted and TCMPF approval is to be obtained prior to taking up the panel fabrication work.

Type

The MCC shall be suitable for indoor installation. It would be fabricated as per detailed specification described and as per IP 42.

Bus bar rating

The bus bar shall be capable of carrying 1.25 times of full load current of respective MCC Incomer

For incoming feeder of rating up to 630 A, 4 pole MCCB & for rating higher than 630 A, 4 pole ACB.

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The Incomer shall have 4 poles Electrically operated draw out type EDO, ACB of suitable rating / type with built in solid state / Microprocessor based protective device with all accessories. Also, the Incomer shall have 3-phase 4-wire communicable energy meter with necessary Indications and CT's and phase Indication lamps.
For Incomer of the panel, the rating of the switchgear shall be 1.25 times of rated full load current of the plant at rated capacity.

Out-going Feeders
The Bidder shall provide the outgoing feeders to all the electrical drives covered in the section.

One no of 100 A TPN MCCB unit for welding point shall be provided in each MCC. MCC shall be provided with 2 nos. of RTD sensors for temperature monitoring.

9.2 ELECTRICALS
Supply, laying and termination of required quantity of armoured LT power cables from MCC to respective motors (steel braided cable copper conductor upto 70 sq.mm sizes above 70 sq.mm copper conductor armoured cable of approved make)/copper braided control / Instrument cables of suitable sizes with cabling accessories in excavated trench / GI cable trays and GI conduits for outdoor shall be carried out. Necessary SS cage cable trays, SS conduit pipes within plant area, earthing conductor, earth pits, and emergency stop and motor isolator in SS enclosures shall 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 SS cage tray, SS shrouds for all pumps & motors shall be provided. Supply & placement of rubber mats of proper size as per Electrical Inspectorate rules shall be provided.

All the electric motors shall be energy efficient IE-4 motors. However, in case of OEM equipment, where IE-4 is not available, IE-3 motor can be accepted as minimum standard. All the VFD driven motors shall be designed for inverter duty.

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All the VFD driven motors shall be designed for inverter duty. Power & electronic earthing shall be separate.

9.2.1 POWER CABLE (LT)

Quantity : 1 Lot (as per functional/design requirement)

Power cables for use on 415 V system shall be of 1100 volt grade, steel braided PVC insulated and PVC sheathed copper conductor upto 70 sq. mm conductor size and above 70 sq. mm HR PVC / XLPE insulated, PVC sheathed, armoured and overall PVC sheathed copper conductor. Cables from PCC to MCC shall be XLPE insulated, PVC sheathed, armoured and overall PVC sheathed aluminium conductor strictly as per IS : 7098 (Part I)– 1988.

Unarmoured cable to be used for vibrating equipment & only if specifically mentioned in schedule of quantities.

The size of these cables shall be as specified in single line diagram. The minimum size shall be as per the table given above.

All the cables from PCC to MCC shall be XLPE insulated armoured aluminium conductor.

All the cables from MCC to various motors/loads in the plant shall be steel braided copper flexible cable up to 70 Sq.mm (SBEE) and XLPE/HR-PVC insulated armoured multistrand copper conductor above 70 Sq.mm.

9.2.2 CONTROL CABLE

Quantity : 1 Lot (as per functional/design requirement)

Control cables for use on 415 V. system shall be of 1100 volts, 1.5 mm2, copper braided copper flexible conductor copper conductor, PVC insulated, PVC sheathed and overall PVC sheathed.

9.2.3 INSTRUMENT / COMMUNICATION CABLES

Quantity : 1 Lot (as per functional/design requirement)

Instrument cable shall be of multi-stranded annealed plain copper conductor, extruded PVC type A insulated. Overall screened with Al. Mylar tape along with

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tinned copper, drain wire of size 7/ 0.30 mm. Extruded PVC ST1 inner sheath, copper bradded. Extruded PVC type ST1 outer sheathed instrument signal cables. All instrument cables shall be rodent proof. Min. Size of the instrument cable shall be 0.75 sq.mm.

The outside plant building cabling of communication cables and instrument cables of suitable sizes shall be laid with cabling accessories with GI cable trays and GI conduits.

9.2.4 ELECTRICAL ACCESSORIES

Quantity : 1 Lot (as per functional/design requirement)

CABLE TRAY WITHIN PLANT

GI cage trays shall be used for laying of the cables within the plant and outside the plant, inside MCC room. All overheads cable trays will be in GI construction.

These shall be perforated type, heavy duty, 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 shall be 1.5 mm upto 300 mm cable tray width. For cable trays having width more than 300 mm, height to be 75mm and thickness of plate shall be 2.0 mm. Cable trays shall be of 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. shall also be supplied.

Cable tray for automation/network /signal cables shall be separate from power and control cables. SS cage type cable trays shall be provided with in the plant for vertical dropout in process area shall be cage type SS cable tray.

CABLE GLAND

Quantity :1 Lot

These shall be provided at both ends of armoured/ unarmoured electrical cables. Cable glands shall be manufactured as per performance requirements of BS 6121, amended as on date, with brass material accurately machined and nickel-plated. These shall be of heavy duty single compression type for cable conductor

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sizes above 35 Sq. mm and weather proof double compression type for cable conductor sizes upto 35 Sq.mm. Single compression cable glands shall be complete with checknut, gland body, 3 nos. metal washers, outer seal rubber ring and compression nut. Double compression glands shall be complete with checknut, gland body, neoprene outer ring, armour clamping cone, armour clamping ring, armour clamping nut, skid washer & outer seal nut. For steel braided cables polyamide gland shall be provided.

CABLE CONNECTOR

Quantity : 1 Lot

Cable connectors, lugs/sockets, shall be copper /Aluminium alloy, suitably tinned , solderless crimping type.

CABLE ROUTE MARKER

Quantity :1 Lot

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.

CABLE INDICATOR

Quantity :1 Lot

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.

CONDUIT

Quantity :1 Lot

All the cable drops in process area shall be in open cage type SS cable trays. However wherever conduits are required shall be of SS 304.

EARTHING PITS

Suitable dia Copper /GI pipe in pipe Chemical earthing's with minimum 3 m long pipe for the panels and the equipment's shall be provided. The earthing pits shall be complete with Plate, electrode, watering pipe and chamber with cover.

- GI pipe chemical earthing 3 m long for MCC panels and equipment's : Suitable

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- Copper pipe earthing 3 m long for Automation : Suitable As alternate, Bidder may also consider Chemical Earthing.

5.2.5 UPS

Quantity : 1 Set (as per functional/design requirement)

The bidder has to get drawing approval and safety certificate from the Electrical Inspectorate / CEIG Tamil Nadu for the Electrical installation in the Ice cream and Fermented product block. The statutory fees remitted shall be reimbursed on submission of the original bill.

10.0 INSTRUMENTATION & AUTOMATION

The scope covers design, project engineering, control philosophy, software development, manufacture, assembly, shop testing, packing, transportation to site, unloading at site, storage, erection, site testing & pre-commissioning, commissioning, initial & successful operation and performance testing of the entire Control & Instrumentation package of the plant for safe, reliable, consistent, optimum and efficient operations.

10.1 AUTOMATION

DESIGN OBJECTIVE

Only CIP station and Pasteurization station shall be PLC based. Common PLC or separate PLC can be supplied for both the system. Both System shall be fully automatic in operation. The CIP distribution shall be done via Flow plate system with proximity switch for each route. Route selection shall be done in CIP PLC with the Proximity switch inputs. Apart from this, individual PLC which are part of equipment such as Ice cream freezers, Ice cream packing machines, hardening tunnel/room, homogenizer, deep freeze system, air compressor, hydroflow systems, etc shall be designed and supplied as per OEM standards and OEM operating procedures. All other area instrumentation used shall have local displays for reading and noting purpose. The PLC system shall be capable of handling sequential control logic through a graphical user interface & should be able to provide sequential diagnostic. All communication with the field devices including third party shall be digital having required overall speed &

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there should not be any loss of data/information packets during the various communication processes.

Automation system shall comprise of:

- Hardware and software for PLC
- The system shall support client server architecture. All the personnel computers (PC) shall have latest configuration at the time of ordering. All the industrial PCs like ES/OS, Server, client, have min. quad core or higher processors and min. 8 GB or Higher DDR RAM or better.
- Human Machine Interface (SCADA) PC shall have 29" color TFT - LCD display.
- All the PC's shall have original latest windows software and antivirus software with required licenses.

The C&A System shall be designed to ensure:

- High degree of System availability and reliability with necessary spare viz. **15%** spare I/O cards, **30%** spare memory for main PLC CPU, 30**%** spare SCADA tags in the main CPU, back plane, switches, network components etc. The 12/24 V DC power supply system for the CPU as well as field I/O stations, shall have dual/twin channel power output.
- Low downtime and high meantime between failures.
- System flexibility and modular up-gradation/expansion capability.
- Safety of the control system (hardware & software) with related equipment and operating personnel. The control system should be tamper proof & immune from external un-warranted influence of any kind.
- Open connectivity using OPC (Ole for Process Control) through open protocol for third party/system connectivity including MIS.
- Hot swappable (online replaceable) I/O modules/cards.
- The system should have audit trail facility (including logging of all operator actions on equipment & set point changes) for **7 days**.

Communication of all field devices/ remote I/O stations or third party devices/systems with the proposed PLC shall be digital & two way.

All sanitary design pneumatic valves shall be of Intelligent (bus connected with diagnostic features) as well as conventional type (with hardware signal output having necessary field diagnostic features) – In case of 4-20 mA instruments the connectivity should be remote I/O station based.

The supplier should propose their detailed architecture along with the bid.

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GENERAL DESCRIPTION

a) The integrated control system proposed for the new Ice cream plant shall be fully automatic, which will have **the required features of both PLC system suitable for a modern Ice cream and fermented product Plant.**

b) The process parameter i.e. temperature, pressure, steam control, flow control, level control, etc., shall be controlled automatically through PID controllers. All the data referring to raw materials, products, chemicals and utilities are made available on SCADA.

c) All the operations such as milk processing as well as process CIP operations including the CIP kitchen shall be automated and monitored/controlled from the proposed automation system.

d) The automatic control shall include starting operation, operation during process, shut down (fail safe/power failure) and CIP operations. The conductivity and other CIP parameters for CIP tanks shall be controlled automatically.

