(n)Procure
TOLL FREE NUMBER
7359 021 663

Tender Consolidated Details

Note: All Dates are in dd/mm/yyyy hr:min as per **Indian Standard Time (IST)**

NIT/Tender Details - 456815

View BOQ Details

Organization / Department Name :	**DAIRIES (GUJARAT)**
Circle/Division	**Dudhsagar Dairy**
IFB No / Tender Notice No	MDCMPUL / 2021-22 / 168 / DHD/ Paneer Plant
Name of Project	Design, Manufacture, Supply, Installation, Testing & Commissioning of 3 MT/Day Capacity (expandable to 5 MT/Day) Semi Automatic Paneer Manufacturing, Packing & Storage at Dudhmotisagar Plant, Dharuhera-Haryana of Mehsana District Co-op. Milk Producers' Union Ltd on turnkey Basis
Name of Work	Design, Manufacture, Supply, Installation, Testing & Commissioning of 3 MT/Day Capacity (expandable to 5 MT/Day) Semi Automatic Paneer Manufacturing, Packing & Storage at Dudhmotisagar Plant, Dharuhera-Haryana of Mehsana District Co-op. Milk Producers' Union Ltd on turnkey Basis
Estimated Contract Value(INR)	52,500,000.00 (five crore twenty five lacs only)
Period Of Completion	6 Months
Mode of Tender	Open
Tender Currency Type	Single
Tender Currency Settings	Indian Rupee(INR)
Consortium / Joint Venture	Not Applicable
Rebate	Not Applicable
Sector Category	Cooperatives
Form of Contract	Turn-Key
Product Category	Supply, Errection And Commis-Sioning

Amount Details

Bid Document Fee / Bid Processing Fees :	11800 (eleven thousand eight hundred only)
Bid Processing Fee Payable To :	Mehsana District Co-operative Milk producers' Union Ltd. , Mehsana .
Bid Security/EMD/Proposal Security (INR) :	Rs. 1,050,000.00 (ten lacs fifty thousand only)
Bid Security/EMD In Favour Of/Remarks :	Mehsana District Co-operative Milk producers' Union Ltd. , Mehsana .

Tender Dates

Bid Document Downloading Start Date	10/04/2021 17:58:13 onwards
Bid Document Downloading End Date	07/05/2021 18:59:00
Pre Bid Meeting	Yes (Offline)
Pre Bid Meeting Opening Date	23/04/2021 11:00:00 onwards
Last Date & Time for Receipt of Bids	07/05/2021 18:59:00
Bid Validity Period	120 Days
Remarks:	Last Date and Time for submitting all supporting documents (in Hard copy)-10th May 2021 at 18:00 hrs.at Tender Section (Purchase Department), Dudhsagar Dairy, Mehsana-384002. Last Date & Time for ONLINE submission of tender fee, EMD and commercial bids-7th May, 2021 at 18:59 hrs. Price bid should be on Firm Price in INR only,on FOR DHD, Dharuhera basis

Other Details

Officer Inviting Bids :	I/C Mangaing Director
Bid Opening Authority :	I/C Mangaing Director
Address :	Mehsana District Co-operative Milk Producers Union Limited Dudhsagar Dairy,Highway, Mehsana-384002
Contact Details :	99740 59278,80032 77738

General Terms & Conditions Top

General Terms and Conditions

(1) Bidders can download the tender document free of cost from the website.
(2) Bidders have to submit Price bid in Electronic format only on nprocure website whereas Technical bid in Hard copy (Physical documents) till the Last Date & time for submission.
(3) Price bid in physical form will not be accepted in any case.
(4) Free vendor training camp will be organized every Saturday between 4.00 to 5.00 P.M. at (n)code solutions-A Division of GNFC Ltd., Bidders are requested to take benefit of the same.

Bidders who wish to participate in online tenders will have to procure / should have legally valid Digital Certificate as per Information Technology Act-2000 (Class-III) using which they can sign their electronic bids. Bidders can procure the same from any of the license certifying Authority of India or can contract (n)code solutions- A division of GNFC Ltd, who are licensed Certifying Authority by Govt. of India.

In case bidders need any clarifications or if training required to participate in online tenders, they can contact (n)Procure Support team:-

(n)code Solutions-A division of GNFC Ltd.,
(n)Procure Cell
403, GNFC Infotower, S.G. Road,
Bodakdev, Ahmedabad – 380054 (Gujarat)

Contact Details
Phone
Airtel: +91-79-40007501, 40007512, 40007516, 40007517,40007525
Reliance : +91-79-30181689

Fax : +91-79-26857321, 40007533
E-mail : nprocure@ncode.in

TOLL FREE NUMBER: 1800 419 4632 (EXT: 512,513,514,515,516,517)

Other Terms & Conditions as per detailed tender documents

Tender Documents

Sl.No	File Name	Description	File Size
1.	A DHD Paneer NIT Tender 2021.22.pdf	A. Tender NIT of DHD Paneer Project	678.49 KB
2.	Part_B_Paneer_Project_Technical_Part.pdf	B.DHD Paneer Project Technical Part	1.26 MB
3.	Appendices-2_Paneer_Sec_block_diagram_.pdf	Appendix Paneer section block diagram	272.61 KB
4.	C Common Tender Part.pdf	General terms and conditions of Tender and PO	801.92 KB
5.	D Formats 2021.rar	Standard Format of Authorisation, Bank Guarantees and Vendor data sheet	59.51 KB

Tender Stages

StageName	Evaluation Opening Date	Priority
Preliminary Stage	11/05/2021 10:00:00	1
Technical stage	11/05/2021 10:10:00	2

Commercial Stage 11/05/2021 10:15:00 3

Tender Stage Screens

ScreenName	Form Type	Screen Mode	Mandatory	Multiple Submission	Documents Required
Stage Name: Preliminary Stage					
Tender fee and EMD details	User Defined Template	Standard	Mandatory	No	
Stage Name: Technical stage					
Check List	User Defined Template	Standard	Mandatory	No	
Stage Name: Commercial Stage					
Price Bid	User Defined Template	Secured	Mandatory	No	

Certificate Details

Decryptor Name : Subodh Kumar Kant(Manager Purchase)

SerialNo : 53963BF5

SubjectDn : CN=KANT SUBODH KUMAR, S=Gujarat, PostalCode=384002, OU="PURCHASE,ECID - 9931128", Phone=631c96478a61fc0246d1d84adb0b9073d04a3e8a82ba529177a9065b0545ff87, O=MEHSANA DISTRICT COOPERATIVE MILK PRODUCERS UNION LTD, C=IN

Cert Issuer : CN=(n)Code Solutions CA 2014, OID.2.5.4.51="301, GNFC Infotower", STREET="Bodakdev, S G Road, Ahmedabad", S=Gujarat, PostalCode=380054, OU=Certifying Authority, O=Gujarat Narmada Valley Fertilizers and Chemicals Limited, C=IN

Thumprint : 969DC985966A70FB5C2D793C4130F4F1E698FB71

Tender Assignments

Tender Modifier	Preliminary Stage	Technical stage	Commercial Stage
Subodh Kumar Kant(Manager Purchase)	Subodh Kumar Kant(Manager Purchase)	Subodh Kumar Kant(Manager Purchase)	Subodh Kumar Kant(Manager Purchase)

Close

Icons Representation

Documents Attached

Powered By: C1India Private Limited **Server Time : 12/04/2021 11:32:41**

APRIL 9, 2021

3 MT/DAY CAPACITY SEMI AUTOMATIC PANEER MANUFACTURING, PACKING & STORAGE PLANT (ON TURN-KAY BASIS)AT DUDHMOTISAGAR DAIRY, DHARUHERA, HARYANA

E-Tender cum Reverse Auction Document: MDCMPUL / 2021-22 / 168 / DHD/ Paneer Plant

PURCHASE DEPARTMENT – TENDER SECTION

MEHSANA DISTRICT CO-OPERATIVE MILK PRODUCERS' UNION LIMITED

Dudhsagar Dairy, Highway, Mehsana – 384002Phone: 02762-253201,

Fax: 02762-253201

www.dudhsagardairy.coop

Contents

1. General Information

Mehsana District Co-operative Milk Producers' Union Limited, Mehsana (MDCMPU Ltd.) popularly known as Dudhsagar Dairy, (located at Mehsana in Gujarat) is one of the largest Co-operative Dairy in India. MDCMPU Ltd was established in 1960 with the noble intention of ensuring a fair return to the milk producers. It is a district level apex body of milk cooperative societies in Mehsana & Patan District which aims to provide remunerative returns to milk producers' and also to serve the interest of consumers by providing quality and safe milk and milk products which give good value for money. It is having eights dairies, two milk chilling centres, two cattle feed plants, semen collection plant and one Dairy Science College. Various products manufactured are milk in milk pouches, Dahi, Buttemilk, Ghee, Table Butter, Milk Powder, Sweetened Condensed Milk, Ice Cream, Flavoured milk and long shelf life (UHT) milk. It is selling almost all milk and milk products in India and abroad under the brand name of Amul and Sagar and having total turnover of around Rs 5944/- crores (FY 2019-20) with its broad base of more than 10 lakh farmer members in Gujarat, Rajasthan and Haryana states.

For more details about us kindly visit the following websites:

1. Dudhsagar Dairy: http://www.dudhsagardairy.coop/
2. Pashu Samvardhan Kendra, Jagudan: http://www.sagarxjagudan.com/
3. Mansinhbhai Institute of Dairy & Food Technology: http://www.midft.com/

1.1 Notice Inviting Tender

Tender Notice No.	MDCMPUL / 2021-22 / 168 / DHD/ Paneer Plant
Online Tender Website	https://www.nprocure.com/
Reverse Auction Website	https://e-auction.nprocure.com/
Website for Digital Signature Certificate (DSC)	https://www.ncodesolutions.com/
Bid Documents Download Start	9th April, 2021
Bid Documents Download End	7th May, 2021 at 18:59 hrs.
Pre-Bid Meeting	23rd April.2021, 11:00 PM at M-Floor of Admin block, Dudhsagar Dairy, Mehsana-384002
Last Date & Time for ONLINE submission of tender fee, EMD and commercial bids	7th May, 2021 at 18:59 hrs.
Last Date, Time & Address for submitting all supporting documents	10th May 2021 at 18:00 hrs. Tender Section (Purchase Department)

(in Hard copy) as mentioned in the tender document	Mehsana District Co-operative Milk Producers' Union Limited Dudhsagar Dairy Highway- Mehsana – 384 002, Gujarat, Telephone No: (02762) 253201-05,
Bid Validity Period	120 Days
Bid Document Fee:	Rs. 10,000.00 + 18% GST = Rs. 11,800
Bid Security/EMD (INR)	Rs. 10,50,000/-
Bid Document Fee/EMD Payable To	Mehsana District Co-operative Milk Producers' Union Ltd., Mehsana
Beneficiary Name	Mehsana District Cooperative Milk Producers Union Limited
Credit Account Number	02380310000063
Account Type	Cash Credit
Bank Name	HDFC Bank Ltd
Bank Branch Name	Mehsana Branch
IFSC Code	HDFC0000238
Name of Company	Mehsana District Co-operative Milk Producers' Union Ltd, Dudhsagar Dairy, Highway, Mehsana, Gujarat, PIN - 384002
Name of Tender	Design, Manufacture, Supply, Installation, Testing & Commissioning of 3 MT/Day Capacity (expandable to 5 MT/Day) Semi Automatic Paneer Manufacturing, Packing & Storage at Dudhmotisagar Plant, Dharuhera- Haryana of Mehsana District Co-op. Milk Producers' Union Ltd on turnkey Basis
Name of Work description	Design, Manufacture, Supply, Installation, Testing & Commissioning of 3 MT/Day Capacity (expandable to 5 MT/Day) Semi Automatic Paneer Manufacturing, Packing & Storage at Dudhmotisagar Plant, Dharuhera- Haryana of Mehsana District Co-op. Milk Producers' Union Ltd on turnkey Basis
Period of Completion of Project	6 Months
Estimated cost of Project	Rs. 5,25,00,000
Other Terms and Conditions	1. This is a two-stage tender i.e. first, technical data submitted by bidders will get analysed at our end. Then commercial bid of only

	technically qualified bidders will be considered for second stage of commercial evaluation. 2. Bidders have to abide by all terms and conditions and specifications of items mentioned in tender document. 3. Bids without tender fee and EMD will not get considered. 4. Bidder has to upload scanned copy of Tender fee and EMD submission documents as required in e-tender on n-procure website. Remaining all supporting documents have to be submitted in Hard copy in sealed envelope to Purchase department of Dudhsagar Dairy, Mehsana. 5. There will be a Reverse Auction on the basis of the L1 rates of E Tender Price bids. Only those parties who qualify in Tender, will be given item wise participation in e-Auction. 6. In case of dispute, decision taken by I/C Managing Director will be final.	
Officer Inviting Bids	I/C Managing Director	
Bid Opening Authority	I/C Managing Director / Purchase Head	
Address	Purchase department C/o. Managing Director Mehsana District Co-operative Milk Producers' Union Ltd, Dudhsagar Dairy Highway, Mehsana, Gujarat-384002	
Contact Details	02762-253201-05	
Contact Person	Contact No.	E-mail ID
For Technical queries		
Sh J.P.Jani (Factory Head, Dudhsagar Dairy, Mehsana) Sh. Shivsharan, (DHD Plant, Dharuhera)	99740 59278 80032 77738	jpjani@mehsanaunion.coop ssharan@mehsanaunion.coop
For commercial queries and help in filling tender:	02762-253201, Extn:161 & 164	skkant@mehsanaunion.coop kamehta@mehsanaunion.coop purexecutive@mehsanaunion.coop

1.2 Eligibility Criteria

A. Commercial Criteria

1.2.1 The Bidder shall have aggregate financial turn over in the last three financial years ending 31st March (i.e. 2017-18, 2018-19, 2019-20) should not be less than 60 Crores. Audited Balance sheet and Income tax return documents shall be provided as proof of financial turn over.

B. Technical Criteria

1.2.2 The bidder shall possess previous experience of Supply, Installation and Commissioning of Milk and Milk Products manufacturing Plants in his own name in reputed dairy plants of India. The plant installed by the bidder shall have Dairy equipments i.e. manufacturing, packing machines, CIP units etc

Vendor shall have to submit Purchase Orders Copy along with Work completion Certificate / execution certificate as supporting document describing installation of in his own name in reputed Dairy Plants of India. The Bidder shall have executed one dairy project with amount of 5 Crores i.e. equivalent to tender cost

Bidder or subsidiary of bidder should have its own manufacturing unit for manufacturing equipments like Paneer Vat, Pressing stations, Paneer Cooling vat, Hoops etc

1.2.3 The bidder shall have been in the business of Dairy Equipment supplier since last 5 years on their own name. Vendor shall have to provide minimum one Purchase order of Dairy Equipment supply or SITC of before financial year of 2016-17.

1.2.4 Site visit certificate for the actual working conditions. Before submitting their offer, the bidder shall have examine the project site of works and its surroundings and obtain all information at own responsibility. Vendor shall have to collect all information and get certificate from site In-Charge to submit in tender bid.

The vendor which is blacklisted by our organization / GCMMF / NDDB are not eligible to bid otherwise, bid will not be accepted and EMD may be forfeited.

A. Downloading of Tender Document and Payment of Tender fee and EMD

The Bid document can be downloaded from website **www.nprocure.com**.

The Tender Fee and EMD Amount should be paid by NEFT/RTGS/IMPS to Mehsana District Co-operative Milk Producers' Union Limited in the bank account mentioned in above NIT. **ANY OTHER MODE OF PAYMENT IS NOT ACCEPTABLE**

Tender fee (non-refundable) and EMD (refundable) amount is mentioned in 1.1. Notice Inviting Tender.

After Paying the amount by NEFT/RTGS/IMPS, details of the same should be given in preliminary stage of the tender on www.nprocure.com. The soft copy of the payment advice of the transaction to be uploaded on the portal as a proof of payment.

Any future correspondence related to this tender will get published on www.nprocure.com.

The security deposit /EMD will be interest free.

B. Submission of Tender

Submission of the Tender Fee & EMD details

Bidder has to submit tender fee and EMD payment details and Price bid online on N-procure portal only.

Submission of Physical Documents

All other supporting documents in Physical form/ hard copy has to be submitted to **our office at Mehsana**, in sealed envelope mentioning our Tender document reference on top of the envelope. Any lapse in document submission may result in disqualification of bid. Following documents are required:

1. Technical Bid (signed and sealed copy of tender document with technical details)
2. UTR of Tender Fee and EMD submitted online by NEFT/ RTGS/ IMPS
3. Copy of balance sheet of FY 2017-18, 2018-19 & 2019-20
4. Copy of GST certificate
5. Copy of PAN No.
6. Vendor Registration Form (if Bidder is not already registered as vendor with Dudhsagar Dairy)
7. P.O. and work completion copy as specified in above Eligibility Criteria.
8. Product leaflet if needed.
9. Reference list.
10. Tentative Work execution schedule

Note: Bidder must submit all supporting documents of Tender bid with proper Paging and indexation at beginning. Our Tender document should be submitted in hard copy duly signed and sealed each page at first and page no. of supporting documents should start then e.g. If our tender document is of total 15 pages, then page no. of your supporting document should start from page no.16. Page no. of respective supporting document must be mentioned in Checklist's last column for proper verification of supporting documents. Highlighting of requirement compliance as per eligibility criteria should be done on respective page of tender bid document.

Submission of Commercial (Price) Bid

Bidder should submit Commercial (Price) Bid online on website www.nprocure.com only. Commercial bid (price bid) in physical form (price bid) sent to Mehsana District Co-operative Milk Producers' Union Limited, Mehsana will be rejected out rightly.

Note: Only after verification and acceptance of documents submitted, commercial bid will get opened.

C. Bid Security

All Bids must be accompanied by Earnest Money Deposit (EMD) in the form specified in the Bidding document. The Bids not accompanied with EMD shall be summarily rejected. The Bid security shall be denominated in Indian Rupees of value as specified.

The Bid security may be forfeited if:

1. A Bidder or Supplier withdraw its bid during the period of bid validity specified by the Purchase on the tender document

   or

2. In case of successful Bidder / Supplier, if the Bidder / Supplier fails to sign the contract or execute the contract within specified period of contract.

D. Reverse Auction

Dudhsagar Dairy May go for reverse E-Auction facilitated by Nprocure for the last stage of negotiation depending on the Prices and number of bidders participated.

In such case, there will be a Reverse Auction on the basis of the L1 rates of E Tender Price bids. Only those parties who qualify in Tender will be given item wise participation in e-Auction.

E. Rights Reserved by Dudhsagar Dairy, Mehsana

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

F. Acceptance of Tender Terms and Conditions by Bidder

Quoting price bid on n-procure website will be treated as acceptance of all terms and conditions of tender document.

I/C Managing Director

Mehsana District Cooperative Milk Producers Union Limited

Dudhsagar Dairy, Mehsana

2. Check List

2.1. General checklist

The details to be provided by bidders in prescribed General check list format, as below: **(Supporting documents to be submitted in Hard copy to our office):**

Sr. No.	Particulars	Requirement	Confirmation Status or Information	Page no. in Bid
1	Agreed for this Project on Turn-key basis and on Fixed Price and Door Delivery basis at our Dudhmotisagar Dairy, Dharuhera plant as specified in tender document .(Yes / No)	Yes		
2	Agreed for General Terms and Conditions of tender document (Yes / No)	Yes		
3	Agreed for Specific Terms of tender document (Yes / No)	Yes		
4	Agreed for Technical Specifications, Special conditions of Project and Scope of supply and work as specified in Tender. (Yes / No)	Yes		
5	Earnest Money Deposit (EMD) Paid.(Yes / No) – Provide details	As per Tender		
6	Tender Fee Paid (Yes / No) – Provide details	As per Tender		
7	Submit GST Number	True copy required		
8	Submit PAN Number	True copy required		
9	Duly signed and sealed copy of tender document	Yes		
10	Already Registered with Dudhsagar Dairy (Yes / No). If Yes, then mention your Vendor code no. otherwise submit enclosed vendor registration form along with supporting documents listed therein.	Yes/No		
11	Contact No. and name of contact person	Your details		
12	Address	Your details		
13	Email ID of contact person	Your details		
14	Submit Manufacturer's Authorization	Original copy		

	Certificate as per given MAF letter format or your own Manufacturing License, (as applicable)	of MAF or True copy of Mfr.License required		
15	Turnover (2017-18) (in Rs. Only)	Aggregate of 3 years (2017-20) Min. Rs. 60 Crores		
16	Turnover (2018-19) (in Rs. Only)			
17	Turnover (2019-20) (in Rs. Only)			
18	Bidder's Login id for Reverse Auction	To be created and provided		

2.2 Technical Checklist 2.2.1

Copy of minimum single purchase order of Min. Rs. 5 Crore not older than FY 2016-17 is needed. (Please refer eligibility criteria 1.2.2)

Sr. No.	Purchase Order Description	Purchase Order Date	Supply and work completion End Date	Organization (Client's name)	Contact no. and name of contact person of your client	Main Product / service of PO	Value (Rs.)	Document Page no. in bid
1								
2								

2.3 Technical Checklist 2.2.2

Copy of Minimum single purchase order which was of before **FY 2016-17** (Please refer eligibility criteria 1.2.3)

Sr. No.	Purchase order brief description	Purchase order date	PO Execution Start Date	PO Execution End Date	For Company (Client's name)	Contact no. and name of contact person of your client	Value (Rs.)	Supporting Document Page Number
1								

2.4 Other eligibilities

Sr. No.	Particulars	Requirement	Confirmation Status or Information	Supporting Document Page No.
1	Have you Confirmed / provided all details of your offered items' Specifications /Dimensions/ Capacity / Make / Model etc.	Must comply properly in tender document BOQ		
2	Do you have Your Service network/ center with stock of essential spares / parts within territory of our Dudhmotisagar Dairy Plant.	Yes . If Yes, pl give Address and contact details.		
3	Are you currently blacklisted by any Co-operative Milk Union in Gujarat	No. Submit Your self-declaration for the same on your company letterhead.		
4	Have you Visited Our Site at DHD, Dharuhera Plant..	Yes, Site visit report in hard copy		

3. Tender Price Bid Format

This is for reference only. Bidder should fill price bid on tender website.