Mix formulation, Preparation, Transfer till pasteurization & CIP Kitchen shall be operated from SCADA located in control room. Tank level and temperature of the each tank shall be displayed in the SCADA system

e) automatic control shall include starting operation, operation during process, shut down (fail safe/power failure) and CIP operations. The conductivity and other CIP parameters for CIP tanks shall be controlled automatically

f) Display and analysis of the critical process parameters shall be carried out in the workstation.

g) The normal operation and shutdown of the plant shall have manual interface. However, for emergency shutdown and safety operations of the various items and processes, the necessary action for shutdown and safety shall be initiated automatically by plant automation system. For this purpose, the critical parameters for various processes shall be put as set points and necessary interlocks shall be executed by automation system.

h) The automation system should be capable of operating continuously in the ambient temperature experienced in the plant. Air conditioning system would be provided in main control rooms & laboratories. However, the remote/field I/O stations, third party or network related devices/hardware

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won't have any additional controlled environment and the same should have all necessary protections against temperature/ dust/moisture. Suitable enclosures shall be provided wherever required. The system should be able to record and report all the production parameters.

i) The automation system shall be interfaced with third party devices viz. homogenizer, etc wherever necessary. For collection of utility related data, interfacing would be required with utility flow meters etc through suitable communication network. Network connectivity with substation shall also be required for monitoring & control of power monitors installed in PCC incomers & Outgoing feeders (ACBs / MCCBs). Contractor shall consider necessary hardware/ software/ communication network for interfacing/connecting the different sections/systems mentioned above with the Dairy Automation Systems.

j) All the third party automation systems wherever required (other than main PLC system) shall have communication port suitable for the main automation system & all these systems shall be seamlessly connected to the main system. All field hardware signals should be connected through remote I/O stations. All the systems should communicate digitally to have better information exchange.

k) The central automation system for mix pasteurizer and CIP station shall be located in the main control room of the Dairy and shall directly control said operations with facility of milk/ ice cream & CIP activities.

CONTROL PHILOSOPHY

The contractor is required to submit the control philosophy during detail engineering for finalization.

TECHNICAL REQUIREMENTS

a) General

All equipment, system and accessories furnished shall be from latest proven product range of established/reputed manufacturers and shall conform to applicable national and international standards.

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The design of various control systems and related equipment shall adhere to the principle of failsafe operation implying that loss of signal, loss of power supply or failure of any component will not lead to hazardous conditions/ product losses, while at the same time, prevent occurrence of false and unrelated trips.

b) Climatic Condition

The instruments / control system shall be suitable for environmental conditions that are normally encountered in western part of India. All equipment / system / sub-system etc. shall be fully tropicalized accordingly.

Ambient Temp. 55 deg. C.

Relative humidity – 95% at <55 deg. C.

c) System power supply condition

For applications requiring AC power, 240 V AC, 50 Hz **uninterrupted power supply** shall be made available by supplier from UPS (3 phase input / 1 phase output) complete with a common servo stabilizer. The UPS battery bank may be common.

In case of power failure, the UPS (3 phase input / 1 phase output) should be capable of delivering power for min. **60 Minutes** to control/ instrumentation system including valve actuation power. The UPS shall have a static by-pass switch. Necessary filters should be considered to protect the system from harmonics, which may be generated in the UPS.

12/24 V DC power supply shall be used wherever applicable for Control System and will be derived from the UPS. Any other voltage level required for the system shall also be the responsibility of the Supplier along with all required hardware. DC voltage system for Main CPU & all I/O stations/panels shall be with dual channel & kept separate for different step downs as per requirement. Each filed I/O stations shall have separate voltage step down/standard power converter module system from 220V AC to duel channel 12/24 V DC to meet the requirement.

Control & Instrument (C&I) equipment furnished shall incorporate necessary techniques for protection against electrostatic discharge and radio frequency interface, as per international codes and standards.

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Safety earthing and C&I System earthing shall be separate. Safety earth bus shall be connected to main plant earth pit. Separate earth pit/s shall be provided for system earth bus (electronic earth). Electronic earth shall be cabled directly to the corresponding earth bar. The earthing for automation/C&I system shall be of copper only.

All instruments shall have clear access for maintenance, removal, lay-down, calibration etc. The sensors & display units should be separate.

All readable instruments shall be clearly visible unassisted.

Portable SS access ladder with platform shall be provided for easy access of instruments, valves and actuators.

All prefabricated plugged cables, power supply cable for Supplier's System.

System Cabinet, Marshalling Cabinet and Power Supply Cabinet to fulfill the system requirement.

Power Distribution Cabinet for extension of power supply to field instruments.

Automation of various sections shall be designed as given below:

d) Processing

The system shall prompt the operator to commence pasteurizing after the necessary conditions are checked and requirements are met with. Pasteurizing can be commenced at any time, but the prompt shall be logged as an event. The automation system shall start all the processing equipment.

Pasteurization parameters shall be fully controllable from the automation system. Temperatures shall be logged for each stage of process and service sections, and trend charts (Real as well as Historical) retained by the system.

The sterilization of pasteurizer shall be done at the end of CIP operation, before starting the milk processing. The sterilization process has to be planned by the CR operator in such a way that it starts before milk processing and continues to run till milk processing is started. This is to ensure proper sterilization of pasteurizers and also to reduce the diversion time during cold start conditions.

The milk pasteurizers shall be fitted with differential temperature sensors between hot water and milk sections to detect plate fouling. Pasteurizers shall

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close down and -short clean- at pre-selected intervals (around 7 to 8 hours) or when the differential temperature sensors indicate the need to clean. Full CIP cleaning shall be selected by the operator only at the end of the days run.

Level transmitter value shall act as standby in case the high or low level switches fail for any tanks & silos.

The system shall maintain a continuous log of all operating parameters, and the status of the vessel and also the type of product, and temperature etc. The system shall be capable of an instantaneous inventory check of all vessels in the plant.

e) CIP

Measurement / Trending, regulating & Control system

Measurement / Trending (through PLC), regulating and control system having control loops consisting of Electronic transmitters, switches, RTDs and control valves with electro pneumatic positioner, regulators etc. Each system shall contain following:

- Level Control.
- Temperature measurement & Control.
- Conductivity/ Concentration measurement and control.

The conductivity, concentration measurement & Level control along with re-circulation within the CIP kitchen shall be controlled through PLC.

- **SERVICES :**

There would be separate PLC based control systems for Air compressors.

10.2 INSTRUMENTATION

Field Instruments shall be suitable for area in which these are located. In general, field instruments shall be weatherproof, dust tight and corrosion resistant with protection class IP-66. Field instrument shall be suitably mounted, supported and terminated in RIO panel in the field.

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Dial size for all pressure and temperature gauges shall be 150 mm and any lower size selection specific to the application shall be subject to the purchaser's approval.

In general, the minimum accuracy of the instruments shall be as below:

- Electronic transmitter: +/- 0.2 % of FSD (accuracy as per OEM and or process requirement)
- Pressure and temperature gauge: +/- 1.0 % of FSD
- Conductivity transmitter: +/- 0.5 % of FSD (accuracy as per OEM and or process requirement)
- Level gauges: +/- 5 mm of the reading

The repeatability of pressure, temperature, level and flow switches shall be +/- 1.0 % of FSD (minimum)

Measuring ranges of transmitter shall be selected in such a way that best accuracy of measured value (in the measurement range) is achieved. Material of construction of thermo well shall be SS 316 suitable for the application. Color-coding/number coding for field instruments cables (I/O cables) for easy trouble shooting. (Different color-codes/number codes for Analog input, Analog output, Digital input, Digital output and Network Cables).

The cable & instrument air inlet at the instruments would have proper protection. Instrument air tapping from header shall be of SS-304 pipe with SS-304 distributor and FRL/moisture trap, etc.

All field instruments/equipment shall be provided with stainless steel (SS) tag plates with engraved tag no. and service description. The tag plate shall be secured to the instrument/equipment with SS chain.

The design of various control systems and related equipment shall adhere to the principle of failsafe operation implying that loss of signal, loss of power supply or failure of any component will not lead to hazardous conditions, while at the same time, prevent occurrence of false and unrelated trips.

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The instruments / control system shall be suitable for environmental conditions that are normally encountered in utilities in India. All equipment / system / sub-system etc. shall be fully tropicalized.

LIST OF EQUIPMENTS

A. ICE-CREAM PLANT

S.NO	DESCRIPTION OF MAJOR ITEMS	CAPACITY	QTY	UOM
1.0	**RAW MATERIAL RECEIVING & STORAGE SECTION**			
1.01	MILK SILO	5 KL	1	NO.
1.02	MILK TRANSFER PUMP	5 KLPH	1	NO.
1.03	CIP RETURN PUMP	10 KLPH	1	NO.
1.04	CREAM STORAGE TANK (INSULATED & JACKETED)	2000 L	1	NO.
1.05	CREAM PUMP	1000 LPH	1	NO.
2.0	**MIX PREPARATION SECTION**			
2.01	ICE CREAM/CANDY MIX PREPARATION-CUM-STORAGE TANK	2000 L	2	NOS
2.02	KULFI MIX PREPARATION TANK	1000 L	1	NO.
2.03	KULFI MIX TRANSFER PUMP	1 KLPH	1	NO.
2.04	KULFI MIX COOLING THE/PHE - TWO STAGE WITH TOWER WATER AND CHILLED WATER	1 KLPH	1	NO.
2.05	TURBO-BLENDER FOR DRY INGREDINT DISSOLVING- (SPX/TETRAPAK)	1000 KG/HR	1	NO.
2.06	BUCKET TYPE DUPLEX FILTER	3000 LPH	1	NO.
2.07	PHE HEATER (TEMP. PROFILE)	3000 LPH	1	NO.
2.08	HOT WATER PREPARATION SYSTEM WITH TANK, PHE AND PUMP		1	NO.
2.09	MIX RECIRCULATION PUMP	3000 LPH	1	NO.
2.10	MIX TRANSFER PUMP	1000 LPH	1	NO.
2.11	CIP RETURN PUMP	10 KLPH	1	NO.
3.0	**ICECREAM PROCESSING SECTION**			
3.01	ICE CREAM MIX PASTEURIZER	1000 LPH	1	NO.
3.02	COOLING TOWER WITH PUMP 2 NOS. (1W + 1S)		1	NO.
3.03	HIGH PRESSURE HOMOGENIZER	1000 LPH	1	NO.
4.0	**ICECREAM AGEING AND FLAVOUR MIXING SECTION**			
4.01	ICE CREAM MIX AGEING TANK	2000 L	4	NOS
4.02	AGED MIX TRANSFER PUMP	2000 LPH	1	NO.
4.03	FLAVOUR MIXING TANK	600L	4	NOS
4.04	SS PLATFORM FOR FLAVOUR MIXING TANK		1	NO.
4.05	DISC TYPE STRAINER	600 LPH	4	NOS
4.06	CIP RETURN PUMP	10 KLPH	1	NO.
5.0	**CIP SYSTEM:**			
5.01	AUTOMATED CIP SYSTEM FOR ICP & FERMENTED PRODUCTS – 1 CIRCUIT EXP. TO 2.		1	SET
5.02	SKID MOUNTED CIP TANK & PUMP FOR FREEZER, PACKING MACHINES ETC		1	SET

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S.NO	DESCRIPTION OF MAJOR ITEMS	CAPACITY	QTY	UOM
6.0	**CHOCOLATE MAKING & REWORKING SECTION**			
6.01	CHOCOLATE PREPARATION TANK	300 L	1	NO
6.02	ICE CREAM REPROCESSING / REWORKING TANK	300 L	1	NO
6.03	HOT WATER BATH FOR CAN		1	NO
6.04	HOT WATER PREPARATION SYSTEM WITH TANK, PHE AND PUMP		1	SET
7.0	**INGREDIENT PREPARATION SECTION**			
7.01	NUT & DRY FRUIT OVEN		1	NO
7.02	NUT CUTTING MACHINE		1	NO
8.0	**MISCELLANEOUS EQUIPMENT**			
8.01	STEAM WATER MIXING BATTERY		4	NOS
8.02	FURNITURES		1	LOT
8.03	UPS FOR AUTOMATION PURPOSE		1	SET
8.04	PACKING HALL TEMP. MAINTENANCE SYSTEM		1	SET
8.05	CRATE TROLLEY FOR ICECREAM CRATES		8	NOS
9.0	**ICECREAM MAKING AND PACKING EQUIPMENT**			
9.01	CONTINUOUS ICECREAM FREEZER	600 LPH	2	NOS
9.02	CHILLED WATER BALANCE TANK, PHE CHILLER AND PUMP FOR FREEZER CONDENSING UNIT		1	NO
9.03	FRUIT FEEDER		2	NOS
9.04	ICE CREAM CUP FILLING MACHINE - ROTARY	6000 CPH	1	NO
9.05	ICE CREAM CONE FILLING MACHINE - ROTARY	3000 CPH	1	NO
9.06	RIPPLE TANK WITH DOSING PUMP - TROLLEY MOUNTED		1	NO
9.07	ICE CREAM TUB FILLING MACHINE – 20 TPM		1	NO
9.08	ON LINE METAL DETECTOR WITH CONVEYOR		1	NO
9.09	INKJET PRINTER FOR FAMILY & BULK PACK CARTONS - (COMMON)		1	NO
9.10	LID PRINTING MACHINE		1	NO
9.11	SS CARTONING / WORKING TABLES		4	LOT
9.12	WEIGH SCALES 100 KG – 1 NO., 5 KG- 1 NO.,1KG-3 NOS.		1	SET
9.13	CANDY LINE- AUTOMATIC WITH ONE ICE WATER FILLING UNIT , ONE VACUUM SUCKING UNIT , AN ICE CREAM FILLING UNIT, A STICK INSERTING UNIT, A CHOCOLATE COATING UNIT, PRIMARY ISOLATED & SECONDARY BRINE PUMP (DEFROST) AND R-404 A BASED CONDENSING OPERATED THROUGH PLC. 2 SET OF MOULDS IN SS316 0.8MM THICK. OTHER ANCILLARIES LIKE CONVEYOR AND FLOW WRAPPING MACHINE.	3000 CPH	1	NO
10.0	**ICECREAM - FREEZING AND STORAGE:**			
10.01	ICE CREAM DEEP FREEZE ROOM (18 M X 8.25 M X 4 M) X 2 NOS	30 KL		
10.01.1	A)PUF INSULATION WITH PRE COATED GI SHEET, DOORS, AIR CURTAINS AND WEATHER PROOF LIGHT FIXTURES		2	SET

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S.NO	DESCRIPTION OF MAJOR ITEMS	CAPACITY	QTY	UOM
10.01.2	B) R- 404 - PACKAGED TYPE REFRIGERTAION SYSTEM COMPLETE WITH FORCE DRAFT COOLERS, REFRIGERATION CONTROLS AND AIR COOLED CONDENSING UNITS		2	SET
10.02	ICECREAM DEEP FREEZER FOR FUTURE - ROOM SIZE 10.50 X5.25 X 4 M WITH DOORS AND LIGHT FIXTURES		1	SET
10.03	ICE CREAM HARDENING ROOM (7 M X 3.5M X 4 M)	3 KL		
10.03.1	A)PUF INSULATION WITH PRE COATED GI SHEET, DOORS, AIR CURTAINS AND WEATHER PROOF LIGHT FIXTURES		1	SET
10.03.2	B) R- 404 - PACKAGED TYPE REFRIGERTAION SYSTEM COMPLETE WITH FORCE DRAFT COOLERS, REFRIGERATION CONTROLS AND AIR COOLED CONDENSING UNITS - 2 X 9 TR MINIMUM		1	SET
10.04	ANTEROOM WITH PUF INSULATION - PRE COATED GI SHEET, DOOR, AIR CURTAINS AND WEATHER PROOF LIGHT FIXTURES(27 M X2.5 MX 4M)		1	SET
10.05	ANTEROOM FOR ICECREAM DISPATCH (17.5 M X 3 M X 4 M) WITH 2 NOS. OF SLIDING DOORS		1	NO
11	**UTILITIES:**			
11.01	SERVICE PIPES, VALVES, FITTINGS & SUPPORTS		1	LOT
11.02	SS PNEUMATIC VALVES OF MIX PROOF TYPE, SEAT VALVE AND BUTTERFLY VALVES FOR AUTOMATION OF MIX PREPARATION AND PROCESSING LINE (IT SHALL BE AS PER TENDER WHICH INCLUDES THE AUTOMATION OF MILK TANK 5 KL X 1 NO, CREAM TANK 2 KL X 1 NO. , MIX PREPARATION TANKS 2KL X 2 NOS, KULFI MIX PREPARATION TANK 1 KL X 1 NO., TURBO BLENDER OPERATION, PHE HEATING, MIX RECIRCULATION & MIX TRANSFER AND MIX PASTEURIZATION. FOR AUTOMATION, LEVEL TRANSMITTERS, LEVEL SWITCHES, FLOW METERS OF VOLUMETRIC TYPE SHALL BE USED. ALL THE TANKS SHALL HAVE TEMPERATURE TRANSMITTERS.)		1	LOT
11.03	SS PIPES (PRODUCT/CIP) PIPES, VALVES, FITTINGS & SUPPORTS (ALL MANUAL VALVES SHALL BE BUTTERFLY TYPE AND FLOW PLATES SHALL BE USED INSTEAD OF 3 WAY PLUG VALVES)		1	LOT
12.00	**SS STRUCTURALS- PLATFORM FOR FLAVOR MIXING TANK, MIX PREPARATION TANKS AND CIP PLATFORM**	**3 MT**	**1**	**LOT**

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S.NO	DESCRIPTION OF MAJOR ITEMS	CAPACITY	QTY	UOM
13.00	**ELECTRICALS - MCC, POWER CABLING, INSTRUMENTATION CABLE, CABLE TRAY (SS CAGE TYPE FOR PROCESS HALL AND GI CABLE TRAY FOR OTHER AREAS), EARTHING, RUBBER MAT, ETC.,**		**1**	**LOT**
13.01	PLC BASED AUTOMATION WITH FOR MIX PREPARATION AND PROCESSING WITH LEVEL INSTRUMENT FOR TANKS AND FLOW METER IN WATER/MILK/ CREAM		1	NO.
14.00	**SPARES (INCLUDING IMPORTED FREEZERS)**		**1**	**LOT**

B. FERMENTED PRODUCTS PLANT AND UTILITIES

LIST OF EQUIPMENTS - FERMENTED PRODUCTS PLANT				
S.NO	**DESCRIPTION / ITEMS**	**CAPACITY**	**QTY**	**UNIT**
1	**CURD - 5000 KGPD**			
1.01	CURD MILK STORAGE TANK	5 KL	1	NO.
1.02	CURD MILK TRANSFER PUMP	5KLPH	1	NO.
1.03	CURD PASTEURIZER COMPLETE SET WITH 15 MIN HOLDING	2 KLPH	1	NO.
1.04	PASTEURIZED CURD MILK STORAGE TANK	5KL	1	NO.
1.05	PASTEURIZED CURD MILK TRANSFER PUMP	2 KLPH	1	NO.
1.06	CIP RETURN PUMP	10 KLPH	1	NO.
1.07	CURD MILK PRE HEATER WITH HOT WATER GENERATION SYSTEM	2 KLPH	1	NO.
1.08	INOCULATION TANK FOR CURD IN POUCH	1 KL	2	NOS
1.09	INOCULATION TANK FOR CURD IN CUP	500 L	2	NOS
1.10	CIP RETURN PUMP FOR CURD TANK	10 KLPH	1	NO.
1.11	POUCH FILLING MACHINE FOR CURD	5000 PPH	1	NO.
1.12	ROTARY CURD CUP FILLING MACHINE WITH CHANGE PARTS FOR THREE SIZES	2400 CPH	1	NO
1.13	**CRATE WASHER AND CONVEYOR**	600 CPH	1	NO.
1.14	HEATER FOR INCUBATION ROOM	SUITABLE	1	NO.
1.15	CURD INCUBATION ROOM (5 M X 4 M X 4M)	5 MT	1	NO.
2	**COLD STORAGE**			
2.01	A)PUF INSULATION WITH PRECOATED GI SHEET, DOORS, AIR CURTAINS AND WEATHER PROOF LIGHT FIXTURES		1	SET
2.02	DAHI BLAST COOLER (5 M X 4 M X 4M)	3.5 MT	1	SET
2.02.1	A)PUF INSULATION WITH PRECOATED GI SHEET, DOORS, AIR CURTAINS AND WEATHER PROOF LIGHT FIXTURES			
2.02.1	B) R- 404 - PACKAGED TYPE REFRIGERTAION SYSTEM COMPLETE WITH SS304B FORCED DRAFT COOLERS, REFRIGERATION CONTROLS AND AIR COOLED CONDENSING UNITS - (TO COOL 1750 KG. CURD FROM 42 DEG C TO 12 DEG C IN 2 HRS), APPROX 2 X 9 TR UNITS			