Sl.	BOQ Item No.	ITEM DESCRIPTION	Capacity required	Quantity	Basic Price	GST in %	Net Amount
1	5.1	Line from Existing PMST distribution header to SMSTs/Paneer Milk tanks including pneumatic valves & fittings	Suitable	1 Lot			
2	5.2	Standardized Milk Storage tanks (SMSTs) with Platform for Paneer Milk Storage	15,000 Lit.	2 No.			
3	5.3	Standardized milk transfer pump from SMSTs to Milk heating module (VFD Operated)	3 KLPH	1 No.			
4	5.3.1	Milk return line from Existing SMSTs distribution header to Raw milk tank of Process Section-Dharuhera Plant including pneumatic valves & fittings	Suitable	1 Lot			
5	5.3.2	Self Priming CIP return Pump for SMSTs (Standardized Milk storage tanks of Paneer Section)	Suitable	1 No.			
6	5.4	Skid Mounted Regenerative Milk Heating module and Whey cooling Module	3 KLPH	1 Set			
	5.5	**Citric Acid Preparation cum Storage System**					
7	5.5.1	Citric Acid Solution tank with Platform	2500 Liter	2 Nos.			
8	5.5.2	Metering Pump for Citric Acid Solution dosing	4000 LPH	2 Nos.			
9	5.6	Paneer vat	1500 Liter (Geometric cap. 2,000 Liter)	4 Set			

10	5.7	Self Priming CIP Solution return Centrifugal Pump for Paneer Vat	Suitable	1 No			
11	5.8	Paneer Hoops	Suitable to Prepare 10 Kg Paneer blocks	180 Nos.			
12	5.9	Wheel Mounted SS trolleys for Paneer Hoops transfer	Suitable & as required	1 Lot			
13	5.10	Paneer Press / Paneer Pressing Station	4 Set/ 6 Heads with 4 Hoops pressing/Head	6 Set			
	5.11	**Paneer Blocks Cooling Vat (Insulated) with Cooling water recirculation pump, water chiller, Filtration, UV & Ozonization System**					
14	5.11.1	Paneer Block Cooling Vat (Insulated)	2000 Liter (each for 90 blocks)	2 Nos.			
15	5.11.2	Self Priming CIP Solution return Pump for Paneer Cooling vat	Suitable	1 No.			
16	5.11.3	Cooling water circulation Pump	Suitable	1 No.			
17	5.11.4	Cooling Water Chiller (To maintain cooling water temp 4 deg C)	5 KLPH	1 Set			
18	5.11.5	Cooling water Duplex Filter with change over facility	Suitable	1 Set			
19	5.11.6	UV treatment System	Suitable	1 Set			
20	5.11.7	Ozonization System	5 KLPH	1 Set			
21	5.12	Wheel Mounted SS trolleys from Paneer Cooling Vat to Cold store/Packing Room	Suitable	1 Lot			
22	5.13	SS tables for blocks demoulding & Paneer Packing	Suitable	1 Lot			

		Paneer whey collection System					
23	5.14	Whey Balance tank for collection of Paneer whey	200 Lit	1 No			
24	5.15	Whey transfer Pump to regenerative PHE	5 KLPH	1 No.			
25	5.16	Cooling tower water pump for whey cooler	Suitable	2 Nos. (1 W+1 Standby)			
26	5.17	Chilled Whey storage tank (intermediate, Insulated VMST)	15,000 Liter	1 No..			
27	5.18	Whey transfer pump to Whey Pasteurizer	5 KLPH	1 No.			
28	5.19	Self priming CIP return Pump for Chilled Whey storage tank	Suitable	1 No.			
29	5.20	Whey Pasteurizer; Design Temp Prog. (6-30-78-4 °C) 93% regeneration efficiency	5 KLPH	1 Set			
30	5.21	Pasteurized Whey Storage tank	15,000 Liter	2 Nos.			
31	5.22	Self priming CIP return Pump for Past Chilled whey storage tanks	Suitable	1 No.			
32	5.23	Whey Dispatch Pump	20 KLPH	1 No			
33	5.24	Electronic Mass flow meter	20 KLPH	2 No			
34	5.25	Whey dosing Pump for Butter Milk thermizer balance tank (VFD Based)	3 KLPH	1 No			
35	5.26	Whey Dispatch Chiller (7 deg C to 3 deg C)	20 KLPH	1 No			
36	5.27	Whey tanker dispatch Hose (Food grade)	63 mm & suitable length	1 Set			
37	5.28	Paneer Block Cutting Machine (200 gm & 500 gm)	300 Kg/Hr	2 Nos.			
38	5.29	Paneer Vacuum Packing machine	400 Kg/Hr	1 Nos.			
39	5.30	Wheel mounted SS trolleys for transfer Packed Paneer blocks to Paneer Sterilizer	Suitable, (as required)	1 Lot			

	5.31	**Hot Water Sterilizer**					
40	5.31.1	Packed Paneer Sterilization Vat (Insulated with Platform)	2000 Packets per Hr	1 Nos.			
41	5.31.2	Hot Water Circulation Pump	Suitable	1 Nos.			
42	5.31.3	Hot water PHE	Suitable	1 Nos.			
43	5.31.4	Hot Water Filters	Suitable	1 Set			
44	5.31.5	Mono rail and Pulley System	Suitable	1 Set			
45	5.32	Wheel Mounted SS trolleys for transfer sterilized Packed Paneer Blocks to Cooling room/ Cartoning	Suitable	1 Lot			
46	5.33	Inkjet Printing Machines with belt conveyor for batch coding	Suitable	2 Nos.			
47	5.34	Manual Cartoning tables	Suitable	1 Lot			
48	5.35	Metal Detector for Finished goods cartons	Suitable	1 Set			
49	5.36	Weighing Scales with SS tables	2 kg and 50 Kg capacity, 5 Nos. of tables	2 kg Cap.-6 Nos., 50 Kg cap.-02 Nos.			
50	5.37	Hoops Cleaning System/tanks	3000 Lit / Suitable	1 Set			
51	5.38	Paneer shredding / Paneer mincer with SS table for rework	Suitable	1 No.			
52	5.39	Paneer Paste Making Machine	Suitable	1 No.			
53	5.40	Cooling tower with Pump & Accessories	Suitable	1 No.			
	5.42	**CIP Kitchen for Paneer Plant**					
54	5.41.1	Acid/ Lye Dosing System with Pumping & Piping	Suitable	1 Lot			
55	5.41.2	Lye Solution Tank:	3000 Liters	1 No			

56	5.41.3	Acid Solution Tank	3000 Liters	1 No			
57	5.41.4	Hot water tank	3000 Liters	1 No			
58	5.41.5	Recuperation or Rinse Water tank	3000 Liters	1 No			
59	5.41.6	Sterilization Tank	500 Lit	1 No			
60	5.41.7	CIP Forward Pump (VFD Operated)	20 KLPH	1 No			
61	5.41.8	Bucket type Duplex filters	20 KLPH	1 No			
62	5.41.9	Tubular Heat Exchanger for CIP solution Heating	20 KLPH	1 No			
63	5.41.10	Automatic Pumping Trap for Heater	Suitable	1 No			
64	5.41.11	Recirculation Pump for Acid and Lye tank	Suitable	1 No			
65	5.41.12	CIP return pump for Paneer Processing equipment- Self Priming	Suitable	1 No.			
	5.42	**Automation & Field instruments**					
		Automation					
66	5.42.1	Automation Hardware	suitable	1 lot			
67	5.42.2	Operator Console PC (OS + ES)	suitable	1 lot			
68	5.42.3	Printer	suitable	1 lot			
69	5.42.4	Network Hardware	suitable	1 lot			
70	5.42.5	Automation/ System Software	suitable	1 lot			
71	5.42.6	Control Desk and Cabinate	suitable	1 lot			
		Field Instruments					
72	5.42.7	Process transmitter	suitable	1 lot			
73	5.42.8	Process gauges	suitable	1 lot			
74	5.42.9	Temperature elements	suitable	1 lot			
75	5.42.10	Process switches	suitable	1 lot			
76	5.42.11	Flow elements	suitable	1 lot			

77	5.42.12	Magnetic Flow meters	suitable	1 lot			
78	5.42.13	Mass flow meters	suitable	1 lot			
79	5.42.14	Vortex Flow meters	suitable	1 lot			
80	5.42.15	Level transmitter	suitable	1 lot			
81	5.42.16	Conductivity Analyzer	suitable	1 lot			
82	5.42.17	Control Valves	suitable	1 lot			
	5.43	**Electrical distribution system**					
83	5.43.1	MCCs	suitable	1 lot			
84	5.43.2	Motors Isolators	suitable	1 lot			
85	5.43.3	Cable trays	suitable	1 lot			
86	5.43.4	Conduits and glands	suitable	1 lot			
87	5.43.5	LT Power Cables	suitable	1 lot			
88	5.43.6	LT Control Cables	suitable	1 lot			
89	5.43.7	Instrument cables	suitable	1 lot			
90	5.43.8	Rubber mats	suitable	1 lot			
91	5.43.9	RCBs and Junction Boxes	suitable	1 lot			
92	5.43.10	VFD & Panel	suitable	1 lot			
93	5.43.11	Earthing for Electrical Power and Automation	suitable	1 lot			
94	5.44	UPS with servo stabilizer, common batteries Control & Automation system (complete)	suitable	1 lot			
95	5.45	Pipes, fittings, valves and supports	suitable	1 lot			
96	5.46	Raw / soft water distribution piping, valves, fittings & supports	suitable	1 lot			
97	5.47	Steam distribution system	suitable	1 lot			
98	5.48	Chilled water distribution	suitable	1 lot			
99	5.49	Compressed air distribution piping, valves, fittings & Supports for entire Plant	suitable	1 lot			

100	5.50	Supporting structure and working platforms for entire plant	suitable	1 lot			
101	5.51	Steam & water mixing batteries	suitable	1 lot			
102	5.52	Installation, testing & commissioning	suitable	1 Job			
103	5.53	Service Cover & Training	suitable	1 Job			

Important Note:

1. **In BOQ item No.5.2** ,Standardized Milk Storage tanks (SMSTs) for Paneer Milk Storage- Capacity: 15000 Lit, Quantity: 02 Set, and **For BOQ item No.5.21** Pasteurized Whey Storage tank, Capacity-15000 Lit, Quantity: 02 Set. Purchaser will provide Agitator set for All 04 Nos. tanks. Bidder shall consider erection value for same and design 15,000 Liter tanks accordingly.
2. **In CIP Kitchen of Paneer Plant,** Purchaser will provide BOQ Item No.5.41.2, 5.41.3, 5.41.4, 5.41.5 (3000 Lit Capacity tanks, Quantity: 03 Nos.), Bidder shall consider erection value for same and design CIP kitchen accordingly.
3. The complete refrigeration system supply i.e. Freon based standalone refrigeration system for Blast Room and Finished good cold store, Forced Air Ventilation System is not in scope of Bidder. The same items will be arranged by Purchaser.

Special Clause :

1. Bid price must be on Fixed rate basis in INR only. Only GST revision as per government notification will be accepted.
2. Basic rates should be inclusive of P and F, freight, insurance, unloading, shifting and positioning at our site i.e.FOR our site,but, exclusive of GST.
3. During project execution, If additional quantity of any item covered in above price table is required either for completion of turnkey project or capacity expansion, bidder will have to supply and install respective item at same approved rate of our purchase order.
4. **NO Foreign exchange rate variation ,EPCG license/ Custom duty benefit to be considered in bid.**
5. **Above special clauses supersede all other related terms and conditions specified in Tender document.**

Part B. Technical Specifications, Conditions, Bidding terms deviation & Forms For

Design, Manufacture, Supply & Labour Job for Installation, Testing & Commissioning of 3 MT/Day Capacity (expandable to 5 MT/Day) Semi Automatic Paneer Manufacturing, Packing & Storage at Dudhmotisagar Plant, Dharuhera- Haryana of Dudhsagar Dairy On turnkey Basis

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Section II
INSTRUCTIONS TO BIDDER

Contents

1. Cost of Bidding

1.1 The Bidder/Supplier shall bear all costs associated with the preparation and submission of its bid, and the "Purchaser", will in no case be responsible or liable for those costs, regardless of the conduct or outcome of the bidding process.

2. Contents of Bidding Document

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

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

3. Clarification of Bidding Document

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

4. Amendment of Bidding Document

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

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

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

5. Pre Bid Meeting

The bidder or his official representative is advised to attend a pre bid meeting which will be convened at the office of purchaser.

Venue of the meeting: As per NIT

Date of Pre Bid meeting: As per NIT

Subsequent Corrigendum, if any, will be uploaded on N-procure portal.

6. Language of Bid

6.1 The Bid prepared by the Bidder/Supplier and all correspondence and documents relating to the bid exchanged by the Bidder/Supplier and the Purchaser shall be written in the **English language.** Any printed literature furnished by the Bidder/Supplier may be written in another language so long as **accompanied by an English translation** of its

pertinent passages in which case, for the purposes of interpretation of the bid, the English translation shall govern.

7. Documents Comprising the Bid

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

1.
- A Bid Form and a Price Schedule completed in accordance with Clauses 7, 8 & 9 to be uploaded as commercial bid

2.
3. Technical Bid (to be submitted online)
4.
- Documentary evidence established in accordance with Clause 10 that the Bidder/Supplier is qualified to perform the contract if its bid is accepted.
- Documentary evidence established in accordance with Clause 11 that the goods and ancillary services to be supplied by the Bidder/Supplier conform to the Bidding Document.
- Bid security (Earnest Money Deposit) furnished in accordance with Clause 12 along with the bid security details form.
- A statement of deviation and exception to the provision of bidding documents.

8. Bid Form

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

9. Bid Prices

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

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

- Charges for packing and forwarding, inland transportation, insurance, unloading at our site and other local costs incidental to delivery of the goods to their destination; will be considered as all Inclusive.
- The cost of installation and commissioning as described in the technical specifications and in accordance with Special conditions of Contract with regard to erection, testing and putting the equipment into satisfactory operations, including successful completion of performance and guarantee tests to be performed at the destination by Bidder/Supplier will be considered as all Inclusive.

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

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

- Spare parts required for the items quoted by the Bidder/Suppliers, as mentioned in BOQ.

- Item wise prices of all the spare parts valid, for acceptance by the Purchaser and placement of orders, for one year from the date of bid opening.
- The prices of the spares shall be optional for evaluation

10. Price Adjustment

Please note that this is a fixed price PO and once the order placed, no price escalation shall be entertained with respect to exchange rate variation and/or custom duty variation.

11. Bid Currency

Prices shall be quoted in Indian Rupees only if a contract is awarded against this invitation for bid. Please note that this is a fixed price PO. No price adjustment shall be allowed on account of any changes in the landed cost due to variation in the Exchange rates and / or Customs Duty (combined effect).

12. Documents Establishing Bidder/Supplier's Experience and Qualifications (Hard copy to be submitted in physical documents)

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

- The documentary evidence of the Bidder/Supplier's qualifications to perform the Contract if its bid is accepted, shall establish to the Purchaser's satisfaction
- That in the case of a Bidder/Supplier offering to supply goods and services under the Contract which the Bidder/Supplier did not manufacture or otherwise produce, the Bidder/Supplier has been duly authorised by the goods' manufacturer or producer to supply the goods. The bid shall include manufacturer's authorisation form given in the bidding documents.
- The Bidder/Supplier has the financial, technical and production capability necessary to perform the Contract. To ascertain this, all bids submitted shall include the information as per the pro forma along with qualification application (Table 1, 2 & 3) in Appendices II**.**
- Copies of original documents defining the constitution or legal status, place of registration and principal place of business of the company or firm or partnership, etc;
- Details of experience and past performance of the Bidder/Supplier on equipment offered and those of similar nature and those of similar nature within the past 5 years and details of current contracts in hand and other commitments.
- Major items of plant and equipment available/ installed in the Bidder/Supplier's factory premises.
- Qualification and experience of key personnel for successful execution of the contract.
- Reports on financial standing of the Bidder/Supplier such as profit and loss statements, balance sheets and, auditor's report of the past three years, bankers' certificates etc.
- Information regarding any current litigation in which the Bidder/Supplier is involved

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

1. Documents Establishing Goods' Conformity to Bidding Document (Hard copy to be submitted in physical documents)

13.1 Pursuant to **Clause 6** the Bidder/Supplier shall furnish, as part of its bid, documents establishing the conformity to the Bidding Document of all goods and services, which the Bidder/Supplier proposes to supply under the Contract.

- The documentary evidence of the goods' and services' conformity to the Bidding Document may be in the form of **literature, drawings and data**, and shall furnish:
- A detailed description of the goods' essential technical and performance characteristics
- A list giving full particulars, including available sources and current prices, of all spare parts, special tools, etc. necessary for the proper and continuing functioning of the goods for a period of two years, following commencement of the goods' use by the Purchaser; and
- A **clause-by-clause commentary on the Purchaser's Technical Specifications** demonstrating the goods and services' substantial responsiveness to those specifications or a statement **of deviations and exceptions** to the provisions of the Technical Specifications.
- All the above document shall be uploaded on the e tender website as mentioned in the IFB

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

2. Bid Security (Earnest Money Deposit)

14.1 Bid security proof to be uploaded online and also to be submitted in the office of purchaser as mentioned in the NIT.

14.2 Pursuant to Clause 6 the Bidder/Supplier shall furnish, as part of its bid, bid security (Earnest Money Deposit) as specified in the NIT (Notice Inviting Tender).

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

14.4 The bid security shall be denominated in Indian Rupees of value as specified.

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

14.6 Unsuccessful Bidder/Suppliers' bid security will be discharged/ returned as promptly as possible but not later than 30 days after the expiration of the period of bid validity prescribed by the Purchaser. The successful Bidder/Supplier's bid security will be discharged upon the Bidder/Supplier's complete execution of Purchase order.

14.7 The bid security may be forfeited:

- If a Bidder/Supplier withdraws its bid during the period of bid validity specified by the Bidder/Supplier on the Bid Form; or
- In the case of the successful Bidder/Supplier, if the Bidder/Supplier fails:

- To sign the Contract in accordance with Clause 28
- To furnish performance security in accordance with Clause 29

3. Period of Validity of Bids

15.1 Bids shall remain valid for 120 days after the last date of submission of the bids prescribed by the Purchaser, pursuant to Clause 16. A bid valid for a shorter period may be rejected by the purchaser as non-responsive.

15.2 In exceptional circumstance, the Purchaser may prior to expiry of the initial validity period, solicit the Bidder/Suppliers' consent to an extension of the period of validity. The request and the responses thereto shall be made in writing (or by cable or telex/fax). The bid security provided under Clause 12 shall also be suitably extended. A Bidder/Supplier may refuse the request without forfeiting its bid security. A Bidder/Supplier granting the request will not be required nor permitted to modify its bid.

4. Format and Signing of Bid

16.1 The Bidder/Supplier shall submit the tender online

16.2 All the technical document as well as eligibility criteria documents shall be submitted in Hard copy in Physical bid documents.

5. Sealing and Marking of Bids

17.1 As per NIT.

6. Deadline for Submission of Bids

18.1 The bid must be submitted online before the tender closing date as per NIT.

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

7. Late Bids

Any bid uploaded by the Purchaser after the deadline for submission of bids shall be rejected as per e tender procedure.

8. Modification and Withdrawal of Bids

20.1 The Bidder/Supplier may modify or withdraw its bid after the bid's submission as per e tender terms and conditions before the dead line of the bid submission.

20.2 The Bidder/Supplier's modification or withdrawal notice shall be prepared, sealed, marked and dispatched in accordance with the provisions of Clause15. A withdrawal notice may also be sent by fax or e mail but followed by a signed confirmation copy, post marked not later than the deadline for submission of bids.

9. Opening of Bids by Purchaser

21.1 The Purchaser will download the "technical bid" as per e tender procedure. After through scrutiny of technical bid including qualification criteria, only eligible bidder's (qualify the technical requirement of the bid) commercial bid shall be opened as per e tender norms.

10. Clarification of Bids

To assist in the examination, evaluation and comparison of bids the Purchaser may, at its discretion, ask the Bidder/Suppliers for a clarification of its bid. The request for

clarification and the response shall be in writing and no change in the price or substance of the bid shall be sought, offered or permitted.

11. Preliminary Examination

23.1 The Purchaser will examine the bids to determine:

- Whether they are complete,
- Whether any computational errors have been made,
- Whether required sureties have been furnished,
- Whether the documents have been properly signed,
- Whether the bids are generally in order.

23.2 Arithmetical errors will be rectified on the following basis:

- If there is a discrepancy between the unit price and the total price that is obtained by multiplying the unit price and quantity, the unit price shall prevail and the total price shall be corrected. If the Bidder/Supplier does not accept the correction of the errors, its bid will be rejected. If there is a discrepancy between words and figures, the amount in words will prevail.

23.3 Prior to the detailed evaluation, pursuant to Clause 22, the Purchaser will determine the substantial responsiveness of each bid to the Bidding Document. For purposes of these clauses, a substantially responsive bid is one, which conforms to all the terms and conditions of the Bidding Document without material deviations. The Purchaser's determination of a bid's responsiveness is to be based on the contents of the bid itself without recourse to extrinsic evidence.

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

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

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

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

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

12. Evaluation and Comparison of Bids

24.1 The Purchaser will evaluate and compare the bids previously determined to be substantially responsive, pursuant to Clause 21. No bid will be considered if the complete requirement covered under this work is not included in the bid. However, the discounts offered by the Bidder/Suppliers, during negotiations, if any, will be taken into account in the evaluation of bids so as to determine the bid offering the lowest evaluated cost for the Purchaser in deciding award of contract/s.

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

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

24.4 The Purchaser's evaluation of a bid will take into account, in addition to the bid price and the price of incidental services, the following factors**,** in the manner and to the extent indicated in this Clause 22 and in the Technical Specifications:

- Cost of inland transportation, insurance and other costs within India incidental to delivery of the goods to their final destination.
- Delivery schedule offered in the bid.
- The cost of components and service;
- The availability of spare parts and after-sales services for the equipment offered in the bid.
- Deviation in payment schedule from that specified in the Special Conditions of Contract
- The quality and adaptability of the equipment offered.
- The performance and productivity of the equipment offered

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

13. Contacting the Purchaser

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

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

14. Post-qualification

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

26.2 The determination will take into account the Bidder/Supplier's financial, technical and production capabilities. It will be based upon an examination of the documentary evidence of the Bidder/Supplier's qualifications submitted by the Bidder/Supplier, pursuant to Clause 10 as well as such other information as the Purchaser deems necessary and appropriate including details of experience and records of past performance.