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LIST OF EQUIPMENTS - FERMENTED PRODUCTS PLANT				
S.NO	**DESCRIPTION / ITEMS**	**CAPACITY**	**QTY**	**UNIT**
2.03	ANTE-ROOM FOR LOADING OF CURD IN BLAST ROOM AND COLD STORAGE (4 M X2.5 MX 4 M). PUF INSULATED WITH PRECOATED GI SHEET, DOORS, AIR CURTAINS AND WEATHER PROOF LIGHT FIXTURES WITH 1 NOS OF DOORS AND AIR CURTAIN		1	SET
2.04	CURD, LASSI & BUTTER MILK COLD STORE - (10 M X5.25M X 4 M)	15 MT	1	SET
2.04.1	A)PUF INSULATION WITH PRECOATED GI SHEET, DOORS, AIR CURTAINS AND WEATHER PROOF LIGHT FIXTURES			
2.04.2	B) R- 404 - PACKAGED TYPE REFRIGERTAION SYSTEM COMPLETE WITH SS 304 FORCED DRAFT COOLERS, REFRIGERATION CONTROLS AND AIR COOLED CONDENSING UNITS - 2 X 5 TR MINIMUM			
3	**BUTTER MILK SECTION**			
3.01	CURD SETTING TANK FOR BUTTER MILK	2 KL	1	NO.
3.02	SS SHEAR PUMP	2 KLPH	1	NO.
3.03	TRANSFER PUMPWITH VFD	5 KLPH	1	NO.
3.04	PHE CHILLER FOR COOLING LASSI / BUTTER MILK (COMMON)	5 KLPH	1	NO.
3.05	CIP RETRUN PUMP	10 KLPH	1	NO.
3.06	PASTEURIZED WATER TANK	2 KL	1	NO.
3.07	PASTEURIZED WATER TRANSFER PUMP	5 KLPH	1	NO.
3.08	POUCH FILLING MACHINE WITH IN BUILD FOR BUTTER MILK / LASSI	5000 PPH	1	NO.
3.09	THERMISER FOR BUTTER MILK AND LASSI (FUTURE)	1 KLPH	0	NO.
3.10	HIGH SHEAR MIXER WITH SHEAR PUMP WITH SUITABLE CHILLER	0.5 TPH	0	NO.
4	**LASSI SECTION**			
4.01	CURD SETTING TANK FOR LASSI	2 KL	1	NO.
4.02	SUGAR DISSOLVING AND SYRUP PREPARATION TANK.	500 L	1	NO.
4.03	SUGAR SYRUP / WATER TRANSFER PUMP	5 KLPH	1	NO.
4.04	HOT WATER BASED - WATER / SUGAR SYRUP HEATING SYSTEM	5 KLPH	1	NO.
4.05	SUGAR SYRUP FILTERS - BUCKET TYPE FILTER	5 KLPH	1	NO.
4.06	INLINE METAL DETECTOR FOR SUGAR SYRUP	SUITABLE	1	NO.
4.07	CIP RETURN PUMP	10KLPH	1	NO.
5	**OTHER EQUIPMENTS**			
5.01	MANGO PULP BALANCE TANK	200 L	1	NO.
5.02	DOSING PUMP - SCREW TYPE	500 LPH	1	NO.
5.03	OVER HEAD BALANCE TANK	1KL	1	NO.
6	**UTILITIES**			
6.01	**COMPRESSED AIR HANDLING SYSTEM**			

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LIST OF EQUIPMENTS - FERMENTED PRODUCTS PLANT				
S.NO	**DESCRIPTION / ITEMS**	**CAPACITY**	**QTY**	**UNIT**
6.01.1	VFD DRIVEN LUBRICATING SCREW AIR COMPRESSOR IN ACOUSTIC ENCLOSURE OF OIL FREE TYPE &WITH AFTER COOLER MOISTURE SEPARATOR (1 W + 1S)	300 CFM	2	NOS
6.01.2	SS AIR RECEIVER WITH ACCESSORIES		1	NO,
6.01.3	AIR DRYER REFRIGERATED TYPE		2	NOS
6.01.4	COMPRESSED AIR PIPES & FITTINGS		1	SET
6.02	**INDUSTRIAL ELECTRICAL LT - MCC, POWER CABLING, INSTRUMENTATION CABLE, CABLE TRAY (SS CAGE TYPE FOR PROCESS HALL AND GI CABLE TRAY FOR OTHER AREAS), EARTHING, RUBBER MAT, ETC.,**		1	LOT
7	**MISCELLANEOUS:**			
7.01	**STRUCTURAL BRIDGES/PLATFORMS**			
7.01.1	SS STRUCTURAL PLATFORMS IN FERMENTED PRODUCT SECTION AND CROSS OVER BRIDGE FOR CRATE CONVEYORS ETC. -		1	LOT
7.02	STEAM PRESSURE REDUCING STATION WITH BYPASS VALVES ARRANGEMENT		1	SET
7.02.1	STEAM DISTRIBUTION, CONDENSATE RECOVERY SYTEM WITH INSULATED TANK OF 2 KL AND PUMPING SYSTEM WITH INSULATION AND CLADDING.		1	LOT
7.02.2	STEAM & WATER MIXING BATTERIES		4	NOS
7.03	RO WATER PLANT - 1KLPH, SS STORAGE TANK- 5 KL WITH TRANSFER PUMP OF SUITABLE CAPACITY		1	SET
7.04	Hand Pallet truck	2 Ton	2	No.
8	**FIRE FIGHTING SYSTEM**			
8.01	FIRE EXTINGUISHERS FOR CONTROL ROOM, OFFICE, FERMENTED PRODUCT BLOCK		1	LOT
9.0	**ERECTION, TESTING AND COMMISSIONING OF THE PLANTS**		1	Job

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BATTERY LIMITS

Item	Purchaser's Scope	Supplier's Scope Includes
Civil works	Necessary foundations for equipment based on the details provided by the equipment supplier. Civil work pertaining to the earthing, grouting of various foundation bolts, other patch up/finished works, specifically for the cut-openings in the wall, ceiling etc. including supply of necessary civil materials required for the above.	Drawing for the cut-openings in the wall, ceiling, pipe sleeves required for the above if necessary. Supply of necessary foundation bolts along with the template, sub base, motor slide rails and all other associated erection materials.
Cream	Cream for Ice cream shall be provided at one point inside the process hall.	Tapping from the header in the process hall to cream storage tank of Ice Cream Plant.
Milk	Standardized Milk for the manufacturing of Ice-cream, Curd, Butter Milk and lassi making shall be provided at one point inside the process hall.	a. Tapping from the header in the process hall to Ice Cream Plant and onward for Ice cream manufacturing. b. Tapping from the header in the process hall to Curd, Buttermilk and lassi
Sugar and SMP	Weighing of sugar and SMP manually and transferring to Turbo blender.	Dissolving of dry ingredients to prepare Ice Cream mix.
Chocolate	Ingredients required to prepare chocolate syrup/ Concentrate	Preparation of chocolate mix and making ai available at the outlet of chocolate tank for manual transfer.
CIP	a. CIP of milk and cream transfer line from main dairy to ice-cream plant b. Concentrated acid and alkali at one point inside CIP Kitchen.	a. CIP system for milk / cream silo, ice cream mix preparation & processing, mix ageing tanks, flavor mixing tanks, ice cream freezers & filling machines, fruit & nut feeders etc. are included. b. CIP of curd, butter milk and Lassi equipment.

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Item	Purchaser's Scope	Supplier's Scope Includes
Power	LT power to be provided at one point / PCC in the ice cream and Fermented products block. Earthing pit as required.	a. PCC to MCC and to all Motors, controls and earthing b. Power supply to instrument, controls and earthing.
Steam & Condensate	HP Steam at pressure of > 5Kg/Sq.cm shall be made available near the Ice-cream Plant.	Tapping the HP steam and distribution through PRS(Pressure reducing Station) to all consumption points within the scope of this tender & condensate return line up to feed water tank in existing boiler house. The condensate shall be collected and stored in a insulated tank which will be provided by Purchaser
Water	Raw water, Soft water and RO water shall be made available at one point inside the process hall of ice cream plant.	Tapping of Raw, soft and RO water from the headers inside the process hall and distribution to all consumption points.
Chilled water Supply & Return	Supply and Return line at one point inside the process hall.	Distribution of chilled water line from tapping header terminating to all consumption points & return line to the return header.
Compressed air	----------	Generation and distribution of compressed air to all consumption points.
Effluent	Collection of effluent from generation points and transfer to existing ETP (Effluent treatment Plant)	Effluent shall be left at the generation point.

LIST OF APPROVED MAKES

SL. NO.	DESCRIPTION	MAKES
1.0.ICE CREAM MAKING, FILLING, PACKING & HARDENING & FERMENTED PRODUCTS		
1.1	PROCESS TANKS (MILK, CREAM, ICE-CREAM MIX, AGEING, FLAVOURING, CHOCOLATE TANKS. INOCULATION TANK & CIP TANKS)	TETRAPAK /GEA /IDMC /ZEUEZR / REPUTED DAIRY EQUIPMENT SUPPLIER
1.2	SS MILK & CIP PUMPS / HOT	FRISTAM/ SPX/ ALFA LAVAL/ ZEUTECH/

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SL. NO.	DESCRIPTION	MAKES
	WATER PUMP	ZEUZER
1.3	SS LOBE PUMP	FRISTAM/ ALFA LAVAL/ SPX/ ZEUTECH/ OMAC
1.4	SS SCREA PUMP (PROGRESSIVE CAVITY TYPE)	NETZSCH/ ROTOMAC/ ROTO
1.5	PHE / PASTEURIZER	TETRAPAK/ SPX/ SONDEX
1.6	THE & CIP HEATER	TETRAPAK/ HRS/ EQUIVALENT
1.7	HOMOGENISER	FBF ITALIA/ TETRAPAK/ NIRO SOAVI/ APV GAULIN
1.8	TURBO-BLENDER	FRISTAM/ TETRAPAK/ SPX/ ZEUTECH
1.9	MILK & CIP HOSES	SAINT GOBAIN/ MTG/ TRELLEBORG/ CITERDIAL
1.10	CRATE WASHER	SWASTIK/ DAIRY ENTERPRISES/ SS ENGINEERS
1.11	CONTINUOUS ICE CREAM FREEZER (IMPORTED)	TETRAPAK/ GRAM /ICEGROUP/ TEKNO ICE/ CATTA27
1.12	FRUIT FEEDER	PWS/ SYNERGY AGRO/ EQUIVALENT
1.13	ICE CREAM CUP/CONE/TUB FILLING MACHINE	PWS /ISF / MICRON / TETRAPAK / PANCHAL
1.14	ICE CANDY MACHINE	SYNERGY/ MICRON/ SHRUTI / TETRAPAK
1.15	ONLINE INKJET PRINTER	DOMINO / VIDEOJET / IMAGE
1.16	OFFLINE IMPACT PRINTER FOR LIDS OF CUPS/CONES	GARUDA/ SEPACK
1.17	SADDLES FOR COLD INSULATION	SUPERTHERM (LLOYD) / BEARDSELL
1.18	EPS / PUF INSULATION MATERIALS	LLOYDS / BEARDSELL / FRICK/ICEMAKE
1.19	RESIN BONDED MINERAL WOOL MAT	LLOYD / UP TWIGA / ROCKWOOL
1.20	RESIN BONDED MINERAL WOOL PIPE SECTION	UP TWIGA/EQUIVALENT
1.21	SS PIPES	RATNAMANI / BHANDARI FOILS & TUBES/ NEEKA TUBES / APEX TUBES/RENSA
1.22	SINGLE SEAT SS PNEUMATIC VALVES	SPX / GEA TUCHENHAGEN / ALFA LAVAL
1.23	MIX PROOF SS PNEUMATIC VALVES	SPX / GEA TUCHENHAGEN / ALFA LAVAL
1.24	PNEUMATIC SS BUTTERFLY / BALL TYPE VALVES	SPX / GEA TUCHENHAGEN / ALFA LAVAL
1.25	SS MANUAL VALVES & FITTINGS	IDMC / ALFA LAVAL / GEA/EQUIVALENT
1.26	FLUSH TYPE LIGHT & SIGHT GLASS FOR TANKS & VESSELS	ALFA LAVAL / GEA / TETRA PAK / SPX / INOXPA
2.0.INSTRUMENTATION, CONTROLS & AUTOMATION		
2.1	VFD	SIEMENS/ ALLEN BRADLEY/ DANFOSS/ ABB/ SCHNEIDER
2.2	LEVEL TRANSMITTER & INDICATOR	E&H /P&E/ EMERSON / IFM / ANDERSON NEGELE
2.3	TEMPERATURE / PRESSURE TRANSMITTER	E&H /RADIX/ EMERSON / ANDERSON NEGELE / IFM

Noted and agreed to the above

SIGNATURE OF THE TENDERER

SL. NO.	DESCRIPTION	MAKES
2.4	CONDUCTIVITY & PH TRANSMITTER	E&H / EMERSON / ANDERSON NEGELE
2.5	RTD	E&H / EMERSON / ANDERSON NEGELE / IFM/ RADIX / GIC / ALTOP
2.6	PID CONTROLLER	FORBES MARSHALL /SAMSON / AVCON / DEMBLA / YOKOGAVA
2.7	FLOW SWITCH	E&H / IFB, GMBH / IFM / ANDERSON NEGELE
2.8	PROXIMITY SWITCH	IFM/ SICK / P&F
2.9	LEVEL SWITCH (FLOAT TYPE & VIBRATING FORK TYPE)	E&H / EMERSON / ANDERSON NEGELE
2.10	VORTEX / MAGNETIC FLOW METER	E&H / EMERSON
2.11	MASS FLOW METER	E&H / EMERSON
2.12	CONTROL VALVE	SAMSON /DANFOSS /DEMBLA / MARSHALL- ARCA
2.13	PRESSURE SWITCH / TEMP SWITCH	DANFOSS / ALCO / HANSEN / PARKER / E&H/ EMERSON / ANDERSON NEGELE / IMF / INDFOSS / PYROTECH / SWITZER / RADIX / DAG-PROCESS/ TRAFAG
2.14	PRESSURE & TEMPERATURE GAUGE	FIEBIG / H GURU / WAAREE / WIKA / PRICOL
2.15	DUAL TYPE PRESSURE / TEMP GAUGES	FIEBIG / H GURU / WAAREE / WIKA / GIC / PRICOL / ALTOP
2.16	TEMPERATURE DIGITAL INDICATOR / CONTROLLER	E&H / EMERSON / ANDERSON NEGELE / IFM/ RADIX / WIKA
2.17	LOAD MANAGER / POWER / ENERGY MONITOR	ROCKWELL (ALLEN BRADLEY) / SIEMENS / ABB / L&T / SCNEIDER
2.18	PC (PERSONAL COMPUTER)	HEWLETT-PACKARD / DELL
2.19	NETWORK SWITCH	CISCO /SIEMENS / DLINK
2.20	PLC /DCS	SIEMENS / ALLEN BRADLEY / SCNEIDER
3.0.ELECTRICALS		
3.1	ELECTRIC MOTORS	SIEMENS / BHARAT BIJLEE / ABB / LEROY SOMER / CROMPTON GREAVES / KIRLOSKAR
3.2	GEARED MOTOR / GEAR BOX	BONFIGLIOLI/SEW/EURO DRIVES
3.3	AIR CIRCUIT BREAKER	L&T / SIEMENS / SCHNEIDER/ ABB
3.4	MCCB	L&T / SIEMENS / ABB/ SCHNEIDER / MDSLEGRAND
3.5	MPCB	L&T / SIEMENS / SCHNEIDER / ABB
3.6	CONTACTORS	L&T / SIEMENS / SCHNEIDER / ABB
3.7	STARTER OVERLOAD RELAYS	L&T / SIEMENS / SCHNEIDER / ABB
3.8	INTELLIGENT MOTOR PROTECTION RELAYS	L&T / SIEMENS / ALLEN BRADLEY / ABB/ SCHNEIDER
3.9	TIMERS ELECTRONIC	L&T / SIEMENS / SCHNEIDER / ABB
3.10	SWITCH FUSE UNITS	L&T / SIEMENS / SCHNEIDER / ABB
3.11	MCBS	LEGRAND / SCHNEIDER / SIEMENS / HAGER
3.12	PUSH BUTTONS	SIEMENS / L&T / SCHNEIDER / ABB / GE / TEKNIC

Noted and agreed to the above

SIGNATURE OF THE TENDERER

SL. NO.	DESCRIPTION	MAKES
3.13	INDICATING LAMPS (LED)	L&T / SIEMENS / SCHNEIDER / ABB /BINAY/ TEKNIC
3.14	DIGITAL AMMETER & VOLTMETER	SIEMENS / L&T / SCHNEIDER / RISHABH
3.15	ANALOG AMMETER & VOLTMETER	RISHABH / IMP / MECO / AE
3.16	DIGITAL ENERGY METER	SIEMENS / L&T /SCHNEIDER /HPL SOCOMEC
3.17	PVC CONDUIT & ACCESSORIES	PRECISION / CLIPSAL / POLYCAB/ P PLAST
3.18	DIGITAL POWER FACTOR METER	SIEMENS / L&T / SCHNEIDER / RISHABH / EPCOS
3.19	PROGRAMMABLE PROTECTION RELAY	MINILEC/ L&T
3.20	RESIN CAST / POLYCARBONATE CURRENT TRANSFORMER	KAPPA / BHARTI / L&T / NEWTEK / PRECISE / AE
3.21	LT ARMOURED POWER CABLES (ALUMINIUM & COPPER)	KEC (RPG) / FINOLEX / RR KABEL / POLYCAB/ SBEE / UNIVERSAL
3.22	LT ARMOURED COPPER CONTROL CABLES	KEC (RPG) / FINOLEX / RR KABEL / POLYCAB/ SBEE / UNIVERSAL
3.23	LT STEEL BRAIDED COPPER POWER & CONTROL CABLES	LAPP KABEL / SBEE / RR KABEL
3.24	SIGNAL & INSTRUMENT CABLE	LAPP KABEL/ FINOLEX/ POLYCAB/ RR KABEL/ SBEE / THERMOPAD
3.25	POWER CAPACITORS	EPCOS / SCHNEIDER / NEPTUNE DUCATI / L&T / KHATAU JANKAR / UNISTAR
3.26	APFC RELAY	BELUKE / EPCOS / L&T / SIEMENS
3.27	HARMONICS FILTER	APCOS / SCHNEIDER / ASIAN / L&T / DB EECTRONICS
3.28	CABLE TRAY	INDIANA / MEK / PILCO / ELCON / METALICA PRESSINGS / POWER CONTROLS
3.29	ISOLATING SWITCHES	SIEMENS / L&T / SCHNEIDER / ABB
3.30	HRC FUSES	L&T / SIEMENS / EE / GE POWER / C&S
3.31	PLUG & SOCKET	LEGRAND / CLIPSAL / BCH
3.32	IP 65 BOXES FOR MOTOR ISOLATOR/JUNCTION BOX	HENSEL / RITTAL / R STAHL
3.33	TERMINAL BLOCKS	WAGO / LAPP INDIA / CONNECT WELL / ELMEX
3.34	ROTARY SELECTOR SWITCH	L&T / SIEMENS / SALZER /KAYCEE
3.35	CABLE GLANDS	LAPP KABEL / DOWELS /COMET / BRACKO
3.36	CABLE LUGS	LAPP KABEL / DOWELS / COMET
3.37	MECHANICAL INTERLOCK	L&T / SCHNEIDER / ABB
3.38	ELECTRONIC SOFT STARTER	DANFOSS / ALLEN BRADLEY / SIEMENS / SCHNEIDER / L&T / ABB
3.39	SERVO VOLTAGE STABILIZER	SUVIK / APLAB / NEEL / CRYCARD
3.40	UPS	EMERSON / HI-REL / DB ELECTRONICS/ SOCOMEC / REILO
3.41	SMF BATTERY	AMCO / EXIDE / AMARA RAJA / AMCO YUASA
4.0.WATER & STEAM VALVES & PIPES (MS & GI)		