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

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

15. Right to Vary Quantities at the Time of Award

The Purchaser reserves the right at the time of award of Contract to increase or decrease by up to 15% (Fifteen percent) the quantity of goods and services specified in the Schedule of Requirements without any change in unit rates as specified in the price break – up or other terms and conditions.

16. Right to Accept any Bid and to Reject Any or All Bids

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

29. Notification of Award

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

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

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

30 Signing of Contract

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

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

31 Performance Security

31.1 the successful Bidder/Supplier shall furnish the performance security in accordance with the special conditions of Contract, in the Performance Security Form provided in the Bidding Document or another form acceptable to the Purchaser.

32 Turn-key Contract

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

33 Delivery Schedule of items

Bidder/Suppliers should submit a detailed item wise delivery schedule keeping in view the completion period of the contract. Such items shall be grouped under monthly

delivery schedule with total value of such items. This will facilitate for ensuring the cash flow requirement for the project.

Table 1
Check List of Bid Submission

SN	Requirement	Tick ✓
1	Bid Form ,Copy of Online Bid submitted on N-procure portal.	
2	Qualification Application and supporting	
3	Manufacturers' Authorisation Form or Manufacturing License issued by Government authority	
4	Technical Deviation Statement form	
5	Commercial Deviation Statement form	
6	Bid Security (Earnest Money Deposit)	
7	Power-of-attorney for authorised signatory	

Section III
General Conditions of Contract

Contents

1. Definitions

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

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

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

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

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

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

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

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

2. Application

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

3 Definition of Country of origin

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

4 Standards

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

5. **Use of Contract Documents and Information**

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

5.2 The Bidder/Supplier **shall not**, without the Purchaser's prior written consent, make use of any document or information except for purposes of performing the Contract.

5.3 Any document, other than the Contract itself, shall remain the property of the Purchaser and shall be returned (in all copies) to the Purchaser on completion of the Bidder/Supplier's performance under the Contract if so required by the Purchaser.

6 Patent Rights

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

7. **Performance Security**

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

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

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

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

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

8 Inspection and Tests

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

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

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

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

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

9 Packing and Marking

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

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

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

10 Delivery and Documents

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

11 Insurance

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

12 Transportation

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

13. Incidental Services

13.1 As specified in the Special Conditions of Contract, the Bidder/Supplier shall be required to provide any or all of the following services:

- Performance or supervision of on-site assembly and/ or start-up of the supplied Goods;

- Furnishing of tools required for assembly and/or maintenance of the supplied goods
- Furnishing of a detailed operations and maintenance manual for each appropriate unit of the supplied Goods; and manuals covering the operation and maintenance of automation software and control systems.
- Performance or supervision or maintenance and/or repair of the supplied Goods, for a period of time agreed by the parties, provided that this service shall not relieve the Bidder/Supplier of any warranty obligations under this Contract and
- Conduct of training of the Purchaser's personnel, at the Bidder/Supplier's plant and/or on-site, in assembly, start-up operation, maintenance and/or repair of the supplied Goods.

14. Spare Parts

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

- Such spare parts as the Purchaser may decide to purchase from the Bidder/Supplier, provided that this decision shall not relieve the Bidder/Supplier of any warranty obligations under the Contract; and
- In the event of termination of production of the spare parts:
- Advance notification to the Purchaser of the pending termination, in sufficient time to permit the Purchaser to procure its needed requirements; and
- Following such termination, furnishing at no cost to the Purchaser, the soft-copies, the blueprints, drawings and specifications of the spare parts, if and when requested.

15. Warranty/Guarantee

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

15.2 This warranty/guarantee shall remain valid for not less than 12 months after the Goods or any portion thereof as the case may be, have been successfully commissioned and plant handed over to the purchaser.

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

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

15.5 If the Bidder/Supplier, having been notified, fails to remedy the defect(s) within a reasonable period, the Purchaser may proceed to take such **remedial action** as may be

necessary, at the **Bidder/Supplier's risk and expense** and without prejudice to any other rights which the Purchaser may have against the Bidder/Supplier under the Contract.

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

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

16. Payment

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

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

16.3 Payments shall be made promptly by the Purchaser within forty five (30) days of submission of an invoice/claim by the Bidder/Supplier.

17. Prices

Prices charged by the Bidder/Supplier for Goods delivered and Services performed under the Contract shall not, with the exception of price adjustments authorized by the special conditions of the contract, vary from the prices quoted by the Bidder/Supplier in its bid and the Contract shall be on fixed price basis.

18. Change Orders

18.1 The Purchaser may, at any time, by a written order given to the Bidder/Supplier make changes within the general scope of the Contract in any one or more of the following:

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

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

19. Contract Amendment

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

20. Assignment

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

21. Sub-contracts

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

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

22. Delays in the Bidder/Supplier's Performance

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

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

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

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

23. Liquidated Damages

23.1 Subject to **Clause 25**, if the Bidder/Supplier fails to deliver any or all of the Goods or perform the Services within the time period(s) specified in the Contract, the Purchaser shall, without prejudice to its other remedies under the Contract, deduct from the Contract Price, as liquidated damages as under:

a. For the Supply Component:
A sum equivalent to **0.5%** of the delivered price of the delayed goods (As per the price break up furnished by the supplier and accepted by the Purchaser, which the supplier fails to supply within the time period specified in the contract for each week of delay.

b. For the Erection and Commissioning Component:
A sum equivalent to **0.5%** of the un – executed portion of each week of delay or part thereof beyond the time specified in the contract for the successful completion of the plant.

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

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

24. Termination for Default

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

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

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

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

25. Force Majeure

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

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

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

26. Termination for Insolvency

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

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

27. Termination for Convenience

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

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

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

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

28. Resolution of Disputes

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

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

29. Governing Language

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

30. Applicable Law

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

31. Notices

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

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

32. Taxes and Duties

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

33. Right to use defective equipment

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

34. Income Tax and Other Taxes

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

35. Jurisdiction

35.1 Settlement of any dispute out of the purchase order/ contract against this bid shall be subject to the courts at address mentioned in "invitation for bid"

Section IV
Special Conditions of Contract

Contents

The following special conditions of contract shall supplement the General conditions of contract. Whenever there is a conflict, the provisions herein shall prevail over those in the General conditions of contract. The corresponding clause number of the General conditions is indicated in parentheses:

4.1 Definitions (Clause 1)

4.1.1 The Purchaser is Mehsana District Co-operative Milk Producers' Union Limited (herein after referred as Dudhsagar Dairy) and would include the term "Owner"

4.1.2 The Bidder/Supplier is (Name of Bidder/Supplier).

4.1.3 Equivalency of Standards and Codes (Clause 4)

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.

4.2 Performance Security (Clause 7)

4.2.1 The Performance Security shall be in the amount of 10% of the contract price up and shall be released after the date of completion of performance obligations including warranty obligations.

4.3 Inspection and tests (Clause 8)

4.3.1 The inspection of the goods shall be carried out to check whether the goods are in conformity with the technical specifications attached to the purchase order form and shall be in line with the inspection/test procedures laid down in the schedule of specifications and the contract conditions.

4.4 Delivery and Documents (Clause 10)

Original and seven copies of :

a) the supplier's invoice showing purchase order no., Goods' description, quantity, unit price, total amount;
b) Delivery note/packing list/lorry receipt;
c) Manufacturer's/Supplier's guarantee certificate;
d) Inspection Certificate issued by the nominated inspection agency, and the Supplier's factory inspection report;
e) Certificate of origin (As applicable)
f) Insurance policy;
g) Any other document evidencing payment of statutory levies.

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 no. and date should also be mentioned in the invoice/s.

4.5 Insurance (clause 11)

4.5.1 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.

4.5.1 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.

4.6 Incidental services (Clause 13)

4.6.1 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 scope of the Contract.

4.7 Spare Parts (Clause 14)

4.7.1 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 one months of placement of order.

4.7.2 Losses during Trial :(Clause 23)

Not applicable in this tender

4.8 Warranty/Guarantee (Clause 15)

4.8.1 The warranty/guarantee shall be as per provision under clause 15

4.9 Payment (Clause16)

4.9.1 Payment for supply, installation and commissioning contracts:

For Supply;

- 20% advance of total contact value or Purchase Order amount on

1. Acceptance of the Purchase Order i.e.
a) Submission of Duplicate Copy of the order duly signed by authorized signatory putting stamp of the Organization
b) Execution of the Contract Form

2. Against Submission of bank guarantee for equivalent amount valid for 30 days beyond the stipulated delivery (as per schedule of delivery & supply) or Completion Period. Last date for defaulter's claim should be min 3 months beyond BG validity date.

3. Against Submission of Plant layout and P&ID Diagram of Process & Services

- 60% Progressive Payment of Supply Value against safe receipt of goods at site within 30 days.

- 20% balance payment on satisfactory erection & commissioning of entire plant and Production trial of the plant (on acceptance by the Purchaser/Purchaser's representative) against 10% a performance bank guarantee of equivalent amount valid for one year from the date of successful Product trial. Last date for defaulter's claim should be min 3 months beyond BG validity date.

For Erection:

- 60% of Payable Erective Value on Progression of erection of all equipment including related accessories as per approved layout as per Joint Measurement Sheet within 60 days of submission of JMS.

- 20% of payment against commissioning & successful Product trial of plant

- 20% balance payment on satisfactory erection & commissioning of entire plant and Production trial of the plant (on acceptance by the Purchaser/Purchaser's representative) against 10% a performance bank guarantee of equivalent amount valid for one year from the date of successful Product trial. Last date for defaulter's claim should be min 3 months beyond BG validity date.

In all the cases the suppliers are required to furnish the performance bank guarantee from a Nationalized Bank for an amount equivalent to 10% of the Contract/purchase order value valid for one year till the end of the contract/purchase order and signing of the agreement.

Notes :

a) Payment shall be made on complete supply of an item/group of items specified in the contract. No payment specified in the contract. No payment shall be made if supply of an item/group of items is incomplete.

b) The bank guarantee shall be issued by a Nationalized Bank or schedule banks

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

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

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

f) During project execution, If additional quantity of any item covered in attached price table is required either for completion of turnkey project or capacity expansion, bidder will have to supply and install respective item at same approved rate of our purchase order.

g) Basic rates are inclusive of P and F, freight, insurance, unloading i.e. FOR our site, but, exclusive of GST.

4.10 Resolution of Disputes (Clause 3.28)

4.10.1 All disputes or differences in respect of which the decisions not final and conclusive shall, on the initiative of either party, be referred to the receipt the dispute to arbitration, the purchaser shall refer the dispute to arbitration, the purchaser shall finalize a panel of three Arbitrators and intimate the same to the supplier. The supplier shall within fifteen days of receipt of this list select and confirm his acceptance to the appointment of one from the panel as Arbitrator. If the supplier fails to communicate his selection of name, within the stipulated period , the purchaser shall within the stipulated period, the purchaser shall without delay select one from the panel and appoint him as the sole Arbitrator. If the purchaser fails to send such a panel within thirty days, ass stipulated, the supplier shall send a similar panel to the purchaser within fifteen days. The purchaser shall then select one from the panel and appoint him as the sole Arbitrator within fifteen days. If the purchaser fails to do so, the supplier shall communicate to the purchaser the name of one from the panel who shall than be the sole Arbitrator. The appointment of sole Arbitrator so made shall be final and conclusive. The Arbitration shall be conducted in accordance with the provisions of the Indian Arbitration Act, 1940 and rules there under or any statutory modifications thereof for the time being in force. The Arbitration proceedings shall be held in Address mentioned in "Invitation for Bid" at the time as the sole Arbitrator may decide. The decision of the sole Arbitrator shall be final and binding upon the parties and the expenses of the Arbitrator shall be paid as may be determined by the Arbitrator.

Performance under the contract shall, if reasonably possible, continue during the Arbitration proceedings and payments due to the supplier by the purchaser shall not be withheld, unless they are the subject of the Arbitration proceedings.

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

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

4.11 Notices (Clause 3.31)

4.11.1 For the purpose of all the notices, the following shall be the address of the purchaser and supplier.

Purchaser:– Address as mentioned in Invitation for Bid

Supplier: (To be filled in at the time of contract signature.)

Section V:
Technical Specifications

Sub Section A
Special Condition of Contract for Mechanical Work

Contents

1. Scope

The scope of mechanical work, but not limited to shall be as follows;

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

1.2 Supply and installation of structural platforms and tables.

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

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

1.5 Interconnections of services and Electrical with equipment.

1.6 Guideline for expansion work.

1.7 Clean up of work site.

1.8 Supply of all cleaning chemicals and lubricants.

1.9 Testing, commissioning and start-up.

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

1.11 Training of personnel.

1.12 Detailed specifications are given in the subsequent clauses.

2. General Installation

2.1 Positioning of Equipment

- The work involves preparation of access for moving of the plant and equipment including their fittings from the work site godown or from the place within the site where they have been unloaded, to the place of erection, de-crating and placing on the foundation wherever required. The Purchaser shall arrange all the civil foundations as per the manufacturer Supplier's drawings. The Supplier shall place the equipment and carry out final adjustment of the foundations including alignment and dressing of foundation surface, embedding and grouting of anchor bolts and bedplates. The Supplier shall be responsible for obtaining correct reference lines for the purpose of fixing the alignment of various equipment from master benchmarks provided. Tolerances shall be as specified in equipment manufacturer's drawings or as stipulated by the Purchaser's Engineer. No equipment shall be permanently bolted down to foundations or structure until the Supplier has checked the alignment and witnessed by the Purchaser. The Supplier shall carry out minor alterations in the anchor bolts, pockets etc., at no extra cost and set the equipment properly as per approved layout, drawings and manufacturer's instructions. The Supplier shall supply all the necessary foundation/anchor bolts and bedplates if required without extra cost if these have not been provided with main equipment.
- The Supplier shall supply, fix and maintain, at his own cost, during the erection work, all the necessary centering, scaffolding, staging required not only for proper execution and protection of the said work but also for protection of the surrounding plant and equipment. The Supplier shall take out and remove any or all such centering, scaffolding, staging planking etc., as occasion shall require or when ordered to do so and shall fully reinstate and make good all things disturbed during execution of the work, to the satisfaction of the Purchaser. The Supplier shall be paid no additional amount for the above.

2.2 Structural Platforms and Tables

- Structural platforms shall be required to provide access for various 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** of the following regulations wherever applicable:
- Indian **Boiler** Regulations
- Regulations of **explosives** inspectorate
- All applicable Indian Standards
- All applicable State Government/ Central Government Laws/ Acts

3.2 Scope of Supply

- The 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 Supplier, for the class and make of all materials, must obtain prior approval of the Purchaser. The 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 Supplier's work commences/ terminates at the pipe connections with valves or flanges as specified in flow diagrams/ battery limits.
- The 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 Supplier shall perform necessary internal machining of pipes for installing orifices, flow nozzles, control valves etc. The Supplier shall install all pipes, valves and specialties being procured from other sources.

3.4 Testing of Piping

- The Supplier shall test all piping systems including valves and specialties and instruments as per procedure mentioned in Table 4.
- All piping shall be **internally cleaned and flushed** by the Supplier after erection in a manner suited to the service and as directed by the Purchaser.
- For **hydrostatic testing and water flushing**, the Supplier shall furnish necessary pumps, equipment, instruments and piping etc.

3.5 Other Guidelines

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

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 **3.1 kg/cm^2 (50 psi).**
- **Low-pressure** steam piping when the working pressure of steam is **up to 3.1 kg/cm^2 (50 psi).**
- All the pipes and fittings used for high pressure steam piping work should conform to **IBR** and they should be IBR certified and also to be **identified with number and mark** showing that they are tested by the Boiler Inspector and supported with duly **authentic certificates** to this effect. ALL HIGH-PRESSURE STEAM PIPES SHALL BE **SEAMLESS** TYPE, **SCHEDULE 40**.
- The high-pressure steam piping after installation should be hydraulically tested in presence of the Boiler Inspector for his approval.
- The high-pressure steam piping work should also include fabrication and installation of **pressure reducing stations** strictly conforming to **IBR**.

4.2 Other Piping

- ALL THE PIPING FOR CHILLED WATER, GLYCOL, AMMONIA, SOFT AND RAW WATER, H.P. AND L.P. STEAM, AIR AND FURNACE OIL/ 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 and Ammonia Pipeline

- All the chilled water, glycol & ammonia pipelines shall be insulated by **PUF** pipe sections. The insulation shall be carried out in the **following manner**:
- Before starting insulation work all pipelines shall be **tested** as specified
- The surface of the pipes to be insulated should be properly **cleaned**
- **Hot bitumen** of **85/40** or **85/25** conforming to **IS 702** should be applied uniformly @ **1.5 kg/m^2** 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 and or Insulating Tape
- A thick **vapor seal** with **hot bitumen** @ **2.5 kg/m^2** should be applied uniformly on the outer surfaces of the pipe sections and allowed to dry
- In case the insulation **sweats** or the specified/required insulation, properties are not attained, the entire insulation in such region shall be **redone** with fresh material, entirely at the **Supplier's cost**
- The **thickness** of PUF insulation shall be as required. Density shall be minimum 36 Kg/M3 to be used
- Outer cover shall be aluminum cladding of not less than 22-gauge thickness with SS screwing at regular interval

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/m^2** 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 PUF sheets (min 36 Kg/M3 Density) and one side and edges of the insulation slabs to ensure total rate of **2.00 kg/m^2** 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/m^2** between contacting surfaces
- 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 Pipelines

- 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 **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 **25 mm**

5.4 Aluminium Cladding

- The chilled water, glycol, ammonia, water, steam & hot water lines after insulations may be **covered** by Aluminum **cladding**
- Aluminum cladding will be done with 22-gauge aluminum sheet with proper grooves and overlaps and screwed in position with 12 mm self-tapping parker screws.

6. Interconnections of Services

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

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

7. Guidelines for Expansion Work

7.1 Shutdowns

- Plant shutdown shall be required for making **tapings/ interconnections** of the new equipment/ piping, to be installed under expansion, with the existing equipment/piping. These shutdowns should be **planned** carefully well in advance to enable the Purchaser to take suitable actions for **ensuring normal Plant operations**. The details of shutdowns, the numbers and duration should be worked out and intimated to the Purchaser for approval. The 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 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 Supplier and should be got approved by the Purchaser

7.5 Clean Up of Works Site

- All soils, filth or other matters of an offensive nature taken out of any trench, drain or other places shall not be deposited on the surfaces, but shall at once be carted away by the Supplier from the site of work for proper disposal
- The Supplier shall not store or place the equipment, materials or erection tools on the drive ways and passages and shall take care that his work in no way restricts or impedes traffic or passage of men and materials during erection, the Supplier shall without any additional payment, at all-time keep the working and storage area used by him free from accumulation of dust or combustible materials, waste materials rubbish packing, wooden planks to avoid fire hazards and hindrance to other works
- If the Supplier fails to comply with these requirements in spite of written instructions from the Purchaser, the Purchaser will proceed to clear these areas and the expenses incurred by the Purchaser in this regard shall be payable by the Supplier. Before completion of the work, the Supplier shall remove or dispose off in a satisfactory manner all scaffolding, temporary structures, waste and debris and leave the promises in a condition satisfactory to the Purchaser. Any packing materials received with the equipment shall remain as the property of the Purchaser and may be used by the Supplier on payment of standard charges to the Purchaser and with prior approval of the Purchaser. At the completion of his work and before final payment, the Supplier shall remove and shall restore the site to neat workman like conditions at his cost

8. Cleaning Chemicals and Lubricants

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

9. Testing, Commissioning and Start-up

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

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

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

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

10. Trouble shooting during the trial period

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

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

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

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

- The Supplier has **no previous experience** of commissioning and start-up of the similar equipment
- The Purchaser is of the opinion that the **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 Supplier and the 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 Supplier shall keep his representatives under whose **supervision** the **Purchaser's staff shall be operating and maintaining** the plant and equipment for a **minimum period of one month**. The Supplier's representatives should be present at all times during the running and operation of plant

and equipment. During this period the Supplier shall ensure proper working of complete plant and equipment and attend any works required to be done and shall also take complete responsibility for proper operation and maintenance of the complete plant and equipment

11. Painting

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

11.2 **Lettering and other markings**, including capacity and flow direction markings, shall also be carried out by the Supplier on the tanks, pipelines, 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 Supplier under this contract/order

12. Training of Personnel

12.1 The Supplier shall train necessary staff of purchaser for operation and maintenance. The personnel will be associated for the training during the installation; testing, commissioning and start-up period and the training tenure shall be extended for a minimum period of one month from the date of commissioning and start-up

13. Code of Practice for Painting Service Pipelines

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

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

13.2 On Insulated Pipeline with Aluminium Cladding

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

Table 1 Painting of Equipment & Structural Work

SN	Item	Painting Shade
1	All M.S. platforms/pipe supports/ pipe bridges and any other structures	Dark admiral grey shade No.632 of ISI
2	Water Pumps, Geared Motor of tanks and vats.	Original colour
3	HT & LT panels	Original colour
4	LT distribution switchboards	Dark admiral grey
5	Boiler Chimney, Powder Plant Chimney, & Generator Exhaust	High temperature resistant Aluminium Paint
6	Refrigeration Compressor, air Compressor	Original colour

7	Air Handling Units of Cold Store, Deep Freeze, Packing, Machine room & Laboratory including Ducting	Aluminium Paint
8	Refrigeration Plant Receiver	Dark Red
9	Atmospheric Condensers	Bitumen Paint

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		- Light Brown 410	-
3	Condensate		Light Brown 410	-
4	Hot Water		Light Brown 410	-
5	Drinking Water		French Blue 166	Signal Red 37
6	Treated Water		Light Orange 557	-
7	Cold Water		French Blue 166	Canary Yellow
8	Untreated Water		White	
9	Compressed Air	Sky Blue 101		
10	Vacuum		Black	
11	Steam	Silver Grey 628		
12	Diesel	Light Brown 410	Brilliant 221	
13	Lubricating Oil		Light Grey 631	
14	Drainage	Black		
15	Ammonia	Signal Red 537		

Table 3 Testing Pressures for Various Pipelines

Sr No	Name	Test Pressure kg/cm^2	Test medium	Duration of Test (Hour)	Allowable pressure Drop (kg/cm^2)
1	H.P. Steam pipe lines	27 (minimum)	Water	1/2	0

2	L.P. Steam pipe lines	8	Water	1/2	0
3	Water pipe lines[1]	8	Water	1/2	0
4	Furnace oil/ LSHS	16	Water	½	0
5	SS pipes for dairy	6	Water	1/2	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.					