Noted and agreed to the above

SIGNATURE OF THE TENDERER

SL. NO.	DESCRIPTION	MAKES
4.1	WATER SOFTENING PLANT	ION EXCHANGE / THERMAX/EQUIVALENT
4.2	MULTI GRADE FILTER	ION EXCHANGE / THERMAX/EQUIVALENT
4.3	RO WATER PLANT	ION EXCHANGE / THERMAX/EQUIVALENT
4.4	HYDROFLOW SYSTEM	GRUNDFOSS / EQUIVALENT
4.5	WATER VALVES (BUTTERFLY / BALL)	L&T (AUDCO) / GEMU / INTERVALVE / CRESCENT / LEADER / SAUNDERS / BDK
4.6	HYDRO FLOW SYSTEM	GRUNDFOSS/MATHER-PLATT
4.7	WATER VALVES (DIAPHRAGM)	SAUNDERS / BDK / GEMU
4.8	NON-RETURN VALVE FOR WATER	L&T (AUDCO) / INTERVALVE / LEADER / KIRLOSKAR / EXPERT
4.9	WATER FOOT VALVE	KIRLOSKAR / GG / LEADER
4.10	GI PIPES FOR WATER	TATA / JINDAL / MST / ZENITH / KALYANI
4.11	MS PIPES FOR AIR, STEAM, CONDENSATE	TATA / JINDAL / MST / ZENITH / KALYANI
4.12	NRV FOR AIR / OIL LINE	INTERVALVE / L&T (AUDCO) / LEADER / EXPERT
4.13	SOLENOID VALVE FOR WATER LINES	DANFOSS / AVCON / BURKERT
4.14	STEAM PRESSURE REDUCING STATION	FORBES MARSHALL/ ARMSTRONG, USA/ ARCA / SPIRAX
4.15	STEAM OPERATED PUMPING TRAP	FORBES MARSHALL / ARMSTRONG, USA/ SPIRAX
4.16	STEAM PRESSURE REDUCING VALVE	FORBES MARSHALL/ ARMSTRONG, USA/ ARCA / SPIRAX
4.17	STEAM RELIEF VALVE, TRAPS & STRAINERS	FORBES MARSHALL / ARMSTRONG, USA/ SPIRAX
4.18	STEAM - WATER MIXING BATTERY	FORBES MARSHALL/ARMSTRONG, USA/SPIRAX/SWASTIL
4.19	HP / LP STEAM / CONDENSATE GLOBE VALVES	L&T / SPIRAX / FORBES MARSHALL / ARMSTRONG, USA / LEADER / THERMAX
4.20	HP / LP STEAM VALVES PISTON TYPE	FORBES MARSHALL / SPIRAX / ARMSTRONG, USA / UNI KLINGER
4.21	AUTOMATIC PUMPING PUMP	FORBES MARSHALL / ARMSTRONG, USA/ SPIRAX
5.0.AIR COMPRESSORS & AIR LINE FITTINGS		
5.1	AIR COMPRESSOR (SCREW)	ATLAS COPCO / INGERSOLL RAND / ELGI
5.2	REFRIGERATED AIR DRYER	ATLAS COPCO / INGERSOLL RAND /SMC/ CHICAGO PNEUMATIC / ELGI / BRY AIR / PURIFLAIR
5.3	AIR LINES ACCESSORIES	SHAVO NORGEN / FESTO / SMC / AIRMATIC / LEGRIS / JANATICS
5.4	AUTO DRAIN VALVE	INGERSOL RAND / ULTRA FILTER / ZANDER / JORC / PURIFLAIR
5.5	SOLENOID VALVE	DANFOSS / AVCON / FESTO / JANATICS
6.0.REFRIGERATION PLANT		
6.1	SCROLL / RECIPROCATING COMPRESSOR	BITZER / BLUE STAR /VOLTAS/FRICK
6.2	MOTOR FOR COMPRESSOR	KIRLOSKAR / SIEMENS / ABB / CGL

Noted and agreed to the above

SIGNATURE OF THE TENDERER

SL. NO.	DESCRIPTION	MAKES
6.3	AIR COOLED CONDENSING UNITS	BITZER / EMERSON/ BLUE COLD
6.4	FORCED DRAFT COOLERS	HELPMAN / GOEDHART/ KUBA/ GUNTNER/ STAR COOLERS /FRICK
6.5	AIR CURTAINS	RUSEEL /RADAN /ALMANORD /SIMURG
6.6	PUF PANELS FOR COLD ROOMS	LLOYDS/BEARDSHELL/FRICK/RINAC/JINDAL MECTEC/SINTEX/ICEMAKE
6.7	SS VERTICAL WATER / CHILLED / HOT WATER PUMPS	GRUNDFOS/MATHER & PLATT/WILO/KSB/JYOTI
6.8	REFRIGERATION CONTROLS & ACCESSORIES	DANFOSS/ EQUIVALENT
6.9	ROOM AIR CONDITIONER (CASSETTE & 5 STAR RATING SPLIT TYPE)	HITACHI / MITSUBISHI / CARRIER/LG/ EQUIVALENT
6.10	CHILLED WATER BASED FAN COIL UNIT	CARRIER / BLUE STAR / STAR COOLERS/ VOLTAS/ FRICK
7.0.MISCELLANEOUS		
7.1	STRUCTURAL STEEL	SAIL / TISCO / RINL / ESSAR / ARCELOR/TATA/ EQUIVALENT
7.2	PLAT FORM TYPE AND CHECK WEIGH SCALE	SARTORIUS / METLER TOLEDO / PRECIA MOLEN

Noted and agreed to the above

SIGNATURE OF THE TENDERER

NAME OF ITEM / WORK	:	**DESIGN, SUPPLY, ERECTION, INSTALLATION, TESTING AND COMMISSIONING OF 6 TLPD CAPACITY ICE CREAM PLANT AND 10 TLPD CAPACITY FERMENTED PRODUCTS PLANT AT TIRUCHIRAPALLI DCMPU LTD.,**
TENDER REFERENCE NO	:	1111/Proj.4/2022, Dated:28.02.2022

PART – II

COMMERCIAL BID

THE TAMILNADU COOPERATIVE MILK PRODUCERS' FEDERATION LTD CHENNAI 600 035

SIGNATURE OF THE TENDERER

QUALIFICATION

The commercial offers of such of those tenderer who qualify themselves for being considered for **Design, Supply, Erection, Installation, Testing and Commissioning of 6 TLPD Capacity Ice Cream Plant and 10 TLPD Capacity Fermented Products Plant at Tiruchirapalli DCMPU Ltd.,** by fulfilling the entire terms and conditions as laid in Part I "Technical Bid" of this tender, will be considered for the finalization of the tender. Other commercial offers not qualifying as above will be rejected outright.

SIGNATURE OF THE TENDERER

Design, Supply, Erection, Installation, Testing and Commissioning of 6 TLPD Capacity Ice Cream Plant and 10 TLPD Capacity Fermented Products Plant at Tiruchirapalli DCMPU Ltd.,

ABSTRACT
PRICE QUOTE SCHEDULE

In Rupees

S.N.	DESCRIPTION			RATE
A	**SUPPLY:**			
1	Basic Price (Break up details – to be furnished in a separate enclosure)			
2	Packing Forwarding if any			
3	Transportation charges to site including loading and unloading charges			
4	Transit insurance			
5	GST/IGST			
	Sub-Total (A)			
B	**Installation, Testing and Commissioning**	**Material cost if any**	**Labour Cost**	
1	Unpacking, shifting and positioning charges			
2	Installation, Testing and Commissioning charges			
3	GST/IGST			
	Sub Total (B)			
	TOTAL PRICE (A+B)			
	TOTAL PRICE IN WORDS			

SIGNATURE OF THE TENDERER WITH SEAL

SIGNATURE OF THE TENDERER

BREAK-UP DETAILS FOR ABSTRACT PRICE QUOTE SCHEDULE

In Rupees

S.NO	DESCRIPTION OF MAJOR ITEMS	CAPACITY	QTY	UOM	BASIC PRICE	P&F	TRANSPORT CHARGES	TRANSIT INSURANCE	GST/ IGST	TOTAL PRICE
A	**ICE-CREAM PLANT**									
1.0	**RAW MATERIAL RECEIVING & STORAGE SECTION**									
1.01	MILK SILO	5 KL	1	NO.						
1.02	MILK TRANSFER PUMP	5 KLPH	1	NO.						
1.03	CIP RETURN PUMP	10 KLPH	1	NO.						
1.04	CREAM STORAGE TANK (INSULATED & JACKETED)	2000 L	1	NO.						
1.05	CREAM PUMP	1000 LPH	1	NO.						
2.0	**MIX PREPARATION SECTION**									
2.01	ICE CREAM/CANDY MIX PREPARATION-CUM-STORAGE TANK	2000 L	2	NOS						
2.02	KULFI MIX PREPARATION TANK	1000 L	1	NO.						
2.03	KULFI MIX TRANSFER PUMP	1 KLPH	1	NO.						
2.04	KULFI MIX COOLING THE/PHE - TWO STAGE WITH TOWER WATER AND CHILLED WATER	1 KLPH	1	NO.						
2.05	TURBO-BLENDER FOR DRY INGREDINT DISSOLVING- (SPX/TETRAPAK)	1000 KG/HR	1	NO.						
2.06	BUCKET TYPE DUPLEX FILTER	3000 LPH	1	NO.						
2.07	PHE HEATER (TEMP. PROFILE)	3000 LPH	1	NO.						

SIGNATURE OF THE TENDERER

S.NO	DESCRIPTION OF MAJOR ITEMS	CAPACITY	QTY	UOM	BASIC PRICE	P&F	TRANSPORT CHARGES	TRANSIT INSURANCE	GST/ IGST	TOTAL PRICE
2.08	HOT WATER PREPARATION SYSTEM WITH TANK, PHE AND PUMP		1	NO.						
2.09	MIX RECIRCULATION PUMP	3000 LPH	1	NO.						
2.10	MIX TRANSFER PUMP	1000 LPH	1	NO.						
2.11	CIP RETURN PUMP	10 KLPH	1	NO.						
3.0	**ICECREAM PROCESSING SECTION**									
3.01	ICE CREAM MIX PASTEURIZER	1000 LPH	1	NO.						
3.02	COOLING TOWER WITH PUMP 2 NOS. (1W + 1S)		1	NO.						
3.03	HIGH PRESSURE HOMOGENIZER	1000 LPH	1	NO.						
4.0	**ICECREAM AGEING AND FLAVOUR MIXING SECTION**									
4.01	ICE CREAM MIX AGEING TANK	2000 L	4	NOS						
4.02	AGED MIX TRANSFER PUMP	2000 LPH	1	NO.						
4.03	FLAVOUR MIXING TANK	600L	4	NOS						
4.04	SS PLATFORM FOR FLAVOUR MIXING TANK		1	NO.						
4.05	DISC TYPE STRAINER	600 LPH	4	NOS						
4.06	CIP RETURN PUMP	10 KLPH	1	NO.						
5.0	**CIP SYSTEM:**									
5.01	AUTOMATED CIP SYSTEM FOR ICP & FERMENTED PRODUCTS – 1 CIRCUIT EXP. TO 2.		1	SET						

SIGNATURE OF THE TENDERER

S.NO	DESCRIPTION OF MAJOR ITEMS	CAPACITY	QTY	UOM	BASIC PRICE	P&F	TRANSPORT CHARGES	TRANSIT INSURANCE	GST/ IGST	TOTAL PRICE
5.02	SKID MOUNTED CIP TANK & PUMP FOR FREEZER, PACKING MACHINES ETC		1	SET						
6.0	**CHOCOLATE MAKING & REWORKING SECTION**									
6.01	CHOCOLATE PREPARATION TANK	300 L	1	NO						
6.02	ICE CREAM REPROCESSING / REWORKING TANK	300 L	1	NO						
6.03	HOT WATER BATH FOR CAN		1	NO						
6.04	HOT WATER PREPARATION SYSTEM WITH TANK, PHE AND PUMP		1	SET						
7.0	**INGREDIENT PREPARATION SECTION**									
7.01	NUT & DRY FRUIT OVEN		1	NO						
7.02	NUT CUTTING MACHINE		1	NO						
8.0	**MISCELLANEOUS EQUIPMENT**									
8.01	STEAM WATER MIXING BATTERY		4	NOS						
8.02	FURNITURES		1	LOT						
8.03	UPS FOR AUTOMATION PURPOSE		1	SET						
8.04	PACKING HALL TEMP. MAINTENANCE SYSTEM		1	SET						
8.05	CRATE TROLLEY FOR ICECREAM CRATES		8	NOS						
9.0	**ICECREAM MAKING AND PACKING EQUIPMENT**									

SIGNATURE OF THE TENDERER

S.NO	DESCRIPTION OF MAJOR ITEMS	CAPACITY	QTY	UOM	BASIC PRICE	P&F	TRANSPORT CHARGES	TRANSIT INSURANCE	GST/ IGST	TOTAL PRICE
9.01	CONTINUOUS ICECREAM FREEZER	600 LPH	2	NOS						
9.02	CHILLED WATER BALANCE TANK, PHE CHILLER AND PUMP FOR FREEZER CONDENSING UNIT		1	NO						
9.03	FRUIT FEEDER		2	NOS						
9.04	ICE CREAM CUP FILLING MACHINE - ROTARY	6000 CPH	1	NO						
9.05	ICE CREAM CONE FILLING MACHINE - ROTARY	3000 CPH	1	NO						
9.06	RIPPLE TANK WITH DOSING PUMP - TROLLEY MOUNTED		1	NO						
9.07	ICE CREAM TUB FILLING MACHINE – 20 TPM		1	NO						
9.08	ON LINE METAL DETECTOR WITH CONVEYOR		1	NO						
9.09	INKJET PRINTER FOR FAMILY & BULK PACK CARTONS - (COMMON)		1	NO						
9.10	LID PRINTING MACHINE		1	NO						
9.11	SS CARTONING / WORKING TABLES		4	LOT						
9.12	WEIGH SCALES 100 KG – 1 NO., 5 KG- 1 NO.,1KG-3 NOS.		1	SET						
9.13	CANDY LINE- AUTOMATIC WITH ONE ICE WATER FILLING UNIT , ONE VACUUM SUCKING UNIT , AN ICE CREAM FILLING UNIT, A STICK INSERTING UNIT, A CHOCOLATE COATING UNIT,	3000 CPH	1	NO						

SIGNATURE OF THE TENDERER

S.NO	DESCRIPTION OF MAJOR ITEMS	CAPACITY	QTY	UOM	BASIC PRICE	P&F	TRANSPORT CHARGES	TRANSIT INSURANCE	GST/ IGST	TOTAL PRICE
	PRIMARY ISOLATED & SECONDARY BRINE PUMP (DEFROST) AND R-404 A BASED CONDENSING OPERATED THROUGH PLC. 2 SET OF MOULDS IN SS316 0.8MM THICK. OTHER ANCILLARIES LIKE CONVEYOR AND FLOW WRAPPING MACHINE.									
10.0	**ICECREAM - FREEZING AND STORAGE:**									
10.01	ICE CREAM DEEP FREEZE ROOM (18 M X 8.25 M X 4 M) X 2 NOS	30 KL								
10.01.1	A)PUF INSULATION WITH PRE COATED GI SHEET, DOORS, AIR CURTAINS AND WEATHER PROOF LIGHT FIXTURES		2	SET						
10.01.2	B) R- 404 - PACKAGED TYPE REFRIGERTAION SYSTEM COMPLETE WITH FORCE DRAFT COOLERS, REFRIGERATION CONTROLS AND AIR COOLED CONDENSING UNITS		2	SET						
10.02	ICECREAM DEEP FREEZER FOR FUTURE - ROOM SIZE 10.50 X5.25 X 4 M WITH DOORS AND LIGHT FIXTURES		1	SET						
10.03	ICE CREAM HARDENING ROOM (7 M X 3.5M X 4 M)	3 KL								
10.03.1	A)PUF INSULATION WITH PRE COATED GI SHEET, DOORS,		1	SET						

SIGNATURE OF THE TENDERER

S.NO	DESCRIPTION OF MAJOR ITEMS	CAPACITY	QTY	UOM	BASIC PRICE	P&F	TRANSPORT CHARGES	TRANSIT INSURANCE	GST/ IGST	TOTAL PRICE
	AIR CURTAINS AND WEATHER PROOF LIGHT FIXTURES									
10.03.2	B) R- 404 - PACKAGED TYPE REFRIGERTAION SYSTEM COMPLETE WITH FORCE DRAFT COOLERS, REFRIGERATION CONTROLS AND AIR COOLED CONDENSING UNITS - 2 X 9 TR MINIMUM		1	SET						
10.04	ANTEROOM WITH PUF INSULATION - PRE COATED GI SHEET, DOOR, AIR CURTAINS AND WEATHER PROOF LIGHT FIXTURES(27 M X2.5 MX 4M)		1	SET						
10.05	ANTEROOM FOR ICECREAM DISPATCH (17.5 M X 3 M X 4 M) WITH 2 NOS. OF SLIDING DOORS		1	NO						
11	**UTILITIES:**									
11.01	SERVICE PIPES, VALVES, FITTINGS & SUPPORTS		1	LOT						
11.02	SS PNEUMATIC VALVES OF MIX PROOF TYPE, SEAT VALVE AND BUTTERFLY VALVES FOR AUTOMATION OF MIX PREPARATION AND PROCESSING LINE (IT SHALL BE AS PER TENDER WHICH INCLUDES THE AUTOMATION OF MILK TANK 5 KL X 1 NO, CREAM TANK 2 KL X 1 NO. , MIX PREPARATION		1	LOT						

SIGNATURE OF THE TENDERER

S.NO	DESCRIPTION OF MAJOR ITEMS	CAPACITY	QTY	UOM	BASIC PRICE	P&F	TRANSPORT CHARGES	TRANSIT INSURANCE	GST/ IGST	TOTAL PRICE
	TANKS 2KL X 2 NOS, KULFI MIX PREPARATION TANK 1 KL X 1 NO., TURBO BLENDER OPERATION, PHE HEATING, MIX RECIRCULATION & MIX TRANSFER AND MIX PASTEURIZATION. FOR AUTOMATION, LEVEL TRANSMITTERS, LEVEL SWITCHES, FLOW METERS OF VOLUMETRIC TYPE SHALL BE USED. ALL THE TANKS SHALL HAVE TEMPERATURE TRANSMITTERS.)									
11.03	SS PIPES (PRODUCT/CIP) PIPES, VALVES, FITTINGS & SUPPORTS (ALL MANUAL VALVES SHALL BE BUTTERFLY TYPE AND FLOW PLATES SHALL BE USED INSTEAD OF 3 WAY PLUG VALVES)		1	LOT						
12.00	**SS STRUCTURALS- PLATFORM FOR FLAVOR MIXING TANK, MIX PREPARATION TANKS AND CIP PLATFORM**	**3 MT**	**1**	**LOT**						
13.00	**ELECTRICALS - MCC, POWER CABLING, INSTRUMENTATION CABLE, CABLE TRAY (SS CAGE TYPE FOR PROCESS HALL AND GI CABLE TRAY FOR OTHER**		**1**	**LOT**						