Table 4 Makes of Bought Out Items

SN	Items	Makes
1	Steam piping	
1a	MS C class pipes (Seamless)	
1b	Cast steel globe valves	
1c	Bronze globe valves	
1d	Non-return valves	
1e	Pressure reducing valves, safety valves, expansion joints and other steam fittings	
1f	Pressure & temperature gauge	
2	Furnace oil piping/ air piping	
2a	MS C class pipes (seamless/ ERW as approved)	
2b	Cast steel globe/bronze globe/ Gun metal gate valve	

[1] Soft, Raw, Chilled and Glycol

2c	Pressure gauge	
3	Water piping	
3a	GI `B' class pipe	
3b	CI globe valve	
3c	Gun metal gate valve	
3d	Gun metal globe valves/ strainers/ non return valves	
3e	Water pump	
4	Insulation materials	
4a	Expanded polystyrene	
4b	PUF	
4c	Glass/ mineral wool	
Please select reputed established makes only. Actual supply shall be based on makes approved by us.		

Sub Section B

Special Condition of Contract for Electrical Work

Contents

1. Scope

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

2. Standards

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

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

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

3. Equipment and Accessories Specifications

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

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

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

3.4 Supplier must furnish makes of bought out items.

4. Power Cables (HT)

4.1 Specifications as per Section IV Sub-Section 6

5. Power Cables (LT)

5.1 Specifications as per Section IV Sub-Section 6

6. Control Cables

6.1 Specifications as per Section IV Sub-Section 6

7. Cable Trays

7.1 Specifications as per Section IV Sub-Section 6

8. Cable Glands

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

9. Cable Connectors

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

10. Cable Route Markers

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

11. Cable Indicators

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

12. Pipes for Cables

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

13. Motor Isolators

13.1 These shall be in Aluminum cast housing/ Poly carbonate 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 and powder plant SS-304 motor isolator shall be used. Final finish of housing to be buffer mirror for SS and powder coated gray for Aluminum housing. Sample to be got approved before supply.

14. Control Junction Box

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

15. Remote Push Button Stations

15.1 These shall be used for remote OFF for motors, away from MCC. These shall be suitable for surface/structure mounting in Cast Aluminum housing/Poly Carbonate housing having IP-55 class of protection i.e. completely weather proof. For dairy's process area and powder plant 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-color plastic nameplate to be provided for each feeder

15.3 For out door installation suitable canopy to be provided

16. Erection of Equipment

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

17. Power Control Centres, Distribution Boards, Control Panels & Bus Ducts

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

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

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

17.4 Range of overload relays/timers etc. shall be checked with requirement of motor/systems actually to be connected at site and if the same is under-sized/oversized, it shall be brought to the notice of Engineer-in-charge, who shall arrange procurement of

correct rated components. However, the Supplier shall not charge anything extra for labour for such replacements

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

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

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

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

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

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

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

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

18. Not Relevant to this tender

19. Erection and Testing of Motors

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

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

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

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

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

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

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

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

20. Installation of Cable Network

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

21. General Requirements for Handling of Cables

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

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

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

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

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

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

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

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

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

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

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

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

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

22. Not relevant to this tender

23. Not relevant to this tender

24. Not relevant to this tender

25. Laying of Cables in Cable Trays

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

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

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

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

26. Laying of Cables on Building Surface/ Structure

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

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

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

27. Termination & Jointing of Cables

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

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

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

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

- Strip off the insulation of the cable end with every precaution, not to severe or damage any strand. All insulation to be removed from the stripped portion of the conductor and ends of the insulation should be clean and square
- The cable should be kept clean as far as possible before assembling it with the terminal/socket. For preventing the ingress of moisture and possibility of re-oxidation after crimping of the aluminum conductors, the socket should be fitted with corrosion inhibiting compound. This compound should also be applied over the stripped portion of the conductor and the palm surface of socket
- Correct size and type of socket/ ferrule/ lug should be selected depending on size of conductor and type of connection to be made. Make the crimped joint by suitable crimping tool. If after crimping the conductor in socket/ lug, some portion of the conductor remains without insulation the same should be covered sufficiently with PVC tape

28. Dressing of Cable inside the Equipment

28.1 After fixing of cable glands, the individual cores of cable shall be dressed and taken along the cableways (if provided) or shall be fixed to the panels with polyethylene straps.

Cable shall be dressed in such a manner that small loop of each core is available inside the panel

28.2 For motors of 20 HP and above, terminal box if found not suitable for proper dressing of Aluminium cables, the Supplier shall modify the same without any additional cost

29. Identification of Cables/ Wires/ Cores

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

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

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

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

31. Testing of Cables

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

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

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

31.4 For record purposes test data shall include the measured values of leakage current versus time. T

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

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

32. Earthing Network

32.1 The entire earthing installation shall be done in accordance with the earthing drawings, specification and instructions of the Engineer-in-charge. The entire earthing system shall fully comply with the Indian Electricity Act and Rules framed thereunder. The Supplier 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 equipment shall be determined at site, in consultation with the Engineer-in-charge. Any change in the methods, routing, size of conductor etc. shall be subject to approval of the owner/engineer-in-charge before execution

33. Earth Pit with Electrode

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

35. Not relevant to this tender

36. Erection Procedure Guidelines of Instrumentation & Control System

The erection of Instrumentation & Control System shall be carried out generally conforming to General Technical Standards as described herein. However, the Bidder shall select and adopt methods and procedures for equipment erection to suit the nature

of equipment and erection work, involved according to the best modern practice and his own experience

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

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

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

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

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

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

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

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

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

Table 1 Bureau Indian Standards (BIS)

SN	Description	BIS
1	PVC insulated cables (light duty) for working voltage unto 1100 volts	694-1977 Part I & II

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

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

SN	**Test**	**Report**
1	Circuit (Breaker/Supplier Module Designation/Bus Number)	
2	**Insulation resistance** (Contacts open, breaker Racked in position)	
a.	Between each Phase & Bus **(Mega Ohm)**	
b.	Between each phase and earth **(Mega Ohm)**	
c.	DC and AC control & auxiliary circuits **(Mega Ohm)**	

d.	Between each phase of CT/PT and between CT & PT circuit if any **(Mega Ohm)**	
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/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 Purchaser	Signature and seal of Engineer-in-charge of Supplier

Table 3
Pro forma for motor testing

SN	**Test**	**Report**
1	**Name plate details**	
A	Voltage	
B	HP / KW	
C	Mounting	
D	Current	
E	RPM	
F	Frame size	
G	Make	

H	Sr No	
I	Others	
2	**Insulation test (before cable connection)**	
A	Between Phase and Earth (Mega Ohms)	
B	Between each Phase (Mega Ohms)	
3	**Insulation test (after cable connection)**	
A	Between Phase and Earth (Mega Ohms)	
B	Between each Phase (Mega Ohms)	
4	**No load current**	
A	R Phase Amps	
B	Y Phase Amps	
C	B Phase Amps	
5	**Full load current**	
A	R Phase Amps	
B	Y Phase Amps	
C	B Phase Amps	
6	**Temperature rise after 4 hours run**	
A	On no load degree C	
B	On full load degree C	
C	Ambient temperature during test degree C	
7	**Operation of thermal overload relay**	
A	At normal Full Load current of motor	
B	At twice Full Load current of motor trips in seconds	
Signature and seal of Engineer-in-charge of Purchaser		Signature and seal of Engineer-in-charge of Supplier

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

Table 5 **Recommended Cables Sizes For Industrial Wiring**	
3 Ø	**Aluminium Conductor Cable Size (in mm^2)**

415 V Motor HP	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 **up to 10 HP** Motor, **2.5 mm^2** copper flexible cables should be used.				

Table 6
Sizing of Earthing Lead/ Wire

Sr No	ITEM	Size
1	Control switches	G.I. wire 14 SWG
2	Motor unto 10 HP	G.I. wire 8 SWG
3	Motor above 10 HP unto 125 HP	G.I. strip 25 x 3 mm
4	Motor above 125 HP	G.I. strip 25 x 6 mm
5	Switch Board	G.I. strip 25 x 6 mm

6	Power control centre/ LT panel of sub-station	G.I. strip 40 x 6 mm

Section C

Special Condition of Contract for Erection & Commissioning Work

Contents

1. Sufficiency of Tender

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

2. Programme of Installation & Commissioning

2.1 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 PERT network/ bar chart and any other form as may be required by the Purchaser showing the sequence of order in which the Bidder/Supplier proposes to carryout the works including the design, manufacture, delivery to site, erection and commissioning thereof. After submission to and approval by the Purchaser of such programmed, the 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 him self 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 required

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 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 Within four weeks from the date of receipt of the order, 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 program

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

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

3.10 All dimensions on drawings shall be in metric units

3.11 Drawings (**three sets**) submitted by the 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

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 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 labor force report showing by classifications the number of employees engaged in the work. The Bidder/Supplier's employment records shall include any 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
- 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 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 by Bidder/Supplier 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 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 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 Not applicable

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 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 wiremen 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 get covered under the insurance of the Purchaser; the consequential losses 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

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 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, leveling and dressing of foundation surfaces, bedding and grouting of anchor bolts, bedplates 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 cutouts in walls, floors and ceilings for pipelines shall be done by the purchaser. Adjustment & leveling are to be carried out by the Bidder/Supplier at no extra cost. The Purchaser shall arrange the necessary refilling/repairs of these cutouts and pockets. The Bidder/Supplier should arrange for laying the supports, cutouts, 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
- Necessary temporary water for carrying out the installation shall be supplied at only one point within the project site by the Purchaser free of charge. All necessary distribution tapings from this point onwards shall be the Bidder/Supplier's responsibility
- Necessary temporary power for carrying out the installation shall be arranged by the Bidder/Supplier at Bidder/Supplier's own cost. The Purchaser on written request by the Bidder/Supplier will issue the necessary authorization letter

9.3 If the power is provided to you, it shall be as per the subsection "Responsibility" . However, the Bidder/Supplier shall supply all the items such as energy meter, switchgear etc. required for getting temporary power.

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

9.5 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 under **GCC** (General Conditions of Contract) of Tender part -1 and
- The amount of such costs, which shall be added to the contract price, and shall notify the Bidder/Supplier accordingly

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 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 equipment

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

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 nighttime 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 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

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

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 he 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 Factory Inspector, Boiler Inspector, Electrical Inspector, Weights & Measures Inspector, Explosive Inspector and any other state and local authorities as may be required and the cost of obtaining such approvals shall be included in the contract price

14.2 The 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 Wherever necessary or required, the Bidder/Supplier shall furnish the necessary test and/or inspection **certificates** etc. from the appropriate authorities as per **IBR, IER and other statutory regulations** and the cost for obtaining these certificates shall be included in the contract price

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 at regular interval**. 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 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**	
SN	**Drawings**
1	Equipment drawings for fabricated items.
2	Equipment layout for production and service blocks.
3	Flow diagrams for PROCESS/ CLEANING and various services.
4	Service piping layouts in production and service blocks.
5	SS piping layout in production blocks, WHEREVER REQUIRED.
6	Electrical cable, conduit/ cable tray layout.
7	Standard Installation Drawings for Equipment.
8	PLC/Automation networking drawings, Cabling drawings etc.
9	Automation logic write-up along with logical flow network.
10	Other miscellaneous drawings as required for erection work.

SUB SECTION 1

Instruction to Bidder

1 INSTRUCTIONS TO BIDDER

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

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

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

2 BID STRUCTURE OF TECHNICAL SECTION

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

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

2.2 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--

3 SUB - SECTION 1 INTRODUCTION

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

4 SUB - SECTION 2 INSTRUCTIONS TO THE BIDDER

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

5 SUB - SECTION 3 DESIGN BASIS

Preamble

The bidder is to describe his technical proposal in detail, 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 and consistency.

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, Highest product quality within the standards specified, and plant operation convenience.

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

6 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

7 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**

8 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

9 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. Such items shall be mentioned in Deviation Statement. 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.

10 SUB – SECTION 8 BATTERY LIMITS

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

11 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

12 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

13 SUB – SECTION 11 DRAWINGS, DATA & DOCUMENTS SUBMISSION

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

Sub Section 2
Introduction & Design Basis

1.1 BACKGROUND

Dudhmotisagar Dairy is located at Dharuhera with various milk & Milk based products processing & packing under brand name of Amul.

With the increasing demand of fresh Paneer, there is a need for establishment of Paneer processing, packing & storage section in the existing dairy plant.

The union is aiming at providing Paneer, along with fresh liquid milk, curd & butter milk for direct consumption in the Delhi & NCR region. The new Paneer plant shall be of capacity 3 MTPD expandable to 5 MTPD. The plant should be automated for the required operation or steps of manufacturing according to design basis description, but not fully automated (i.e. semi automated).

The proposed Plant shall be capable of receiving Pasteurized & standardised milk from Processing Section of the existing dairy. All utilities and services shall be designed and tabulated for arranging their supply from Existing Utilities. However Product short duration storage, finished Good storage and air conditioning of Packaging areas is not included in the Scope of the bidder.

Whey generated from Paneer section shall be collected, processed and stored in Insulated storage tanks for further disposal to Butter Milk Plant (within Plant) for Butter Milk Preparation & remaining whey shall be dispatched through Road Tankers to other dairy plant. Paneer Whey dispatch Pump and piping, till Tanker Reception section shall be in the scope of the Bid.

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

The general technical specification of the major components and the ancillary items described in the technical section, its capacities and quantities proposed by the Purchaser are furnished in the '**Basis of Design**' and '**Bill of Quantities (BOQ)**'. These are only for the guidance of the bidder 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 and fulfilling complete "end to end" requirement and the basic configuration of the plant, for Proposed Product.

The quantity of pipes, fittings, valves, insulation, 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 but not lower than that specified in the bid document.

1.2 REQUIREMENTS OF THE PROCESS PLANT:

Plant basis and Utility basis:

Plant operations	16 hours a day
Electricity Charges	Rs. 8.5 /KW unit
Steam Charges	Rs. 3 / Kg of steam Eq.
Boiler Fuel	Natural Gas
Source of Water	Ground Water
Building	Free space reserved in Existing Building
Past. Std. Milk for Paneer	Received from existing Processing section at PMST valve Cluster

1.3 WORKING CONDITIONS:

Site work of every nature has to be planned and executed with the knowledge of site conditions that it is running dairy plant. 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 NIT (Notice of Inviting Tender) of this tender. Product trials shall be commenced at the end of this period.

1.5 SITE CONDITIONS:

To be referred for Dudhmotisagar Plant, Dharuhera, Haryana

1.6 SITE ADDRESS:

The plant shall be installed at Dudhmotisagar Dairy, Dharuhera, Haryana State (India)

Design Basis

Fresh Paneer shall be manufactured and packed in varieities of proposed packs of 200 gm and 500 gm Fresh Paneer blocks. Initially total volume of Paneer shall be 3 MTPD capacity & designed for expandable to 5 MTPD capacity. The Plant design shall be semi automatic considering certain operations shall be controlled through PLC SCADA.

Being a large capacity plant, the bidders are required to offer the state of the art technology suitable for Indian Product with comparable Body & Texture and Composition exactly as per the Indian Taste, approved standards under GCMMF and FSSAI

STANDARDIZED PANEER MILK TRANSFERRING

Standardized Pasteurized milk shall be made available in the Milk tanks dedicated for Paneer Milk by purchaser. But, Bidder shall consider required modification in the Process Plant, Pasteurized Milk Storage tank (PMST) piping distribution header /valve battery and inter silo milk transfer pump for transfer of standardized milk to Paneer Section. Lines erection from Process Plant- PMST to Paneer Milk tanks for milk transfer & CIP shall be in the scope of the bidder.

LMP (Liquid Milk Plant or Process Section of Dharuhera) Section PLC shall accept the request of transfer received from Paneer Section and transfer the milk from dedicated silo.

Moreover, Bidder scope also include transfer of standardized Pasteurized Milk return to Raw Milk Storage tanks of Process Section, Dharuhera. Bidder shall design Paneer Milk Storage tanks unloading headers for transfer of Paneer Milk upto Raw Milk storage tanks with require modification in existing valve battery loading headers.

CIP of Milk Transfer line from PMST to Paneer section, Paneer Section to Raw Milk tanks and its CIP return shall be in scope of Paneer Plant. The scope includes pipes, clamps, supports, SS Fittings & valves, instruments, controls, conductivity meter, insulation of all hot and cold lines and any other specific requirement

Remarks: (The entire CIP Circuit must be stand alone and exclusive for Paneer Plant itself having the time temperature at desire.)

FRESH PANEER MAKING AND PACKING

The pasteurized and standardized milk with 4.65% Fat and 9.08% SNF (Fat/SNF ratio of 0.510 to 0.516) at 4^0 C (max.) shall be drawn either from any of the Pasteurized Milk Storage tanks (PMSTs) of Process Section of Dharuhrea Plant to 15 KL x 02 Nos of standardized milk storage tank (SMST) of Paneer Plant.

Standardised Paneer milk storage tanks valve battery shall have following number of loading & unloading headers:

1. Loading Headers: 1 No for standardized milk loading from any of PMSTs.
2. Unloading Headers: 1 No for transfer to 4 nos. Paneer vat through milk heating module

3. 1 No CIP return header
4. Provision for addition of 1 X 15 KL SMST in future (Only provision of distance piece without valves)

Standardized milk drawn from 15 KL x 02 Nos tanks shall be heated up to 90 Deg C, 10-minute holding by a regenerative type milk heating module of capacity 3 KLPH. The module shall have following PHEs

PHE 1: Regenerative section – to heat the milk thorough hot whey

PHE 2: To heat the milk to 90°C with hot water (to be designed for heating milk from 4 deg C to 90 deg C)

PHE 3 : To cool the heated milk from 90°C to 75-82°C with the incoming milk.

PHE 4 : To cool the whey with cooling tower water (shall be designed to cool whey from 80 deg C to 35 deg C in case of no incoming millk at end of last batch)

PHE 5 : To cool the whey from 35°C to 4°C with chilled water.

PHE 6 : For hot water generation through steam heating.

Milk at 82 deg C (75) Deg C shall be taken in to 1.5 KL x 04 Nos. rectangular vat. In Rectangular vat manual agitation shall be carried out of milk during citric acid dosing. Citric acid @ 0.2 % of milk quantity shall be dosed uniformly with use of metering pump from 2.5 KL x 02 Nos. of citric acid preparation cum storage tank with agitator. Suitable type perforated SS pipe header shall be provided for each rectangular vat for uniform dosing of citric acid across the vat.

Citric acid solution preparation is to be carried out in jackted, insulated (triple walled) 2500 Litre capacity tank with provision of steam injection in jacket. The acid solution shall be prepared with RO/soft water. The citric acid powder in proportion to the water (1% Citric Acid Solution) i.e. 25 kg Citric Acid shall be added in 2500 L capacity preparation cum storage Citric Acid Solution tank. Fixed quantity of water shall be taken in the tank using level switch-based addition of soft water. Acid bag shall be emptied manually into the tank through tank manhole. Mixing shall be carried out with the help of agitator and simultaneous heating of the solution shall be done through steam jacket. The solution shall be heated to a 75-80 °C., and shall be stored at this temperature. For this dedicated PID controller with steam control valve shall be considered by bidder. Local start/ Stop of agitator motor also to be considered.

The 1% citric acid solution shall be dosed automatically to the open vats through a metering pump & dosing headers in a proportion quantity for curdling of milk in the vat..

Milk shall be coagulated in Paneer vat by the addition of food grade coagulant as per FSSAI approved additive (Citric acid),which shall be spread evenly on milk surface by special nozzles/ perforated header installed in central part of Vat's accessories. Specified volume of citric acid (measured by flow meter/any suitable means) shall be dosed from acid tanks with automatic control (timer based dosing). The coagulation process should be completed preferably 5 minutes. Agitation of Milk in Paneer vat during Citric Acid solution addition and coagulation shall be shall be carried out manually using shovels.

After completion of Paneer Milk coaguation, Hoops filling shall be done manually. Suitable type hoops filling stand shall be provided for manual filling of hoops just above vat. Filling of coagulated mass in Paneer Hoops having desired cotton (Porus) type musline cloth. Filled hoops shall be conveyed through trolleys up to pressing station. Hoops shall be placed manually on the pressing station. There shall be total 6 pressing stations. Each station can accommodate 4 hoops. Hoops shall be pressed for within 7 minutes (adjustable) at 2 Kg/cm sq. (adjustable) pressure at pressing station and then transferred through trolleys to cooling vats.

The Paneer block hoops shall then be put in the Paneer block cooling vat filled with 2-4 °C Pasteurized Chilled Water. The blocks shall be cooled to less than 25°C in the vat within 2 hours.
It shall be responsibility of the bidder to design the cooling vats to ensure gradual cooling of the Paneer for maintenance of shape, quality/texture and quantity of Paneer.
The design of the cooling vat should be suitable for CIP also with the use of special CIP lids, placed on the top of vat for automatic cleaning purpose.

The vats shall be filled initially with chilled RO pasteurized water and continuously circulating through the cooling PHE for the maintenance of required temperature within the vats automatically.

The cooling water shall pass through a duplex filter for filtering of Paneer fines with auto change over and UV treatment, ozonitation unit continuously during re-circulation through PHE Chiller. The bidder shall need to ensure the maintenance of quality of water free from bacterial load for one day production without any CIP/Change of water in the cooling vat. After each day operation the RO water shall be drained out and fresh RO water shall be filled.

The Whey pasteurizer shall be connected to Paneer Blocks cooling vat to provide pasteurize RO water in the cooling vat initially. The pasteurizer should be connected to the cooling vat in the circuit in such a way that facility for re-pasteurization of cooling water shall be fesible as & when require.

After completion of cooling of Paneer blocks, the blocks shall be removed/taken out manually from the cooling vat and after de moulding (de hooping) placed on SS trolley to carry up-to Cold store & bring temperature of Paneer blocks from 25°C to 15°C. Further Paneer block transferred to Packing area for cutting on next day.