SIGNATURE OF THE TENDERER

S.NO	DESCRIPTION OF MAJOR ITEMS	CAPACITY	QTY	UOM	BASIC PRICE	P&F	TRANSPORT CHARGES	TRANSIT INSURANCE	GST/ IGST	TOTAL PRICE
	AREAS), EARTHING, RUBBER MAT, ETC.,									
13.01	PLC BASED AUTOMATION WITH FOR MIX PREPARATION AND PROCESSING WITH LEVEL INSTRUMENT FOR TANKS AND FLOW METER IN WATER/MILK/ CREAM		1	NO.						
14.00	**SPARES (INCLUDING IMPORTED FREEZERS)**		**1**	**LOT**						
B	**FERMENTED PRODUCTS PLANT AND UTILITIES**									
15	**CURD - 5000 KGPD**									
15.01	CURD MILK STORAGE TANK	5 KL	1	NO.						
15.02	CURD MILK TRANSFER PUMP	5KLPH	1	NO.						
15.03	CURD PASTEURIZER COMPLETE SET WITH 15 MIN HOLDING	2 KLPH	1	NO.						
15.04	PASTEURIZED CURD MILK STORAGE TANK	5KL	1	NO.						
15.05	PASTEURIZED CURD MILK TRANSFER PUMP	2 KLPH	1	NO.						
15.06	CIP RETURN PUMP	10 KLPH	1	NO.						
15.07	CURD MILK PRE HEATER WITH HOT WATER GENERATION SYSTEM	2 KLPH	1	NO.						
15.08	INOCULATION TANK FOR CURD IN POUCH	1 KL	2	NOS						
15.09	INOCULATION TANK FOR CURD IN CUP	500 L	2	NOS						

SIGNATURE OF THE TENDERER

S.NO	DESCRIPTION OF MAJOR ITEMS	CAPACITY	QTY	UOM	BASIC PRICE	P&F	TRANSPORT CHARGES	TRANSIT INSURANCE	GST/ IGST	TOTAL PRICE
15.10	CIP RETURN PUMP FOR CURD TANK	10 KLPH	1	NO.						
15.11	POUCH FILLING MACHINE FOR CURD	5000 PPH	1	NO.						
15.12	ROTARY CURD CUP FILLING MACHINE WITH CHANGE PARTS FOR THREE SIZES	2400 CPH	1	NO						
15.13	**CRATE WASHER AND CONVEYOR**	600 CPH	1	NO.						
15.14	HEATER FOR INCUBATION ROOM	SUITABLE	1	NO.						
15.15	CURD INCUBATION ROOM (5 M X 4 M X 4M)	5 MT	1	NO.						
16	**COLD STORAGE**									
16.01	A)PUF INSULATION WITH PRECOATED GI SHEET, DOORS, AIR CURTAINS AND WEATHER PROOF LIGHT FIXTURES		1	SET						
16.02	DAHI BLAST COOLER (5 M X 4 M X 4M)	3.5 MT	1	SET						
16.02.1	A)PUF INSULATION WITH PRECOATED GI SHEET, DOORS, AIR CURTAINS AND WEATHER PROOF LIGHT FIXTURES									
16.02.1	B) R- 404 - PACKAGED TYPE REFRIGERTAION SYSTEM COMPLETE WITH SS304B FORCED DRAFT COOLERS, REFRIGERATION CONTROLS AND AIR COOLED CONDENSING UNITS - (TO COOL 1750 KG. CURD FROM 42 DEG C TO 12									

SIGNATURE OF THE TENDERER

S.NO	DESCRIPTION OF MAJOR ITEMS	CAPACITY	QTY	UOM	BASIC PRICE	P&F	TRANSPORT CHARGES	TRANSIT INSURANCE	GST/ IGST	TOTAL PRICE
	DEG C IN 2 HRS), APPROX 2 X 9 TR UNITS									
16.03	ANTE-ROOM FOR LOADING OF CURD IN BLAST ROOM AND COLD STORAGE (4 M X2.5 MX 4 M). PUF INSULATED WITH PRECOATED GI SHEET, DOORS, AIR CURTAINS AND WEATHER PROOF LIGHT FIXTURES WITH 1 NOS OF DOORS AND AIR CURTAIN		1	SET						
16.04	CURD, LASSI & BUTTER MILK COLD STORE - (10 M X5.25M X 4 M)	15 MT	1	SET						
16.04.1	A)PUF INSULATION WITH PRECOATED GI SHEET, DOORS, AIR CURTAINS AND WEATHER PROOF LIGHT FIXTURES									
16.04.2	B) R- 404 - PACKAGED TYPE REFRIGERTAION SYSTEM COMPLETE WITH SS 304 FORCED DRAFT COOLERS, REFRIGERATION CONTROLS AND AIR COOLED CONDENSING UNITS - 2 X 5 TR MINIMUM									
17.00	**BUTTER MILK SECTION**									
17.01	CURD SETTING TANK FOR BUTTER MILK	2 KL	1	NO.						
17.02	SS SHEAR PUMP	2 KLPH	1	NO.						
17.03	TRANSFER PUMPWITH VFD	5 KLPH	1	NO.						

SIGNATURE OF THE TENDERER

S.NO	DESCRIPTION OF MAJOR ITEMS	CAPACITY	QTY	UOM	BASIC PRICE	P&F	TRANSPORT CHARGES	TRANSIT INSURANCE	GST/ IGST	TOTAL PRICE
17.04	PHE CHILLER FOR COOLING LASSI / BUTTER MILK (COMMON)	5 KLPH	1	NO.						
17.05	CIP RETRUN PUMP	10 KLPH	1	NO.						
17.06	PASTEURIZED WATER TANK	2 KL	1	NO.						
17.07	PASTEURIZED WATER TRANSFER PUMP	5 KLPH	1	NO.						
17.08	POUCH FILLING MACHINE WITH IN BUILD FOR BUTTER MILK / LASSI	5000 PPH	1	NO.						
17.09	THERMISER FOR BUTTER MILK AND LASSI (FUTURE)	1 KLPH	0	NO.						
17.10	HIGH SHEAR MIXER WITH SHEAR PUMP WITH SUITABLE CHILLER	0.5 TPH	0	NO.						
18.00	**LASSI SECTION**									
18.01	CURD SETTING TANK FOR LASSI	2 KL	1	NO.						
18.02	SUGAR DISSOLVING AND SYRUP PREPARATION TANK.	500 L	1	NO.						
18.03	SUGAR SYRUP / WATER TRANSFER PUMP	5 KLPH	1	NO.						
18.04	HOT WATER BASED - WATER / SUGAR SYRUP HEATING SYSTEM	5 KLPH	1	NO.						
18.05	SUGAR SYRUP FILTERS - BUCKET TYPE FILTER	5 KLPH	1	NO.						
18.06	INLINE METAL DETECTOR FOR SUGAR SYRUP	SUITABLE	1	NO.						
18.07	CIP RETURN PUMP	10KLPH	1	NO.						

SIGNATURE OF THE TENDERER

S.NO	DESCRIPTION OF MAJOR ITEMS	CAPACITY	QTY	UOM	BASIC PRICE	P&F	TRANSPORT CHARGES	TRANSIT INSURANCE	GST/ IGST	TOTAL PRICE
19.00	**OTHER EQUIPMENTS**									
19.01	MANGO PULP BALANCE TANK	200 L	1	NO.						
19.02	DOSING PUMP - SCREW TYPE	500 LPH	1	NO.						
19.03	OVER HEAD BALANCE TANK	1KL	1	NO.						
20.00	**UTILITIES**									
20.01	**COMPRESSED AIR HANDLING SYSTEM**									
20.01.1	VFD DRIVEN LUBRICATING SCREW AIR COMPRESSOR IN ACOUSTIC ENCLOSURE OF OIL FREE TYPE &WITH AFTER COOLER MOISTURE SEPARATOR (1 W + 1S)	300 CFM	2	NOS						
20.01.2	SS AIR RECEIVER WITH ACCESSORIES		1	NO,						
20.01.3	AIR DRYER REFRIGERATED TYPE		2	NOS						
20.01.4	COMPRESSED AIR PIPES & FITTINGS		1	SET						
20.02	**INDUSTRIAL ELECTRICAL LT - MCC, POWER CABLING, INSTRUMENTATION CABLE, CABLE TRAY (SS CAGE TYPE FOR PROCESS HALL AND GI CABLE TRAY FOR OTHER AREAS), EARTHING, RUBBER MAT, ETC.,**		1	LOT						
21	**MISCELLANEOUS:**									

SIGNATURE OF THE TENDERER

S.NO	DESCRIPTION OF MAJOR ITEMS	CAPACITY	QTY	UOM	BASIC PRICE	P&F	TRANSPORT CHARGES	TRANSIT INSURANCE	GST/ IGST	TOTAL PRICE
21.01	**STRUCTURAL BRIDGES/PLATFORMS**									
21.01.1	SS STRUCTURAL PLATFORMS IN FERMENTED PRODUCT SECTION AND CROSS OVER BRIDGE FOR CRATE CONVEYORS ETC. -		1	LOT						
21.02	STEAM PRESSURE REDUCING STATION WITH BYPASS VALVES ARRANGEMENT		1	SET						
21.02.1	STEAM DISTRIBUTION, CONDENSATE RECOVERY SYTEM WITH INSULATED TANK OF 2 KL AND PUMPING SYSTEM WITH INSULATION AND CLADDING.		1	LOT						
21.02.2	STEAM & WATER MIXING BATTERIES		4	NOS						
21.03	RO WATER PLANT - 1KLPH, SS STORAGE TANK- 5 KL WITH TRANSFER PUMP OF SUITABLE CAPACITY		1	SET						
21.04	Hand Pallet truck	2 Ton	2	No.						
22	**FIRE FIGHTING SYSTEM**									
22.01	FIRE EXTINGUISHERS FOR CONTROL ROOM, OFFICE, FERMENTED PRODUCT BLOCK		1	LOT						
23.0	**ERECTION, TESTING AND COMMISSIONING OF THE PLANTS**		1	Job						
24.00	**GRAND TOTAL**									

SIGNATURE OF THE TENDERER

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Note:-

1). The rates should be quoted separately for equipment-wise with break-up of Basic Price, Packing & Forwarding, Transportation charges, Loading and unloading charges, Transit insurance, GST/IGST for supply, Unpacking, shifting and positioning charges, Erection & commissioning charges, GST/IGST for Erection & commissioning etc., which should be totalled and mentioned in the Abstract of Price Quote Schedule.

2). The tenderer shall furnish break up details for the above in a separate sheet for Price, GST/IGST, with the percentage.

3). All the rates should be only in terms of Indian Rupees.

4). Tenderer should indicate origin of country from which the equipment is imported and has to produce authorization letter from OEM.

5). Phrases like `Extra', `as applicable', `at the prevailing rate' etc. should not be quoted to avoid ambiguity.

Seal of the firm **Signature of the tenderer**

Witness:

1

2

Date:

SIGNATURE OF THE TENDERER