Whey from vats and pressing station and shall be collected in common balance tank with filtertion. This high temperature whey shall be pumped to 3 KLPH capacity regenerative milk heater where the whey temperature is brought down to less than 10°C which shall be further cooled to 4 °C and stored in a 15 KL capacity intermdiate chilled whey storage tank. At the end of production process when there is no milk coming to the plant, leftover whey shall be cooled through cooling tower water & chilled to 4 °C through whey chiller.

The chilled whey at 4 °C shall be stored to 15 KL capacity x 01 Nos. Intermediate whey storage tank. Chilled whey shall be pasteurized by 5 KLPH capacity whey pasteurizer. The pasteurized whey shall be stored at 4 °C in to Pasteurized whey storage tank of 15 KL capacity x 02 Nos. Further Pasteurized whey shall be chilled through dispatch chiller of 20 KLPH capacity to dispatch other plants by road milk tankers at ≤ 4 °C. Facility for the dosing of pasteurized whey in metered quantity to balance tank of butter milk thermizer shall be provided with 5 KLPH capacity VFD operated pump through magnetic flow meter.

Pasteurized whey storage tanks, valve battery shall have following number of loading & unloading headers :

1. Loading Headers: 1 Nos from whey pasteurizer
2. Unloading Headers: 1 No for pasteurized whey dispatch to tanker dispatch bay / Whey dosing to butter milk thermizer balance tank
3. 1 No CIP return header

Valve manifold to be designed to ensure the flexibility in operation & secured (full proof) against mixing of two different flows/CIP fluid in case of malfunctioning in system/equipment or power failure.

Thus, There shall be provision for collection of whey in balance tank, regeneration of its heat to pre-heat incoming milk to Paneer Vat, intermediate whey storage and finally pasteurizing & chilling to 4 °C. The pasteurized & Chilled whey transfer to Butter Milk section and final bulk whey storage tanks (15 KL capacity x 02 Nos). Whey shall be dispatched by Whey dispatch pump. CIP of the dispatch line and tank shall be in the scope of bidder. The complete whey handling system shall be controlled through PLC SCADA.

Suitable manual hoops washing & sterilization system shall be provided for effective cleaning. The system shall include three troughs of suitable size for detergent cleaning, washing and hot water sterilization. The system shall have required pumps and PHEs.

Paneer equipment CIP shall be carried out from a dedicated PLC SCADA operated CIP Kitchen/system for Paneer Plant.The CIP system shall be in the scope of the bidder

In Paneer Manufacutring Plant,following operations shall be controlled through PLC SCADA PC:

1. The complete handling of standardized Pasteurized Milk of Paneer i.e. Paneer milk transferring from Milk Processing Section to Paneer Milk Storage tank & storage in Paneer Milk tanks.
2. Milk transferring from Paneer Milk Storage tanks to Regenerative PHE set
3. Paneer Milk Heating in regenerative Set & transferring to Paneer Vats
4. Automated controlled Citric Acid dosing for coagulation in Paneer Vat
5. The complete whey handling, this include chilling in regenerative PHE set, storage in intermediate tank, Pasteurization, storage for dispatch in tanker & transferring to butter milk thermizer balance tank.
6. CIP System of Complete Paneer Plant

PANEER PACKING - STERILIZATION – CARTONING AND FILLED CRATE TRANSFER TO COLD STORE:

PANEER CUTTING AND PACKING:

An automatic / pneumatic blocks cutting machine to cut the Paneer block of 10 Kg to 200 g and 500 g block shall be provided. Block cutting shall be 0.5 mm width/thickness throughout blades. The individual block of 200g and 500g shall be checked for weight and then shall be placed in a preformed laminated pouch / PET-Poly Pouches. After manually inserting the blocks in the respective pouches, the pouches shall then be vacuum packed in vacuum sealing machines manually and then sterilized.

Suitable forced air ventilation (FAV) system will be installed in the Paneer Packing area for effective ventilation. System shall have HEPA filters with required pre filtration and air washing facility to maintain air quality. Forced Air ventilation system is not in scope of bidder.

PANEER STERILIZATION:

Paneer sterilizer shall have rectangular shape round edges Hot Water Sterilization vat with capacity of sterilize 2000 Packets per hour. Single Paneer sterilization vat with mono rail & pulley arrangement shall be provided with provision of dipping trays filled with packed laminates of paneer blocks and remove from vat after sterilization at 90°C for 30 Minutes in Hot Water.

Packed Paneer pouches shall be transferred manually into SS trays for sterilization. Required working tables for unloading Paneer pouches from HDPE crates and putting into Paneer sterilizing vat trays shall be provided. SS trays loaded with Paneer pouches shall be transferred in Hot Water sterilization vat using mono rail and pulley arrangement. The Packed Paneer shall sterilized at 90-95 deg C for 30 minutes & removed using same mono rail. The sterilizer shall be equipped with Hot water circulation pump, PHE, water make up provision and PID controller arrangement to maitain temperature of hot water. Pumping type trap for effective removal of condensate and cleaning arrangment of Vat.

After sterilization, sterilized Paneer pouches with tray shall be transferred to wheel mounted trolleys. The trolleys shall be taken to cooling room/Blast room where the Paneer block temperature shall be brought down to less than 10 deg C. Further, Cooled Paneer pouches shall be filled in secondary Packaging materials (Pre printed for Batch code on Inkjet printer) & cartoned. Same Paneer Cartons/ Finished Goods are transferred to cold store maintained at temperature of ≤ - 5°C for further dispatch.

Required working tables for unloading crates of sterilized Paneer pouches from wheel mounted trolleys and further cartoning shall be provided. Required SS trolleys for manual transfer of hoops/trays etc within the production/packing/sterilization/hoops washing area shall be provided as per functional requirement.

Bidder shall supply Paneer Shredding Machine and Paneer Paste Making Machine for rework waste paneer collected during Cutting of Paneer Blocks and filteration.

The complete refrigeration system supply i.e. Freon based standalone refrigeration system for Blast Room and Finished good cold store, Forced Air Ventilation System is not in scope of Bidder. The same items will be arranged by Purchaser.

The required Paneer processing steps i.e. **Standardized Milk transferring, storage, Milk heating in PHE, Milk transfering to Paneer Vat, Citric Acid Solution dosing, the complete whey handling upto dispatch** and **CIP of Paneer Plant equipments** shall be controlled through PLC & SCADA based automation system remaining Processing steps of from Paneer Coagulation, hooping , pressing, cooling, cutting, packing, sterilization etc shall be manually / semi automated using PID controller or any othere local automated control as per requirement of process step.

Utilities like Steam, Soft water, RO water, Raw Water, Chilled Water and compressed air shall be made available at one point in the nearest header in Processing Area. Further

distribution of all above utilities including piping, valves & fittings, support structure & pumping shall be in the scope of this tender. Power supply shall be made available at the outgoing feeder from existing PCC located in the utility area. Further Electrical distribution including Main Power cable from PCC to Paneer distribution panel (MCC Panel) shall be in the scope of bidder. Power and electronic earthing required for various equipment shall also be in the scope of bidder. Please refer battery limit for further clarification

IMPORTANT NOTES:

ELECTRICAL & AUTOMATION

The control system shall be designed to enable the automatic operation of certain operations/steps of the Paneer manufacturing plant considering semi automation.

It shall be based on PLC with following, but not limited to below mentioned functionality:

- Ethernet based communication system
- Visualization of all equipment of all working parameters
- Operator input window for desired set-points
- Real time parameters observation
- Registration and recording of all process parameters
- Registration and recording of all alarm status
- Reports generation
- Communication with centralized PLC / DCS of the dairy plant with required signal exchange
- SCADA station with Runtime software for required (Partial) Paneer processing operation/ steps

PLANT BUILDING, REFRIGERATION SYSTEM, SUPPORTING STRUCTURE AND MAINTENANCE PLATFORMS

1) Civil works & building including equipment foundation and supports shall be provided by the purchaser.
2) **The complete refrigeration system supply i.e. Freon based standalone refrigeration system for Blast Room and Finished good cold store, Forced Air Ventilation System is not in scope of Bidder. The same items will be arranged by Purchaser.**
3) Maintenance platforms wherever required as per detail engineering shall be included in the scope for various plant equipment.
4) Support for these platforms shall be taken from the civil building beams and / or columns. Approach to these platforms would be provided from the nearest building floor level through suitable walkway and / or ladders. Railings – up to 1 M height, shall be provided, wherever required (in the scope of this tender).
5) Layout shall be generally as per the plan with location of various areas as given in the plant.

General

The scope this bid also includes but not limited to the following:

- Pipe supports - SS inside full dairy plant areas, for milk and CIP lines and Utility lines.
- MS, outside the production building
- Platform, Tables, Turn tables, cross over bridges for manufacture & packing area as well as for tanks/silos, processing
- Insulation of all hot and cold Milk as well as CIP lines (above ambient Temp)
- All supports (SS or MS) shall be square box type only to avoid deposition of dirt, dust etc.

PRODUCT CONTACT PARTS

- All parts coming in contact with product will be in Stainless Steel SS304.
- All internal weld joints coming in contact with the product and for un-insulated external surfaces shall be ground to 150 grit and other weld joints shall be left un-ground. External and internal surface finish shall be 2B finish

UTILITY DISTRIBUTION

All utility shall be drawn from nearest header from the existng plant, with the isolation valve, metering device and controls as required. The Power shall be drawn from the PCC located in the existing dairy in utility block.

Referigeration system for Paneer plant and air conditioning system for manufacturing, packing area whereever required shall be located in the main plant Building.

CIP SYSTEM

There shall be one automatic CIP sets for the Paneer Plant.

01 set with 1 or 2 circuits for Paneer section shall be provided as per design.

CIP systems shall be able to operate simultaneously and independently from Paneer Plant SCADA System, with its own set of CIP tanks, PHE heaters, filters, pumps, valves & fittings, instruments etc.

Necessary valves, piping, controls and instrument including flow meters, level sensor, conductivity transmitters, temperature sensors/ transmitters, flow switches, proximities etc. shall be included in the scope of the bid.

The system shall be totally secured (full proof) against mixing of the cleaning solutions with the products in case of malfunctioning in system/equipment or power failure.

The system shall be fully automatic and pre-programmed with facilities of selecting and modifying the cleaning sequence and duration from main control room.

Necessary facility shall be provided so as to keep the solution in the tank at the required temperature and concentration all the time/as per requirement. This facility may be provided by using PHE installed in the forward circuit. The facility of carrying out CIP of the CIP tanks should also be provided for each CIP kitchen.

CIP Chemical Storage

Concentrated Acid and lye shall be made available in the existing bulk chemical storage area of existing Plant by Purchaser. Further distribution including pumping, piping, powering pump and its automation for automatic dosing of Acid & lye solution in Paneer section CIP services tank based on conductivity shall be in scope of bidder.

All concentrated acid & lye handling equipment / tanks piping shall be of SS-316 only and min. 2 mm thickness. All stop valves, isolation valves in the acid and lye circuits shall be PTE Diaphragm type only.

Paneer / CIP:

The CIP system shall be controlled from the Paneer Plant SCADA system for demand and supply of CIP fluid at required temperature as per needs. Complete CIP piping, Pneumatic seat valves, manifold, instruments, control, control cables Trays for power and control cables etc., are covered in the scope of the bid.

The CIP plant shall be provided with lye solution tank, acid solution tank, hot water tank & recuperation or rinse water rank with capacity a quantity as per BOQ. Conductivity transmitters shall be provided for feeding of desired quantity of lye & acid concentrate from dosing tank to the respective solution tanks. A pump-based circulation system shall be provided for preparation of uniform solution in the acid and lye solution tanks.

CIP forward circuit with supply pump (**VFD** operated) of required capacity & head as per the design of plant shall be provided. Forward flow control arrangement would be done with frequency drives with close loop feedback from flow meters. CIP solution distribution piping/circuits shall be designed in such a manner so as to maintain required velocity in the pipeline/up to the spray balls/nozzles. The CIP return line shall have duplex filters with auto changeover valves. The filter shall remove all the impurities in the CIP solution before returning it to the respective tanks.

CIP return pumps as many as required based on the plant designed by bidder, shall be included in the scope of supply

The contact parts of the pumps shall be AISI 316. Pump shall be centrifugal type with open impeller and sanitary design complete with motor (Efff-1). CIP return pumps shall be self-priming type with AISI 316 contact parts & to be provided by Paneer plant supplier at various locations to ensure effective cleaning of pipelines/equipment & tanks as per requirement.

Heating of solution would be done in THEs with Pressurised Hot Water heating control arrangement. There shall be suitable diversion valves in all the circuits at the discharge of the CIP heaters for diverting and recirculation of CIP solution through return line in case the forward temperature drops below set-point for quick heating of the solution instead of circulating the cold CIP solution through set of equipment to be CIP.

All the pneumatic valves excepting soft water make up valve shall be seat type only with separate on/off feed back and control cap.

Drain from all CIP tanks shall be connected to SS 304 header of adequate size and discharged to drainage manhole outside the CIP room. Similarly, drain from all return

circuits shall be connected to separate SS 304 header of adequate size through a collection funnel and discharged to drainage manhole outside the CIP room.

SS platform made of chequered plate, box section and staircase with skirting & pipe railing shall be provided for CIP tanks. Necessary supports for the platform shall be taken from the RCC columns/beams/slab of CIP room.

Cleaning / Controls / Programme

The CIP system shall generally comprise the following sequence.

- Water pre rinse for TS recovery
- Pre- Rinse with recuperation water
- Hot detergent circulation
- Hot/Cold water rinse
- Hot acid circulation
- Fresh water rinse
- Hot water sterilization etc.
- Cold sterilization

Further to above basic steps, each step shall be divided into 4 sub-steps like "Push-in", "Emptying", "Push-out" and "Circulation" with respective interlocks for start/stop/skip a particular step timer to avoid dilution, maximum recovery of chemicals and effective use of CIP solution & time.

All CIP steps with timers shall be pre-programmed and shall be defined in Recipes as per various combinations. Based on selection of the recipe before starting a CIP operation, the program shall execute in respective steps automatically.

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/ recuperation tank.

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

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

Dosing shall be done based on the strength of the solution measured by the conductivity meters installed on the re-circulation lines /respective chemical solution tanks. Duration of the re circulation of the solution shall be carried out such that the homogeneous strength of the solution is obtained.

Suitable flow meters would be required in each circuit to measure the forward flow rate during circulation. In each return line there should be flow switches for sensing blockage in the path & conductivity transmitters for recovery purpose. Temperature transmitters would also be required in each return circuit for monitoring return solution temp.

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

The temperature and concentration of cleaning solution shall be continuously monitored and corrected automatically. In case of noncompliance 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 shall be through spray balls/turbines. CIP solution shall be returned to CIP tanks through self-priming CIP return pumps in each route.

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

Sequence of operation and detergent/acid consumption shall be automatically recorded in the process computer and shall be recalled on the screen on demand.

All water/ air header/ distribution lines in CIP kitchen shall be of SS-304. The hot water header / distribution lines in CIP kitchen shall be cladded with SS - 304 sheet of suitable gauge.

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 with validation certificate from designer and loop testings and submitting the hard as well as soft copies as backups.

INSTRUMENTS:

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 min. IP-66. Field instruments shall be suitably mounted, supported and terminated in RIO panel (smart JB).

All field instruments are hardwired type (4-20 mA / 24 V DC)

All pneumatic valves shall be hard wired type only. All VFDs are hard wired type.

Die cast aluminum or stainless-steel casing shall be used as case material in general. 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 owner/engineer's approval.
In general the minimum accuracy of the instruments shall be as below:

Electronic transmitters	:	± 0.20 % of FSD;
Pressure & temperature gauge	:	± 1.0 % of FSD;
Conductivity analyzer	:	± 0.25 % of FSD;
Level gauges	:	± 5.mm of the reading;

The repeatability of pressure, temperature, level and flow switches shall be ± 2.0 % of FSD.
Measuring ranges of transmitters shall be selected in such a way that best accuracy of measured value (in the measurement range) is achieved.

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
- Development of application software including data base graphics, mimics, logs and report format generation, alarm management, model development (MIS Data / Reports with historians logs for at least 15 Months data repository for verifications and print outs)
- Factory and site testing, performance guarantee testing in coordination with client's automation engineer and verification / validation thereof**.**
- Erection and commissioning of the entire control & instrumentation system
- Commissioning for the system
- Providing guarantee for performance of the equipment supplied
- Training of operators, systems engineers and maintenance engineers
- Manuals and documentation, including submission of I/O List, loop diagram, logic diagram, specification/data sheets and other necessary drawings in printed and electronic medium for approval of owner in multiple sets
- Exchange of information related to MIS reporting, SAP information/historian data`s, alarms, process parameters and SCADA screens for inter-transfer sections of the plant with main plant
- The process parameter i.e. temperature, pressure, steam control, flow control, level control, etc. shall be controlled automatically through PID controllers of automation system
- The automatic control should include starting operation, operation on product, shut down, emergency shutdown and CIP. The conductivity and other CIP parameters for CIP tanks shall be controlled automatically

  The entire Control & Automation(C&A) system shall be designed, supplied and commissioned to enable the operator to operate the plant in a safe, efficient and reliable manner, without exceeding plant operational limits and ensuring the overall performance with respect to capacity, quality and consumption. The C&A System shall be designed utilizing state-of-the-art technology to ensure:

  The C &A System shall be configured to perform the following basic functions: -

- Start-up and shut down of plant maintaining the operating conditions
- Ease in operation
- Acquisition display and archiving of plant data and generation of reports and transferring it in to existing MIS system

  The entire operation and monitoring under all regimes of operation i.e. start-up, normal operation, shut down etc. shall be possible through operator's consoles in control room located in Paneer Plant area with dynamic animation.

Selection of all instruments shall meet the requirement of continuous monitoring and process functionality. All process transmitters shall be 4-20 mA type.

CONTROL PHILOSOPHY

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

TECHNICAL REQUIREMENTS

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.

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.

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 °C.

Relative humidity – 95% at <55 °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. **30 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.

Electrical 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.

GENERAL FOR SERVICE SS PIPES, VALVES, FITTINGS & ACCESSORIES

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

MATERIALS FOR PIPING

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

RO water distribution lines: **AISI 304** with seamed joints.

For Steam/Hot Water system: MS 'C' class pipes (ERW) IS 1239/3601/4736

compressed air lines: Compressed air lines shall be of SS 304

Valves

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

Flanges/counter flanges shall be as per BS tables:

- Table D for water
- Table E for air

For pipeline sizing following velocities of the fluid shall be considered

Hot water	:	3 m/s
Water	:	3 m/s
Air	:	20 m/s

SS / MS/ GI STRUCTURALS

SS-304 structural for platforms, product/ CIP / utility pipes, cable tray supports, crossover/ working table etc.

All cable tray supports inside the plant/corridor & tanker bay shall also be of SS-304 box section (2 mm thk.). Supports outside the plant shall be of GI.

Below mentioned areas are to be considered for SS-304 structural and fabrication work:

- SS304 structural supports for all product/ CIP/ Utility piping, cable trays/conduits etc.
- SS304 structural supports for all product/ CIP/ Utility piping, cable trays/conduits etc. all production area, CIP area, Indoor plant corridor etc.
- Self-supported SS304 platforms for approach of all Indoor product tanks of milk, Paneer, CIP etc. with staircase and SS railing.
- SS 304 cross over platforms for easy movement, maintenance and access around the Paneer production line.

In addition to all above mentioned requirement required SS structural platform & supports shall be provided as per functional requirements of the plant operation and maintenance.

MS (GI) structure for tank platforms etc.

- These shall include ISMB, ISMC, angles, flats, bars, MS plates, chequered plate, hand rails of minimum 900 mm height, toe guard etc. The platforms shall have frame underneath and bracing members of suitable sections. Access ladders and structural supports of C class pipe/ISMC channel shall be provided within the scope of the works for structural works quoted.
- MS 5mm thick chequered plate for the trenches shall be provided wherever required.

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

SPARES

Supplier shall supply required spares for 1 years of normal plant operation generally in line with OEMs recommendation in addition to the commissioning spares:

Detailed list of the spares considered by the supplier shall be provided in the bid.

SERVICE COVER & TRAINING

SERVICE COVER

The Indian representative of the contractor shall attend the project for three days each month throughout two years following commissioning / product trial. These visits shall cover meetings, training, equipment adjustment, & servicing. These visits shall not cover guarantee work, which shall be undertaken separately.
The objectives of service covers are intended to ensure that the efficiency of the plant is maintained at the optimum level and to help improve operating and maintenance procedures.

- To keep the plant adjusted for optimum energy efficiency, product quality and minimum product losses.
- To arrange for service visits by specialists to inspect, service and carry out reports.
- To carry-out and audit of plant operating efficiency at regular intervals.

TRAINING

Training shall form an important component of Project Management and shall be undertaken by the contractor for a period of three months. The contractor would train all levels of staff of the client in operating the plant and automation systems including managers, engineers, supervisors, operators and maintenance personnel.

Training would be given both at site and at the manufacturer's works, and a schedule should be proposed by the contractor, together with the content of training programs, their duration and venue.

Training should commence during the erection period Six months include 30 man days of trainer's time as follows:

- Management operations and factory control using automated systems and automated process- 10 man days <1>.
- Supervision of personnel and plant operations in an automated plant -10 man days <2>.
- Familiarization with automation systems hardware and automated equipment operation 15 man days <3>.
- Fault finding & maintenance on control systems & control equipment, including electronic circuits &micro processor -20 man days <3>.
- Familiarization with the basic principles of control systems software, process coding, programming & instructions on how to correct, modify and re-write programs -15 man days <3>.
- Familiarization with start-up procedures, control during operation & adjustment- 20 man days <3>.

<1> Managers & Senior personnel training.
<2> Supervisors & Section heads training.
<3> Supervisors, operators and maintenance staff.

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

Dairy staff for:
- Operation of process, services utilized and process technology
- Operation of machinery and equipment

Maintenance & Electrical staff for:
- On the job training for technical personnel
- Maintenance of plant and equipment

Instrumentation staff:
- On job training covering calibration
- On the job training for technical personnel regarding set points
- Fault finding and maintenance
- Training of hardware & software.
- Process logic
- Fault finding and maintenance

- Services to be provided by Purchaser:
  - Classrooms with chairs and tables for theoretical training
  - Persons selected for training will have a good basic technical education
  - Continuity in training and their assistance during start up of the plant

GENERAL SPECIFICTIONS:

The following shall apply to all the equipment in various sections of the Dairy Plant.

- All MS/.GI structures and equipment to be given one coat of anti-corrosive paint followed by two coats of paint of approved shade.
- All motors in production units shall be covered with SS shrouds. Shrouds should be easily removable and should allow free air circulation as well as entry of electrical cables. All motors installed outside the building shall have GI shrouds
- Suitable safety guards should be provided wherever required.
- All weld joints shall be ground smooth. All corners should be well-rounded. In case of SS surfaces, external & internal surfaces shall be polished to 150 grits. DP tests shall be carried out for all welds after polishing for all holding vessels/tanks.
- All equipment surfaces coming in contact with milk shall be made of SS 304 or SS 316 depending on the application as subsequently desired.
- Stainless steel tables of required size and at appropriate locations shall be provided for work-in- process inventory and other such activities. Platforms and hoists for general operation and maintenance of equipment shall also be provided.
- All fittings/equipment are to conform to SMS standard.
- Detailed preventive maintenance schedules as well as operational manuals of all equipment shall be provided by the Bidder in the form of computer software after commissioning along with printed copies.

The manual shall cover the following aspects:

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

The manuals and drawings are to be supplied as follows:

- 4 sets of manuals and drawings in hard copy.
- 3 set of above in soft copy in CDs.
- 3 Set of CDs of Automation Backup for reinstallation during any failure

Following documents in the list for the manual should be added to the mentioned list:

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

LIST OF DRAWING AND DOCUMENTS

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

Drawings:

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

Charts:

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

- Bar chart for project execution

Brochures:

- Literature covering general and technical information for all equipment covered within the scope of tender

Technical details of any other equipment /item which is not mentioned but is considered to be required as per the description in the text

Sub - Section 3
Responsibilities

3. RESPONSIBILITIES OF BIDDER

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

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

3.0.3 Providing technical data, technical literature, production and service load calculations.

3.0.4 The Scope includes dismantling, shifting & erection in existing Plant equipment as per technical specifications to Newly constructed Paneer Plant building as per attached layout.

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

3.0.6 First charge of oil/lubricants/gas.

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

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

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

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

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

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

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

3.1 RESPONSIBILITIES OF PURCHASER

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

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

3.1.3 Water: Water shall be provided by Purchaser at Free of Cost at one Point.

Power: Power shall be provided by Purchaser at Free of Cost at one Point.

3.1.4 Lighting and domestic wiring system and internal telephone system including the switch boards for lighting. Engineering personnel to liaison with the supplier, Project Manager and the execution team.

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

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

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

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

3.1.9 Timely provision of personnel for training.

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

3.1.11 Suitable Site fabrication yard

3.1.12 Telephone and fax on chargeable basis.

3.1.13 Payment as per agreed terms and conditions.

3.1.14 Approval of drawing

3.1.15 Project manager with team throughout the implementation.

3.1.16 Lightening protection system & protection against rain.

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

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

Sub - Section 4
PROJECT MANAGEMENT

4.1 TIME SCHEDULE

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

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

4.2 MANAGEMENT TEAM

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

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

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

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

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

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

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

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

4.4 APPROVAL

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

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

4.5 INSPECTION

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

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

4.6 SITE WORK AND INSTALLATION

4.6.1 Protection of electronic equipment.

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

4.6.2 Temporary power supplies.

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

4.7 COMMISSIONING

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

4.8 PRODUCT TRIAL AND PERFORMANCE GUARANTEE

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

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

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

4.9 TRAINING

As per technical specifications

4.10 STAND BY OPERATION OF THE PLANT

As per technical specifications

4.11 SERVICE COVER

As per design basis

Sub - Section 5
TECHNICAL SPECIFICATIONS

5.1 LINE FROM EXISTING PMST DISTRIBUTION HEADER TO SMSTS/PANEER MILK TANKS INCLUDING PNEUMATIC VALVES & FITTINGS (including modification in existing PMST valve battery for milk transfer & CIP solution return facility)
Quantity : 1 Lot

Bidder shall have to study the existing valve battery and provide the facility in accordance to the existing provisions. P & ID of existing PMST valve battery is to be included with the tender.

Bidder shall have to consider require modification in the Process Plant, Pasteurized Milk Storage tank (PMST) piping distribution header /valve battery and inter silo milk transfer pump for transfer of standardized milk to Paneer Section. Lines erection from Process Plant- PMST to Paneer Milk tanks for milk transfer & CIP shall be in the scope of the bidder.

Inter Silo milk transfer Pump discharge milk line of 63.2 mm dia. size shall be considered for transferring standardized milk to Paneer Section from PMSTs.

LMP (Liquid Milk Plant or Process Section of Dharuhera) Section PLC shall accept the request of transfer received from Paneer Section and transfer the milk from dedicated silo. Bidder shall have make suitable addition/alteration in Automation software modification as well as hardware addition as per the requirement

5.2 STANDARDIZED MILK STORAGE TANK (SMSTs) WITH PLATFORM FOR PANEER MILK STORAGE
Quantity : 2 Nos.

Capacity : 15,000 Litres, the level would be 100 mm below no foam inlet pipe

Type : Insulated Vertical Milk Storage tank,

Material : Inner shell – SS 304 3 MM; Outer cladding **–** SS 304 2 MM
Inner conical top 2.5 mm, flat bottom 3 MM, outer shell top cone 2 mm
All material of construction shall confirm AISI 304

Finish : 150 grit

Slope : 1:15 slope towards no foam inlet cum outlet for complete drainage

Fittings & Instruments:

Inlet/outlet, breather, CIP spray shall be Rotary jet head (specially designed for effective CIP), sampling cock, Drain hole, thermo-well, lifting lugs, anchor points, Conical mild steel legs with SS cladding & adjustable ball feet, high & low level probes, level & temp. transmitters with local indicator, high level switch (Top mounted), Proximity switch for man way & other accessories like light & sight glass etc.

All MS stiffeners and bottom structure used for construction of silo would be spray galvanized after de rusting

Insulation:

A layer of 15 mm thick PUF insulation followed by EPS in two layers of 50 mm each including vapour barrier to ensure temperature rise does not exceed 1 Deg. C in 24 hours time.

Man way:

Side mounted man way with proximity switch, cover & nitrile gasket. Man way should have deep grove gasket to prevent its slippage during tightening of the man way.

Platform & ladder:

Vendor shall consider 2.1 metre high SS railings will be connected to inter connecting tanks platform made from SS using SS dimple plate. Approach ladder/stair of suitable size shall be considered from ground level to climb on platform.

Agitator:

Customer will provide 02 set of side mounted Stelzer make (imported) Agitator for both SMSTs / Paneer Milk storage tank & vendor shall have to submit GA drawing considering the same agitator set.

Side mounted mechanical agitator to ensure uniform fat distribution without any adverse effects on the contents. Agitation would be milk quantity based & required no. of agitators to be considered to meet the functional requirement with oil drip proof geared motor of adequate capacity and able to uniformly mix milk in the tank within 10 minutes.

Note:

1. Supplier shall submit GA drawing for approval to the purchaser for tank prior to fabrication work in the event of placement of order
2. Common SS platform with SS railing to be considered in the scope
3. Stage inspection shall be offered for;
    a. Material inspection
    b. Welding and insulation inspection
    c. Cladding and water filling

5.3 STANDARDIZED MILK TRANSFER PUMP FROM SMSTs to MILK HEATING MODULE (VFD OPERATED)
Quantity : 1 No

Capacity **:** 3 KLPH

Type **:**Sanitary design, Centrifugal with quick opening fittings, mono-block, free standing with adjustable ball feet

Duty	For transferring standardized milk from Standardized milk storage tank to Milk heating module
Location	At outlet of 15 KL SMSTs
Discharge Head	As required
Type	Centrifugal
Fittings	Quick opening sanitary fittings
Material	AISI 316 (Impeller)
Mounting	Free standing with adjustable SS ball feet
Shaft sealing	Mechanical shaft seal

Gasket	Nitrile rubber
Shroud	AISI 304
Motor	415V, AC, 3 phases, 50 Hz. Squirrel cage, Induction Motor with TEFC/ IP 55 Enclosure, VFD Operated

5.3.1 MILK RETURN LINE FROM EXISTING SMSTs DISTRIBUTION HEADER TO RAW MILK TANKs OF PROCESS SECTION-DHAURHERA PLANT INCLUDING PNEUMATIC VALVES & FITTINGS (Including modification in existing Raw Milk tanks & SMSTs valve battery for Milk Transfer and CIP facility)

Quantity : 1 Lot

Bidder has to study the existing valve battery and provide the facility of returning Milk from SMST (standardized Milk Storage tank) of Paneer Section to Raw Milk tanks of existing Process Section with require CIP facility. Milk Pump (described in 5.3) shall be utilized for transferring milk to Raw Milk tanks before diverting to Paneer Vat.

Bidder shall design Paneer Milk Storage tanks unloading headers for transfer of Paneer Milk upto Raw Milk storage tanks with require modification in existing valve battery loading headers.

Bidder to make suitable addition/alteration in Automation software modification as well as hardware addition as per the requirement

5.3.2 SELF PRIMING CIP RETURN PUMP FOR SMSTs (Standardized Milk storage tanks of Paneer Section)

Quantity : 1 No

Capacity : Suitable

Type : Self priming, Sanitary design, Centrifugal with quick Opening fittings, mono-block, free standing with adjustable ball feet

Capacity	: Suitable
Quantity	: 01 No
Type	: Self priming, centrifugal.
Duty	: To return CIP solution from SMSTs to CIP Kitchen
MOC	: Liquid contact parts in SS 316
Head	: As per requirement

5.4 SKID MOUNTED REGENRATIVE MILK HEATING AND WHEY COOLING MODULE

Quantity :1 Set

Capacity : 3 KLPH

Type : Skid mounted Plate Heat Exchanger with PID based temp. control system for heating and chilling

Duty : For heating of milk for Paneer manufacturing from 4 °C to 90 ° C and holding for 30 minutes before transferring to Paneer vat at 75-78 °C

Paneer Milk heater, complete module with inbuilt hot water generating set etc., shall be required for heating of milk to desired temperature with stipulated holding time. It shall be regenerative type heater with regeneration from both outgoing whey and incoming milk going to vats. The design parameters and temperature program shall be submitted by the bidder as additional information.

Skid mounted module shall have following PHEs

PHE 1: Regenerative section – to heat the milk thorough hot whey

PHE 2: To heat the milk to 90°C with hot water (to be designed for heating milk from 4°C to 90 °C in case of No whey available)

PHE 3 : To cool the heated milk from 90°C to 75-82°C with the incoming milk.

PHE 4 : To cool the whey with cooling tower water (shall be designed to cool whey from 80 deg C to 35 deg C in case of no incoming millk at end of last batch)

PHE 5 : To cool the whey from 35°C to 4°C with chilled water.

PHE 6 : For hot water generation through steam heating

All above PHEs shall have following constructional details:

MOC : SS 316 plates of 0.6 mm thickness

Frame : Free standing SS-304 cladded carbon steel frame on SS–304 adjustable ball feet

Gasket : Snap/clip ON type nitrile rubber EPDM/NBR food grade

Ports : Necessary ports/connections for temp./ pressure sensing to be provided.

Required capacity hot water generating module with hot water pump is in the scope of supply.

5.4.1 STANDARDIZED MILK BALANCE TANK FOR REGENERATIVE PHE

Quantity : 1 No

Capacity : Suitable 200 Lit

Type : Circular with openable type lid

Material : SS 304, 2 mm thick

Design Requirements:

Circular balance tank of suitable capacity, fabricated from SS 304 sheet. The tank shall with openable lid, inlet, outlet, connection with SMS unions. The lid shall be half closed and half openable. CIP spray ball, emergency water push & all other std. accessories. Balance tank shall be provided with low level switch for On–Off the Milk transfer pump. High level switch shall also be provided to generate high level alarm

for the operator. Feed balance tank of Milk Pasteurizers shall be provided with level transmitter which shall control VFD of the inlet pump to regulate in flow for smooth functioning of milk heater.

5.4.2 In-line Filter

Capacity : Suitable
Type : SS 304 MOC, Pipe type, clamp type, one end opening

5.4.3 SS Feed Pump

Capacity : As per capacity of the pasteurizer and CIP requirement
Type : Centrifugal
Other details shall be as per item no. 5.3

5.4.4 Flow Controller (Soft)

Type : Flow meter-based flow controller with regulating feed pump frequency with PID based smooth flow rate control system

5.4.5 Hot water THE/PHE

Capacity : Suitable to generate adequate hot water at requisite temperature for the above milk pasteurizer
MOC : SS 316
Gasket : As per OEM
Frame : Free standing SS steel frame on SS – 304 ball feet
Accessories : All std. accessories
Heating Medium : Steam

5.4.6 Hot Water Expansion Tank

1 Nos. for Suitable to Hot Water circuits for make-up of soft water

5.4.7 Hot Water Pumps

Capacity : As per required capacity of the pasteurizer
Type : Centrifugal.
Quantity : 1 Nos.
Other details shall be as per item no. 5.3

5.4.8 Holding Tube

Type : Tubular / rack mounted
Holding time : 600 Sec. / 10 Minutes
Material of coil : SS – 304

5.4.9 Booster Pump (if required)

Capacity : As per required capacity of the pasteurizer
Quantity : 1 Nos.
Type : Centrifugal
Other details shall be as per item no. 5.3

5.4.10 Instruments: (SCADA base)

Temperature indication at HMI /SCADA PC for all inlet & outlets of milk heating, regeneration, milk flow diversion & hot water THE. The automation system shall calculate online regeneration efficiency & indicate in the SCADA PC / HMI.

Require automation shall be incurred in regenerative PHE with complete control through PLC SCADA for the operation of Milk transfer from Paneer Milk Storage tanks to regenerative PHE set and transferring to all 04 Numbers of Paneer vat continuously with no break.

5.4.11 Accessories:

Flow diversion valve, Control PID valve, water make up On/Off valve, steam control PID valve, Hot water & well water control PID valve, Pneumatic valves, Constant Pressure Valve, flow meter for milk line, temperature transmitter, pressure transmitter, level switches, manual valves, APT Automatic Condensate trap assembly, SS skid, PLC based control panel with communication to main PLC system etc.

5.4.12 Automatic Pumping Trap (APT)

Quantity : 1 No

Capacity : Suitable

Suitable capacity automatic pumping trap with required condensate and steam piping is in the scope of supply.

Note: Supplier shall have to submit GA drawing for approval to the purchaser

5.5 CITRIC ACID PREPARATION CUM STORAGE SYSTEM

Coagulum from standardized milk with online dosing of coagulant with requires automation shall required. The system shall produce coagulum of consistent quality with desirable characteristics of Indian Paneer.

5.5.1 CITRIC ACID SOLUTION TANK WITH PLATFORM

Capacity : 2500 Litres with SS platform adjoining to Paneer Vat

Quantity : 2 Nos.

Type : Vertical, triple walled, dimple Jacketed, round shape, with slopping towards bottom, & insulated & SS 316 cladded with agitator

Duty **:** Citric Acid Solution Preparation by dissolving Citric Acid powder granule in soft water & indirect heating with steam injection jacket to maintain 75-80°C temperature of citric acid solution.

Material **:** Inner shell 3 mm & Intermediate Shell SS 316 with 3 mm thickness whereas Outer cladding **–** SS 304, 2 mm thick;

Finish **:** Inner SS surface shall be 180 grit and outer surface 150 grit

Fittings & Instruments:

No foam inlet 38 mm dia, outlet 100 mm dia SS 316 ball valve, breather, CIP spray shall be Rotary jet head (specially designed for effective CIP), PID Controller for controlling steam injection jacket, high & low level probes, level & temperature transmitters with local indicator, high level switch (Top mounted), Proximity switch for man way/ Manhole & other accessories like light & sight glass, calibrated level marks, sampling cock, SS tubular legs with adjustable ball fits, lifting lugs, thermo well, top cover shall be 3 mm thick and half openable.

Steam distribution accessories

Steam inlet of 1 inch at top, condensate trap of ½ inch size with float type trap and by pass arrangement, Jacket air vent with safety valve and pressure guage

Insulation:

100 mm thick LRB insulation of 120 kg/m3 density

Platform & ladder:

A platform made out of mini. 5 mm thick dimple stainless steel AISI 304 plate with require steps and support legs shall be made with using square pipes of 50x1000x3 mm and 40x40x2 mm, rest plates. Approach ladder for facilate manual addition of dry citric acid 25 kg bag in Citric Acid tank through man way.

Agitator:

Type : Top mounted mechanical agitator to ensure uniform mixing
Material : SS 316 with SS shroud

Test:

a. Jacket shall be test at 10 kg/cm sq
b. Dye penetration test for welding
c. Laser welded plates will be inflated at 30 kg/cm sq
d. Water fill up test for inner vessel

Note:

1) Supplier shall submit GA drawing for approval to the purchaser for tank prior to fabrication work in the event of placement of order
2) Stage inspection shall be offered for;

a. Material inspection
b. Welding and insulation inspection
c. Cladding and water filling

5.5.2 METERING PUMP FOR CITRIC ACID SOLUTION DOSING

Quantity **:** 2 Set;

Capacity **:** 4000 LPH or Suitable

Material **:** SS 316 / Suitable for handling of citric acid

Duty **:** For dosing of citric acid in metered quantity to ensure uniform distribution of the citric acid all along the top surface of the milk in the vat shall be achieved. Suitable metering pump and citric distribution headers shall be provided.

Flow meter

Type **:** Electro-magnetic type

Function:

It will be used for transfer citric acid to coagulation tank and will be metering type

5.6 PANEER VAT
Quantity : 4 Set

Capacity **:** 1500 Litres; Geometric Capacity: 2000 Litres

Type **:** Rectangular open type, Insulated & SS 304 cladded

Material **:** Inner shell SS 304 3 MM thickness, outer cladding SS 304 2 MM thick

Finish **:** Inner surface to be polished to 180 grits whereas outer finishing 150 grit

Design Requirements:

SS rectangular, insulated, open type vat, Capacity: 1.5 KL, fabricated from SS 304 sheet. The vat shall be insulated with 50 mm, mineral wool having density 120 Kg/Cu.M and cladded with SS 304 Sheet.

The Vat shall have be equipped with Acid dosing header/heads, perforated sieve for filter coagulated mass & vat shall have nominal slope towards the outlet. Suitable legs of required height with ball feet (50 mm) shall be provided. Manual agitation of Paneer Milk with shovels.

Vat shall have suitable size stands on the top to keep hoops for manual filling. The vat shall have temperature transmitter, Level transmitter (bottom) and a local digital temperature indicators. Shovels, No foam inlet, level marking, SS tubular legs with adjustable ball feet of 50mm, thermo well, All MS stiffeners shall be painted with two coats of approved shade enamel paints.

Removable top covers for the paneer vat in three piece design shall be provided to facilitate CIP of the vat through central CIP kitchen. Necessary fittings with hoses shall be provided.

Operation of Milk reception in Paneer vats from Regenerative PHE with require automation or PLC controlled SCADA system, further operation will be manual.

Note: Agitation of Milk will be carried out manually with shovels during Paneer preparation. Sufficient numbers of shovels shall be considered in scope of bidder for same.

Note:

1) Supplier shall submit GA drawing for approval to the purchaser prior to fabrication work in the event of placement of order
2) Stage inspection shall be offered for;

a. Material inspection
b. Welding and insulation inspection
c. Cladding and water filling

5.7 SELF PRIMING CIP SOLUTION RETURN PUMP FOR PANEER VATs
Quantity : 1 No

Capacity **:** Suitable

Type **:** Self priming, Sanitary design, Centrifugal with quick opening fittings, mono block, free standing with adjustable ball feet

Other description as per mentioned in 5.3.2 for Self priming CIP return Pump

5.8 PANEER HOOPS
Quantity : 180 Nos.

Capacity **:** To Prepare 10 Kg Paneer block from coagulated Mass

Quantity : 180 Nos.

Type **:** A stainless Steel container fabricated from SS 304, 2 mm thick sheet, with SS stand for Paneer Hoops

Size **:** Hoop - 325 x 329 x 68 mm
Paneer Jali - 318 x 319 x 84 mm
Cap/Lid - 328 x 330 x 18 mm

Functional Requirement:

A stainless steel container in which Paneer shall be filled up and given a mechanical pressure by a Paneer press when stacked in a service to attain a definite shape to the Paneer block.

Capacity of each hoop shall be of 10 Kg approximately with top loose cover. The hoops shall be in three piece design. All the three pieces of hoop shall have perforation of 4 mm dia at 50 mm triangular pitch on all the sides for drainage of whey.

The Paneer hoops shall be in three parts (a) Main body, (b) Spacer and (c) Top cover. All the three parts shall be fabricated from SS 304, 2 mm thick material. The hoops shall be provided with 2 Nos suitable handles and 2 Nos SS rods for spacer guide

The block moulds are made of Micro-perforated and micro grooved stainless steel plates suitable for easy draining of whey and in same time for quick reduction of temperature of Paneer. The Mould should be design in such a way that it gives ease in de moulding as well as with minimum sticking of coagulum with better durability of moulds

Note: Supplier shall have to submit drawing for approval to the purchaser

5.9 WHEEL MOUNTED SS TROLLEYS FOR PANEER HOOPS TRANSFER
Quantity : 01 Lot (as required)

Type **:** wheel mounted SS trolleys, Suitable to carry SS Hoops, Lockable wheel
Material **:** SS 304 MOC, square SS 304 Pipes, Virgin white wheel, 2mm SS Sheet

Functional Requirement:
Suitable for Transferring Paneer Hoops (filled with coagulated mass) from Paneer Vat to Pressing station & Paneer cooling vat. Sufficient numbers of Wheel mounted trolleys shall be offered considering two operations i.e. transferring Paneer Hoops from Paneer Vat to Pressing station and Paneer Pressing station to Paneer Cooling vat at once.

Note: Supplier shall submit GA drawing for approval to the purchaser

5.10 PANEER PRESS / PANEER PRESSING STATION
Quantity : 6 Nos. Stations or 6 set

Capacity :

4 Hoops vertical stack under each Head for each station

6 Nos. of Paneer Press station to carry out pressing of 24 Hoops per batch

Functional Requirement:
The press shall be used for removal of whey from Paneer curd (Coagulated mass) by pressing at 2 Kg/Cm sq for 7 Minutes duration.

Paneer press shall be provided with pneumatically operated cylinders mounted on vertical heads with pressing plates to press one stack of 04 Nos. of hoops each of capacity 10 Kg.

Constructional Details:
Each press shall has one head and under each head 04 Nos. of Hoops can be pressed.

The vertical columns and other supporting structure shall be fabricated from SS 304 material only. The press shall have four legs fabricated from 50 mm square hollow section of SS 304.

The pneumatic system shall comprise of cylinders, direction valves, FRLs, pressure gauges, Main air valve in SS construction, pneumatic fittings, PU air pipes etc.

All pneumatic components shall be of FESTO make.

All complete press including whey tray shall be fabricated from SS 304 quality material for collection of drained whey during pressing.

Pressing time and Pressure shall be adjustable.

A separate control panel (SS 304 construction) shall be provided with required timers so as to set the pressing time and pressure of each head. Press shall have timer based control to cutoff compressed air as per set time. All timers and switched shall mounted in SS panel and solenoid shall be installed on each heads.

5.11 PANEER BLOCK COOLING VAT (INSULATED) WITH COOLING WATER RECIRCULATION PUMP, WATER CHILLER, FILTERATION, UV & OZONIZATION SYSTEM

5.11.1 PANEER BLOCK COOLING VAT (INSULATED)

Quantity : 2 Nos.

Capacity : 2 KL capacity (100 mm below top edge) designed to hold 90 blocks of Paneer each of 10 kg in each vat. i.e. 180 Nos. Paneer Hoops in 02 Nos of Vat.

Type : Rectangular design round edges, with slopping bottom, double walled insulated,

Finish : Inner SS surface of 150 grit & outer SS Surface 150 grit

Functional requirement : after pressing Paneer blocks of 10 kg immersed in this tank, where Pasteurized chilled water is maintained at 4 °C, The same will designed to cool the Paneer block from 65 °C to less than 25 °C (Core temperature) within 2 Hrs.

Design requirement: Rectangular, Insulated and cladded with SS304 sheet. The vat shall have temperature transmitter with local digital indicator

Material of Construction:

Inner Body : SS 304, 2.5 mm
Insulation : 75 mm thick PUFF insulation with 36 kg/m3 density
Covers : 2 mm thick with removable spray ball arrangement

Bottom perforated sheet placed at height of 1000 mm from flat bottom to place paneer blocks

Accessories:
Inlet : SS 51 mm dia inlet at side wall of inner shell
Outlet : 63 mm SS butterfly valve, 500 mm height from ground level

Thermo well, tubular legs 06 nos. with adjustable ball feet, lifting lugs, calibrated level marking etc shall be included in scope.

Removable top covers for the Paneer cooling vat in three piece design shall be provided to facilitate CIP of the vat through central CIP kitchen. Necessary fittings with hoses shall be provided.

Painting
All MS stiffeners used in constructions of the tank should be painted with two coats of approved shade enamel paints

Tests:

a. Dye penetration test for welding joints
b. Water fill up test of inner shell

Note:

1) Supplier shall submit GA drawing for approval to the purchaser prior to fabrication work in the event of placement of order
2) Stage inspection shall be offered for;
   a) Material inspection
   b) Welding and insulation inspection
   c) Cladding and water filling

5.11.2 SELF PRIMING CIP RETURN PUMP FOR PANEER BLOCK COOLING VAT

Quantity **:** 1 Nos.
Capacity **:** Suitable

Type **:** Self priming, Sanitary design, Centrifugal with quick Opening fittings, mono block, free standing with adjustable ball feet

Other details shall be as per item no. 5.3.2

5.11.3 COOLING WATER CIRCULATION PUMP

Quantity **:** 1 Nos.

Capacity **:** Suitable

Type : Sanitary design, Centrifugal with quick opening fittings, mono block, free standing with adjustable ball feet

MOC : SS304 and internal parts SS316

Other details shall be as per item no. 5.3

5.11.4 COOLING WATER CHILLER (To maintain cooling water temperature at 2- 4 ° C)

Quantity **:** 1 No

Capacity **:** Suitable
Type **:** Plate Heat Exchanger with PID based temp. control system

MOC **:** SS 316 plates of 0.6 mm thk.
Frame **:** Free standing SS-304 cladded carbon steel frame on SS–304 adjustable ball feet

Gasket **:** Snap/clip ON type nitrile rubber/NBR food grade
Services **:** Chilled water at +1.5 (min) / + 2 deg C (max)
Cooling water to chilled water ratio - 1 : 1

Cooling water inlet temp 10°C and outlet temp. 4°C

Ports **:** Necessary ports/connections for temp./ pr. sensing to be provided.

5.11.5 COOLING WATER FILTERS

Quantity **:** 1 Set

Capacity **:** Suitable

Duty **:** A sanitary design duplex type of filters for the filtration of cooling water during recirculation.

5.11.6 UV TREATMENT SYSTEM

Quantity **:** 1 Set

Capacity **:** Suitable

Duty **:** For UV treatment of cooling water for disinfection of cooling water

5.11.7 Ozonization treatment

Quantity **:** 1 Set

Capacity **:** Suitable

Duty **:** For Ozonizing treatment of cooling water

Important Note:

Paneer cooling Vat shall be interconnected with whey Pasteurizer or Regenerative PHE module to Prepare & transfer Pasteurized Chilled water to Paneer Cooling Vat during start of operation.

Note: Supplier shall have to submit GA drawing for approval to the purchaser

5.12 WHEEL MOUNTED SS TROLLEYS FOR TRANSFERING PANEER BLOCKS
Quantity : 01 Lot (as required)

Type **:** wheel mounted SS trolleys, Suitable to carry SS Hoops, Lockable wheel

Material **:** SS 304 MOC, square SS 304 Pipes, Virgin white wheel, 2mm SS Sheet

Functional Requirement:

Transferring Paneer Blocks from Paneer Cooling vat to Cold Store for surface drying or carried to Packing Room for cutting.

Note: Supplier shall have to submit GA drawing for approval to the purchaser

5.13 SS TABLES FOR BLOCKS DEMOULDING & PANEER PACKING
QUANTITY :1 Lot (Suitable & as required)

MOC : Fabricated from SS304 square pipe of 40X40X3 mm sq pipe and SS304 sheet.

Functional Requirement:
For de-moulding/de-hooping of Paneer blocks on SS tables before transferring to Cold Store maintained at 4°C & SS tables for Paneer cutting, weight adjustment and packing activities. Sufficient numbers of SS tables shall be considered for both operations.

5.14 WHEY BALANCE TANK
Quantity : 1 No

Capacity : Suitable 200 Lit

Type : Circular with openable type lid

Material : SS 304

Design Requirements :

Circular balance tank of suitable capacity, fabricated from SS 304 sheet. The tank shall with openable lid, inlet, outlet, connection with SMS unions. The lid shall be half closed and half openable. CIP spray ball, emergency water push & all other std. accessories. Whey balance tank shall be provided with low level switch for On–Off the whey transfer pump. High level switch shall also be provided to generate high level alarm for the operator.
A perforated sieve for trapping of Paneer fines/particles carried along with whey shall be provided.
Inline strainer shall be fitted between balance tank to whey transfer Pump of 51 mm size & having MOC SS 304
Note: Supplier shall have to submit drawing for approval to the purchaser

5.15 WHEY TRANSFER PUMP TO REGENERATIVE PHE
Quantity : 1 No

Capacity : 5 KLPH

Type : Sanitary design, Centrifugal with quick opening fittings, mono block, free standing with adjustable ball feet

Duty : For transfer of whey from whey balance tank to Regenerative PHE set

MOC : Complete SS316 construction

Other details shall be as per mentioned in item no. 5.3

5.16 COOLING TOWER WATER PUMP FOR WHEY COOLER
Quantity: 2 Nos. (1 Working +1 Standby)

Capacity : Suitable

Type : Centrifugal / High efficiency Grundfoss vertical pump
Duty : For transfer of cooling water from cooling tower to whey cooler
Motor : Efficiency – 1(IE2)

Material : Body & working parts SS304 with cast iron base

5.17 CHILLED PANEER WHEY STORAGE TANK
Quantity : 1 No.

Capacity : 15,000 Litres

Type : Vertical Milk Storage tank, double walled, Insulated & SS 304 cladded

Material : Inner shell SS 304, SS-304 cladding

Duty : For inter-mediate storage of chilled whey before Pasteurization

Other details as per **mentioned in item no.5.2** for full technical specifications along with accessories, instrumentation and automation requirement along with test & Inspection.

5.18 WHEY TRANSFER PUMP TO WHEY PASTURIZER
Quantity : 1 No

Capacity : 5 KLPH

Type : Sanitary design, Centrifugal with quick opening fittings, mono block, free standing with adjustable ball feet

Duty : For transfer of chilled whey to whey pasteurizer

MOC : Complete SS 316 construction

Other details shall be as per item no.5.3

5 .19 SELF PRIMING CIP RETURN PUMP FOR CHILLED WHEYSTORAGE TANK
Quantity : 1 No.

Capacity : Suitable

Type : Self priming, Sanitary design, Centrifugal with quick Opening fittings, mono block, free standing with adjustable ball feet

Other details shall be as per item no. 5.3.2

5.20 WHEY PASTEURIZER
Quantity : 1 Set

Capacity : 5 KLPH

Whey pasteurizer, complete skid with hot water generating set (PHE type) required for pasteurization of whey up to **78 Deg C**, The hot water generation section (PHE type) shall be separate.

The brief description of whey pasteurizer shall be as given below:

Type **:** Plate Heat Exchanger

Temp Profile: 6-30-78-4 ° C

Material **:** SS 316 plates of 0.6 mm thickness with NBR/ Nitrile rubber (SNAP /CLIP ON) gaskets

Frame **:** Free standing SS-304 cladded carbon steel frame on SS 304 ball feet

Finish **:** 150 grit

Whey inlet & final outlet temp.: Inlet 4^0 C, final outlet 4^0 C

Services **:** Chilled water at + 1.5^0 C (min) & + 2^0 C (max) Whey to chilled water ratio - 1:1.5, Hot Water, Air, Power (3 Phase) etc

Regeneration Efficiency **:** 93 %

The proposed whey pasteurization plant shall be provided with all the necessary instruments, controls and automation system for safe operation.

Whey pasteurizer shall have following items

:

5.20.1 Balance Tank

Capacity **:** Suitable 200 Lit

Type **:** Circular with openable type lid

Material **:** SS 304

Accessories:

CIP spray ball, emergency water push &all other std. accessories. Feed balance tank of whey pasteurizer should be provided with level transmitter which s hould control VFD of the pump to regulate in flow for smooth functioning of whey pasteurizer and Low & high level switch for On–Off the pasteurization functional requirement.

Mounting : Free standing on adjustable ball feet

5.20.2 SS Feed Pump

Capacity : 5 KLPH (VFD operated)

Quantity : 1 No.

Type : Sanitary design, Centrifugal with quick opening fittings, mono block, free standing with ball feet

MOC : Complete, SS316

Other details shall be as per item no. 5.3

5.20.3 Electronic Magnetic Flow Meter

Capacity : 6 KLPH

Type : Electronic Magnetic type flow meter

Duty : These shall be used for online flow measurement of whey being transferred to pasteurizer

5.20.4 Duplex Filter

Capacity : 6 KLPH

MOC : SS-304

Quantity : 1 Set

Type : Duplex filter with auto change over facility. Valve cluster shall be designed with special type of valves so that both filters remain in series during CIP.

Accessories : Differential pressure transmitter

5. 20.5 Hot water generation and Whey heating PHE (Separate PHE)

Capacity : Suitable to generate adequate hot water at requisite temperature and Whey heating for the above whey pasteurizer with soft water make up arrangement.

Quantity : 1 Set
Plate : SS 316, EPDM / Viton SNAP ON gaskets on both sides.

Frame : Free standing SS cladded carbon steel frame on SS - 304 ball feet

Accessories : All std. Accessories

5.20.5.1 Hot Water Expansion Tank

Quantity : 1 No
Suitable to the hot water circuit with high level switch and automatic butterfly valve for water make up in the tank to control the water level.

5.20.5.2 Automatic Pumping Trap (APT)

Quantity : 1 No
Suitable capacity automatic pumping trap with required condensate and steam piping is in the scope of supply.

5.20.6 Hot Water Pump

Quantity : 1 No

Capacity : Suitable

Type : Energy efficient, vertical multistage with Eff-1 motor

MOC : SS-304 body with SS-316 working parts

Duty : To circulate hot water through hot water PHE

Accessories : Flow control valve, Constant pressure unit for the hot water system.

5.20.7 Booster Pump

Capacity : 5 KLPH

Quantity : 1 No

Type : Sanitary design, Centrifugal with quick opening fittings, mono block, free standing with adjustable ball feet

MOC : SS 316

Other details shall be as per item no. 5.3

5.20.8 Plate Pack for Regeneration and Chilling

Type : PHE

Plate : SS 316

Section : 2 Section (Regeneration and Chilling)

Gasket : Clip-on type, NBR.

Frame : Free standing SS cladded carbon steel frame on SS – 304 ball feet

Accessories : All std. accessories

5.20.9 Holding Tube

Type : Tubular / rack mounted, separate standing structure with max length of 6 meter

Holding time : 15 Sec.

Quantity : One set

Material : SS – 316

Other details : Required SMS unions shall provided for cleaning of holding tube

5.20.10 Instruments:

Required Samson make control valve (with extra solenoid valve) for heating and chilling system. Pneumatically operated ON/OFF type valve shall be provided between the manual and PID valve.

Temperature transmitter for indication at SCADA PC for all inlet & outlets of heating, regeneration, chilling, flow diversion & hot water PHE. The automation system shall calculate online regeneration efficiency & indicate in the SCADA PC/HMI.

Constant pressure valve at product outlet & pressure transmitter (at required locations) based alarm system shall be provided to prevent entry of utilities into product sections of the PHE.

Necessary temperature transmitters, valves including FDV for chilling and heating section, controls etc. shall be provided.

5.20.11 Tools

Essential special tools including torque wrench should be supplied with the machine without charging any extra cost. - 1 set.

Following information shall be provided by the contractor along with offer:

The type and the number of the plate, plate area, finishing, heat load, pressure drop and utility consumption in the various section of the heat exchanger, operating hours between two successive CIP programs, CIP schedule.

The whey pasteurizer should run continuously at rated capacity and efficiency for a period of 8 hours without CIP.

Important Note:

Whey Pasteurizer shall be designed interconnected with Paneer Cooling Vat to prepare & supply Pasteurized chilled water for cooling of Paneer blocks (once in day)

Note: Supplier shall have to submit GA drawing for approval to the purchaser

5.21 PASTEURISED WHEY STORAGE TANK
Quantity : 15 KL x 02 Nos.

Capacity : 15,000 Litres

Quantity : 02 Nos.

Type : Insulated Vertical Milk Storage tank, Double walled

Material : Inner shell – SS 304 3 MM; Outer cladding **–** SS 304 2 MM
Inner conical top 2.5 mm, flat bottom 3 MM, outer shell top cone 2 mm
All material of construction shall confirm AISI 304

Finish : 150 grit

Slope : 1:15 slope towards no foam inlet cum outlet for complete drainage

Fittings & Instruments:

Inlet/outlet, breather, CIP spray shall be Rotary jet head (specially designed for effective CIP), sampling cock, Drain hole, thermo-well, lifting lugs, anchor points, Conical mild steel legs with SS cladding & adjustable ball feet, high & low level probes, level & temp. transmitters with local indicator, high level switch (Top mounted), Proximity switch for man way & other accessories like light & sight glass etc.

All MS stiffeners and bottom structure used for construction of silo woluld be spray galvanized after de rusting

Insulation:

A layer of 15 mm thick PUF insulation followed by EPS in two layers of 50 mm each including vapour barrier to ensure temperature rise does not exceed 1 Deg. C in 24 hours time.

Man way:

Side mounted man way with proximity switch & cover & nitrile gasket. Manway should have deep grove gasket to prevent its slippage during tightening of the man way.

Platform & ladder:

Vendor shall consider 2.1 metre high SS railings will be connected to inter connecting tanks platform made from SS using SS dimple plate. Approach ladder/stair of suitable size shall be considered from ground level to climb on platform.

Agitator:

Customer will provide 02 set of side mounted Stelzer make (imported) Agitator for both Whey storage tank & vendor shall have to submit GA drawing considering the same agitator set

Side mounted mechanical agitator to ensure uniform fat distribution without any adverse effects on the contents. Agitation would be milk quantity based & required no. of agitators to be considered to meet the functional requirement with oil drip proof geared motor of adequate capacity and able to uniformly mix milk in the tank within 10 minutes,

Tests:

Following test shall be conducted by the manufacture at its works:

1. Dye penetration test for weld joints
2. Water fill up test of inner vessel for water tightness before insulation
3. Agitator performance

Note:

1) Supplier shall submit GA drawing for approval to the purchaser for tank prior to fabrication work in the event of placement of order
2) Common SS platform with SS railing to be considered in the scope
3) Stage inspection shall be offered for;

a. Material inspection
b. Welding and insulation inspection
c. Cladding and water filling

5 .22 SELF PRIMING CIP RETURN PUMP FOR PASTEURIZED WHEYSTORAGE TANK
Quantity : 1 No.

Capacity : Suitable

Type **:** Self priming, Sanitary design, Centrifugal with quick Opening fittings, mono block, free standing with adjustable ball feet

Other details shall be as per item no. 5.3.2

5.23 WHEY DISPATCH PUMP
Quantity : 1 No.

Capacity **:** 20 KLPH

Duty **:** For dispatch of pasteurized Whey through road tankers.

Type **:** Sanitary design, Centrifugal with quick opening fittings, monoblock, free standing with adjustable ball feet.

MOC **:** Complete SS316 construction

Other details shall be as per item no. 5.3

5.24 ELECTRONIC MASS FLOW METER
Quantity : 2 No

Capacity **:** 20 KLPH

Type **:** Coriolis type mass flow meter

Functional Requirement:
These shall be used for online mass flow measurement of whey dispatch through tankers & second used for online mass flow measurement of whey transfer to butter milk section.

5.25 WHEY DOSING PUMP TO BUTTER MILK THERMIZER BALANCE TANK- VFD BASED
Quantity : 1 No with VFD

Capacity **:** 3 KLPH with VFD

Type **:** Sanitary design, Centrifugal with quick opening fittings, mono block, free standing with adjustable ball feet

Duty **:** For dosing of pasteurized whey in the buttermilk thermizer balance tank in metered quantity.

Other details shall be as per item no.5.3

5.26 WHEY DISPATCH CHILLER
Quantity: 1 No

Capacity **:** 20 KLPH

Duty **:** To chill whey for tanker dispatch from 7 °C to 3 °C.

Type **:** Plate Heat Exchanger with PID based temp. control system

MOC **:** SS 316 plates of 0.6 mm thk.

Frame **:** Free standing SS-304 cladded carbon steel frame on SS–304 adjustable ball feet

Gasket **:** Snap/clip ON type nitrile rubber/NBR food grade

Services **:** Chilled water at +1.5 (min) / + 2 deg C (max)
Whey to chilled water ratio - 1 : 1
Whey inlet temp 7°C and whey outlet temp. 3°C

Ports **:** Necessary ports/connections for temp./ pr. sensing to be provided.

Note: Supplier shall have to submit GA drawing for approval to the purchaser

5.27 WHEY TANKER DESPATCH HOSE (Food Grade)
Quantity : 1 Set

Size **:** 63 mm dia. & Suitable length

- Hose shall be crimped & fitted with SMS Union with linear.

- **Detailed Technical Descriptions:**
  1) Both end S.S. 304 SMS female liner and nut duly crimped. Vendor has to provide complete SMS Union Set at both ends.
  2) Both ends should have 63 mm, SS 304 pipe piece inserted in rubber pipe with SMS Union/Nut.
  3) Operating/Working pressure: up to 10 bar, Bursting Pressure: 30 bar
  4) Maximum vacuum : 0.7 BAR
  5) Bending Radius: 150 MM
  6) Operating Temperature range: -30°C to 110 °C
  7) Inner Tube: NON PORUS, which clear colour, odourless and tasteless, mirror like smooth for smooth flow of CIP solution, Smooth NBR Lining.
  8) REINFORCEMENT: Finish Fabric with Helix wire with Textile ply.
  9) COVER: WEATHER RESISTANT, FABRIC IMPRESSION, Blue Colour. Supply details shall be visible on cover.

APPLICATION:

- It should comply FDA Standards & BFR Recommendation, milk friendly, food grade rubber hose pipe
- Suitable for withstand CIP with hot water and diluted Caustic Lye [2 % Concentration] & Nitric Acid [1.5% Concentration].
- Temperature of Hot water and CIP Solution will be 100 Deg C Maximum.
- Utmost flexibility, ease of handling & light weight. Hoses shall be Food grade, FDA approved, crimped both ends and suitable to withstand high temperature of CIP solutions with maximum operation temperature of 95-110°C

5.28 PANEER BLOCK CUTTING MACHINE (200 gm & 500 gm)
Quantity : 2 Nos.

Capacity **:** 300 Kg/ hr

Type **:** Operated through pneumatic system

MOC **:** Complete SS304 construction

Suitable for cutting blocks of:

200 gm size - 80 X 110 X 22 mm - 350 kg

500 gm size - 80 X 110 X 55 mm - 875 kg

MACHINE DESCRIPTION

Paneer blocks shall be fed manually to the block cutting machine one by one for all production types. Blocks are cut by razor blade in fixed weight portions which with full stroke of cylinder. The system shall be design to have minimum fines generation.

An automatic / pneumatic blocks cutting machine to cut the Paneer block of 10 Kg to 200 g and 500 g block shall be provided. Block cutting shall be 0.5 mm width/thcikness throughout blades.

5.29 PANEER VACCUM PACKING MACHINE
Quantity : 1 Nos.

Capacity **:** 400 Kg/ Hr

Type **:** Double Chamber Vacuum Packing and Sealing Machine

MOC **:** Complete SS304 construction

Double chamber vacuum packing machine shall have minimum 2 nos. of chamber per machine and 2 Nos. of seal bars. Machine shall have vacuum pump of suitable capacity. Vacuum packing machine shall have digital micro processor based controller and pneumatically operated sealing jaw.

5.30 WHEEL MOUNTED SS TROLLEYS FOR TRANSFER PACKED PANEER BLOCKS TO PANEER STERILIZER
Quantity : 01 Lot

Type **:** wheel mounted SS trolleys, Suitable to carry SS Hoops, Lockable wheel

Material **:** SS 304 MOC, square SS 304 Pipes, Virgin white wheel, 2mm SS Sheet

Functional Requirement:

Transferring Packed Paneer blocks to sterilizer room

5.31 HOT WATER STERILIZER
Quantity : 01 Set

Capacity **:** 2000 Packets per Hour

Functional Requirement:

Hot water tank shall be used to achieve commercial sterility of Paneer in pouches. Sterilization shall be done in batches and approximately batch of above mentioned capacity shall be sterilized.

MOC : SS 304

Temp. : 95 Deg. C

Holding time : 30 Min. holding and to ensure that in less than 10 min. The product is off loaded from tank, and next batch is loaded again.

System : Hot water generation and circulation system with necessary insulation, collection tank, drainage facility, temperature & flow controls, online heating through THE/ PHE on the return line and finishing heater on forward line

Operation : PLC based operation with time, temperature indications for every batch and product temperature at Min.3 locations or more.

NOTE: Following Accessories to be considered in the scope in addition to other standard accessories;

1. Digital sample sensor shall be considered in the scope
2. Automation for sterilization and safety system

5.31.1 PACKED PANEER STERILIZATION VAT (Insulated with Platform)

Quantity **:** 1 Nos.

Capacity **:** 2000 Packets per Hour

Type **:** Rectangular design round edges, with slopping bottom, double walled insulated, with openable type lid

Finish **:** Inner SS surface of 150 grit & outer SS Surface 150 grit

Functional requirement: After vacuum packing , Paneer blocks filled pouches are immersed in this Hot water tank for sterilization, In the same tank, Hot water is maintained at 90°C, & Paneer Packets are dipped in the same tank for 30 minutes with the help of mono rail & Pulley arrangement and removed.

Design requirement: Rectangular, round edged, Insulated and cladded with SS304 sheet. The vat shall have temperature transmitter with local digital indicator

Material of Construction:

Inner cylindrical Body	: SS 304, 2.5 mm
Insulation	: LRB 100 mm thick of 120 kg/m3 density
Covers	: 2mm thick with removable spray ball arrangement

Bottom perforated sheet placed at height of 1000 mm from flat bottom to place Paneer trays filled with Packets of Paneer

Accessories:

Inlet : SS 51 mm dia. inlet at side wall of inner shell
Outlet : 63 mm SS butterfly valve, 500 mm height from ground level

Thermowell, tubular legs 06 nos. with adjustable ball feet, lifting lugs, calibrated level marking etc shall be included in scope.

Removable top covers for the Paneer sterilizer Hot water vat in three piece design shall be provided to facilitate CIP of the vat through central CIP kitchen. Necessary fittings with hoses shall be provided.

Suitable size Platform shall be provided with Hot Water sterilization vat for placing sterilized Paneer pouch trays during the process of sterilization.

Painting
All MS stiffeners used in constructions of the tank should be painted with two coats of approved shade enamel paints

Tests:
c. Dye penetration test for welding joints
d. Water fill up test of inner shell

5.31.2 HOT WATER CIRCULATION PUMP

Quantity **:** 1 Nos.

Capacity **:** Suitable

Type : Sanitary design, Centrifugal with quick opening fittings, mono block, free standing with adjustable ball feet

MOC : SS304 and internal parts SS316

Other details shall be as per item no. 5.3

5.31.3 HOT WATER PHE (To maintain Hot water temperature at 90°- 95°C)

Quantity **:** 1 No

Capacity **:** Suitable
Type **:** Plate Heat Exchanger with PID based temp. control system

MOC **:** SS 316 plates of 0.6 mm thk.
Frame **:** Free standing SS-304 cladded carbon steel frame on SS–304 adjustable ball feet

Gasket **:** Snap/clip ON type nitrile rubber/NBR food grade
Services **:** Hot water at 95deg C (max)
Ports **:** Necessary ports/connections for temp./ pr. sensing to be provided.

5.31.4 HOT WATER FILTERS

Quantity **:** 1 Set

Capacity **:** Suitable

Duty **:** A sanitary design duplex type of filters for the filtration of Hot water during recirculation.

5.31.5 MONO RAIL AND PULLEY SYSTEM

Quantity **:** 1 Set

Capacity **:** Suitable

Type : Sanitary design, ceiling mounted & operated with remote

Functional Requirement:

It shall be designed to dip and remove Paneer packets filled trays from Hot water tank during each batch sterilization.

Note:

1) Temperature and time of sterilization in the sterilizer shall be controlled through PLC based automation system of the equipment.
2) The size of the hot water sterilizer should be such that above mentioned capacity shall accommodated and all the surfaces are directly exposed to the hot water so as to have uniform temperature and color of the product.

Note:

1) Supplier shall submit GA drawing for approval to the purchaser prior to fabrication work in the event of placement of order
2) Stage inspection shall be offered for;
   a) Material inspection
   b) Welding and insulation inspection
   c) Cladding and water filling

5.32 WHEEL MOUNTED SS TROLLEYS FOR TRANSFER PANEER BLOCKS TO COOLING ROOM / CARTONING ROOM
Quantity : 1 Lot (as required)

Type : Suitable**,** wheel mounted SS trolleys, Lockable wheel
Material : SS 304 MOC, square SS 304 Pipes, Virgin white wheel, 2mm SS Sheet

Functional Requirement:

The trays coming out from the sterilizer shall be manually transferred and stacked one over other with sufficient space for air circulation in to the wheel mounted trolleys. These trolleys shall be manually transferred to the Paneer blast room or cartooning room after cooling. Sufficient numbers of SS trolleys shall be considered for same operations including finished good dispatch.

The trolleys shall be fabricated from SS304 Angle of 40 X 40 X 5 mm thick.

Note: Supplier shall submit drawing for approval to the purchaser prior to fabrication

5.33 INKJET PRINTER WITH BELT CONVEYOR FOR BATCH CODING
Quantity : 02 Nos.

Capacity : Suitable

Functional Requirement:

The printing systems shall be offer economic coding. Inkjet printer shall be supplied with belt conveyor having VFD for controlling belt speed.

5.34 MANUAL CARTONING TABLES

Quantity : 1 Lot (as required)

Capacity **:** Suitable

MOC **:** Complete SS304 construction, using square box pipe, rest plates and wheels

Functional Requirement:

The sterilized and cooled Paneer Pouches from blast room are packed in secondary packaging material and filled in cartons using manual cartooning tables

5.35 METAL DETECTOR FOR FINISHED GOOD CARTONS
Quantity : 01 Nos.

Capacity **:** Suitable

Functional Requirement:

It should be online with respective packing line and should detect Ferrous and nonferrous. It should be with sufficient in feed and outlet Conveyor to carry individual packs

Sensitivity: 0.8 mm for faros, 0.9 mm for non-ferrous, 1.1 mm for SS depending on the pack size.

5.36 WEIGHING SCALES WITH SS TABLES
Quantity : 2 kg capacity – 06 Numbers and 50 Kg capacity- 02 Numbers

Capacity : 2 Kg Capacity and 50 Kg Capacity
Qty : 02 Kg Cap. 03 Nos. + 03 Nos. stand-by, 50 Kg capacity-02 Nos.
Table MOC: SS 304

Functional Requirement:

2 Kg Capacity weighing scales utilized for weight check and adjustment during manual filling of 200 gm and 500 gm Paneer Blocks in laminate pouches and 50 Kg capacity weighing scales utilized to check final weight of Finished good cartons of Paneer.

Rectangle SS -304 material working tables are provided to handle the individual packages of Diced/Sliced Paneer packs and filled into CBX. Suitable height of the table to be given to match the metal detector

5.37 HOOPS CLEANING SYSTEM
Quantity : 1 Set

Capacity **:** Suitable (3000 Litres tank)

MOC **:** Complete SS304 construction

Functional Requirement:

Suitable manual hoops washing & sterilization system shall be provided for effective cleaning. The system shall include three troughs of suitable size for detergent cleaning ,washing and hot water sterilization. The system shall have required pumps and PHEs.

5.38 PANEER SHREADDING MACHINE / PANEER MINCER WITH SS TABLE FOR REWORK
Quantity : 1 Nos.

Capacity : Suitable

Functional Requirement: A motorized Paneer mincer to be provided to mince the Paneer rework into suitable size to blend with fresh batches.

5.39 PANEER PASTE MAKING MACHINE
Quantity : 1 Nos.

Capacity : Suitable

MOC : Complete SS304 construction

Functional Requirement: Shredded Paneer feed to Paneer Paste making machine to prepare fine paste and mix with milk in Paneer Vat during before coagulation.

5.40 COOLING TOWER WITH PUMPS AND ACCESSORIES
Quantity : 1 Set

Cooling tower shall be in FRP construction, with fixed spray nozzles, water distribution system and poly propylene fill pack for heat transfer. The cooling tower shall be fitted with a statically balanced axial flow fan (VFD driven) with adjustable type aluminium alloy corrosion resistance blades. The cooling tower shall have air inlet louvers and supporting hardware / MS structures galvanized for long life and to withstand wind load

Quantity : As Per Equipment List
Capacity : As Per Equipment List
Type : tower made in FRP casing with water
: electric motor- VFD operated

Cooling Water Circulation Pump

Quantity : As Per Equipment List
Capacity : As Per Equipment List
Type : Centrifugal type in CI construction with bronze impeller.

5.41 CIP KITCHEN FOR PANEER PLANT
Quantity : 1 Set

As per general description given in basis of design and detailed specifications given below:

5.41.1 Acid/ Lye Dosing System with Pumping & Piping

Type : Dosing line with required sizing and valves.

Capacity : Suitable

Quantity : 1 Lot

Material : AISI 316 L

This system shall be installed near the existing concentrate storage tank

5.41.2 Lye Solution Tank: (Purchaser will Provide)

Type : Vertical, cylindrical free standing on SS ball feet legs

Capacity : 3 KL capacity

Quantity : 01 No

Material : AISI 304

Insulation : Resin bonded fibre glass crown 150

Cladding : AISI 304

Ports & Fittings : Water inlet, return inlet, chemical inlet, outlet, re-circulation pump inlet & outlet, drain, overflow, air vent, man way, Instrument bosses, sampling valve & all other std. fitting

Instruments & controls : High, middle and low-level sensors, conductivity probe, temperature sensor

5.41.3 Acid solution Tank: (Purchaser will Provide)

Type : Vertical, cylindrical free standing on SS ball feet legs.

Capacity & Qty. : 3 KL, 01 Nos

Material : AISI 304

Insulation : Resin bonded fibreglass crown 150

Cladding : AISI 304.

Ports & Fittings : Water inlet, return inlet, chemical inlet, outlet, re-circulation pump inlet & outlet, drain, overflow, air vent, man way, Instrument bosses, sampling valve & all other std. fitting

Instruments & controls : High, middle and low-level sensors, conductivity probe, temperature sensor

5.41.4 HOT WATER TANK: (Purchaser will Provide)

Type : Vertical, cylindrical free standing on SS ball feet legs.

Capacity : 3 KL

Qty : 01 No

Material : AISI 304 min. 2.5 mm thick sides and min 3.0 mm thick top & bottom

Insulation : Resin bonded fibre glass crown 150

Cladding : AISI 304.

Ports & Fittings : Water Inlet, return inlet, outlet, drain, overflow, air vent, man way, Instrument bosses, sampling valve & all other std. fitting

Instruments & controls : High, middle and low-level sensors, temperature sensor

5.41.5 RECUPERATION/RINSE WATER TANK: (Purchaser will Provide)

Type : Vertical, cylindrical free standing on SS ball feet legs.

Capacity : 3 KL, Qty:

Qty : 01 No

Material : AISI 316

Insulation : Resin bonded fibre glass crown 150 Cladding AISI 304.

Ports & Fittings : Water inlet, return inlet, outlet, drain, overflow, air vent, man way, Instrument bosses, sampling valve & all other std. fitting

Instruments & controls : High, middle and low-level sensors, temperature sensor

5.41.6 Sterilization Tank:

Capacity : 500 Lit

Qty : 01 Nos.

MOC : SS 304

Type : Insulated, vertical tank

Instruments : Low, middle & high level switch, Temp transmitter etc

This tank shall be used for cold as well as hot sterilization of the equipment

5.41.7 CIP FORWARD PUMP-VFD OPERATED

Capacity : 20 KLPH

Qty : 01 No

MOC	: AISI 316
Type	: Centrifugal, VFD operated

All other specifications same as item no. 5.3

5.41.8 Tubular Heat Exchanger for CIP Solution heating

Capacity	: 20 KLPH
Qty	: 01 Set
Application	: To maintain temperature of solutions/ Water at the required levels.
Heating medium	: LP Steam
MOC	: AISI 316
Accessories	: All standard Accessories. Necessary instruments and controls will be provided, as required

5.41.9 AUTOMATIC PUMPING TRAP FOR HEATER

Capacity	: Suitable
Qty	: 01 No
Application	: To automatically trap and pump condensate from CIP heater to storage tank by using live LP steam.
Type	: Automatic Pumping Trap
High-pressure Medium	: LP Steam

5.41.10 BUCKET DUPLEX TYPE FILTERS

Duty	: For filtering of the cleaning liquid.
Capacity	: Suitable
Qty	: 1 Set
Material	: AISI 316
Strainer	: Perforated screen type Bucket type Filter shall have dual bucket and shall have butterfly valves to change over from one bucket to other at inlet and outlet of filter

5.41.11 RECIRCULATION PUMP FOR ACID & LYE TANK

Capacity	: Suitable
Qty	: 01 No
MOC	: AISI 316
Type	: Centrifugal

All other specifications same as item no 5.3

5.41.12 CIP return pump for Paneer Processing equipment- Self Priming

Capacity : Suitable

Qty : 1 Nos.

Type : Centrifugal, Self priming

All other specifications same as item no 5.3.2

Note:

1) **Customer will provide 3 KL Capacity 04 Numbers of tanks for CIP kitchen tank i.e. Acid Solution, Lye Solution tank, Acid Solution tank, Hot water tank and recuperation tank.**
2) **Vendor shall have to provide offer accordingly in Price Bid for erection of same tanks only.**

Note:

1) Supplier shall submit GA drawing for approval to the purchaser for tank prior to fabrication work in the event of placement of order
2) Stage inspection shall be offered for;

a) Material inspection
b) Welding and insulation inspection
c) Cladding and water filling

5.42 AUTOMATION & FIELD INSTRUMENTS

Automation system shall be provided for Paneer plant for the some Processes/steps of Paneer Manufacturing for parameter monitoring, control and recording of milk transfer from new plant storage, Milk heating in regenerative PHE module, dosing of Citric Acid, the complete whey handling, Cooling of Paneer Blocks. Localized PID controlled system shall be considered for remaining operations for desire control on manufacturing processes.

5.42.1 AUTOMATION HARDWARE

HYBRID PLC

Quantity : As per equipment list (with redundancy at Power Supply)

The High-End HYBRID PLC system offered shall have open architecture and shall use common engineering tool for operator station, automation system, communication system, engineering system and I/O. Sub systems are integrated together with standard & proven networks with fully optimized & standard open protocols. All the components use single database.

Comprehensive self-diagnostic features shall be provided to facilitate easy fault location and detection of failure without individually checking each I/O modules. On-line testing facility of control system while the unit is in operation, shall be provided with suitable indication for easy identification of faulty module.

5.42.2 OPERATOR CONSOLE PC (ES + OS) / HMI

Quantity : As per equipment list (ES + OS)

Type : PC with core i7 processor & 22" color TFT screen monitor. Hard drive of minimum 1 TB memory space and min 8 GB RAM shall be supplied along with the required latest Operating System software (Microsoft Windows), Microsoft Office Suite, Utility Software, Anit-Virus software with 2 years of license validity and other software as required for the running and maintenance of the PC.

The SCADA- Operating station shall be high end PC & shall have DVD_RW drives with back-up data recording facility. Suitable software shall support multi-screen technology.

Each operator console will be fully capable of addressing any plant data thus, will function as a single window for operation, monitoring & control. Each terminal will be independent with its support hardware including adequate local memory for resident database to reduce data traffic through the highways. The resident data will be continuously updated at all terminals.

The HMI software shall support Multi Screen Technology and PC's shall consists of Key Board, mouse, graphic and report Printers and necessary hardware & software.

Printing of graphs/trends & report would be possible from the HMIs.

5.42.3 PRINTERS

Quantity : As per equipment list

Multi-function (Scan, Print) printer B/W A4 size – 2 Nos

5.42.4 NETWORK HARDWARE

Quantity : 1 Lot
Ethernet cable / Fibre Optic cable : 1 Lot
Field run bus/ similar bus cable : 1 Lot
ASI bus cable for valves : 1 lot
Switches : As required
Interfacing Units for third party devices/instruments etc. – 1 Lot
Remote I/Os complete with communication & power unit – 1 Lot
Hardware based security device --1 Lot
Other hardware : as per requirement

The hardware units shall be installed inside suitable wall/rack mounted water tight cabinets.

Accessories
All junction boxes/ distribution boxes for control/ instrumentation system shall be in SS-304 construction. Instrumentation/signal cables/wires shall be laid in separate SS ladder cable tray (including drops) so as to avoid any interference. All automation, instrument & signal cables shall be metal braided (rodent proof) & no conduits would be required. Only flat type ASI cables may be protected suitably in case braiding is not available.

Screened cables shall be provided as per requirement.

5.42.5 AUTOMATION / SYSTEM SOFTWARE

Quantity: 1 Lot

The system software will be based on open architecture/protocol and shall support minimum 32 bit processing platform. For networking TCP/IP or ISO-OSI model will be in use. It shall be latest object-oriented software, which result in fully scalable system. Original license version of the latest release of software shall be used. The system shall use Fibre optics as backbone. Please refer Design Basis for more details. Display of software Screens shall also be done on 55" screen. Additional license if any required shall be also be supplied.

5.42.6 CONTROL DESK AND CABINET

Quantity : As per equipment list

The design of all console / panels/cabinets and layout shall be based on human engineering consideration, fully keeping in view of the convenience of operation and maintenance personnel.

Operators' console shall be free standing type. All keyboards and other cursor control devices will be mounted on the horizontal part of the console. The monitors will be mounted on the raised part of the console.

All system modules, power supply components as required for completeness of the systems shall be housed in system cabinets. The cabinets shall be totally enclosed freestanding type equipped with fully height front and rear doors. Cabinets shall be designed for front access to system modules and rear access to wiring. The cabinets shall be in general designed for bottom entry of cables and shall have non-welded construction only.
Total 4 Nos of Revolving Chair of Godrej Make or as per the approved model shall be supplied.

Constructional Features:

Wood/work surface
Under Counter keyboard trays
Slide out CPU shelves
Binder storage
Printer table
The layout shall be suited to the Control room. The drawing shall be got approved from Union before supply.
Make or as per the approved model shall be supplied.

FIELD INSTRUMENTS

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 min. IP-65. Field instruments shall be suitably mounted, supported and terminated directly in RIO panel (smart JB) in the field.

All field instruments are smart type, hardwired type (4-20 mA / 24 V DC) connected to DCS automation system through RIO panel (Smart JB) in the field & from RIO panel (smart JB) to PLC through fieldbus like profibus / devicenet / Ethernet / Modbus.
All process actuated valves are having ASI connectivity.

5.42.7 PROCESS TRANSMITTERS

Quantity : As per equipment list

The transmitters shall be provided as per requirement for process & utility having best accuracy/reliability, as available in the market and the hard-wired signals (4-20 mA) shall be connected with automation system through I/O stations (smart JB). The transmitters shall have field diagnostic/ configuration facility.

Proper sanitary type mounting arrangement shall be provided for installation of the sensors in various tanks/ pipelines etc., suitable for Dairy application. Tri-clamp type sanitary mounting arrangement should be provided for the sensors to be installed in pipelines. The transmitters shall have local digital display as per requirement.

The temperature transmitter shall be blind type head mounted type.

Measuring ranges of transmitters shall be selected in such a way that the rated value of the measuring variables appears at approx. 50-70% of the span.

The sensing elements and internal parts shall be constructed with AISI 316. In case of stock and corrosive fluid application, diaphragm seal type transmitter with capillary is foreseen.

Transmitters shall generally be installed on Instrument Stands made of 2" SS pipes located at convenient points.

The contractor to quantify the number of such transmitters required, based on the order as well as functional requirement/standard engineering practice & provide accordingly.

The pressure transmitter shall have Integrated digital display.
The output of transmitters shall be 4-20mA.

5.42.8 PROCESS GAUGES

Quantity : As per equipment list
Process gauges shall be provided for local indication on all utility lines & tanks as necessary.

Pressure gauge sensing element shall be Bourdon / Bellow / Diaphragm type in general depending upon the process condition. Direct reading Pressure / Differential Pressure gauges shall be of AISI 316 sensing element and AISI 304 movement material.

All accessories, such as 2-valve manifold etc. shall be provided with pressure gauges according to application. Where process temperature exceeds 70-degree C, siphon loops shall be utilized.

Local temperature measurement shall be done with bi-metal Temperature gauges. Temperature gauges may be direct mounted type (multi angle) or with SS capillary extension (at least 3 Mtrs) as per the application area.

The sensing element / bulb / capillary etc. shall be of AISI 316 for temperature gauges.

The contractor to quantify the number of such gauges required, based on the order as well as functional requirement/standard engineering practice & provide accordingly.

5.42.9 TEMPERATURE ELEMENTS (RTD)

Quantity : As per equipment list

All Temperature Sensors Elements shall be of Duplex type with AISI 316 sheath & MgO filled. Depending on temperature ranges, Pt-100 Resistance Temperature Detector (RTD) or thermocouple shall be used.

Thermocouple / RTD heads, with chain holder, shall be of the waterproof type, with duplex terminal block, gasketed cover and stainless-steel chain. Screwed covers shall be used.
Proper sanitary type mounting arrangement shall be provided for installation of the sensors in various tanks/ pipelines, suitable for Dairy application. Tri-clamp type or suitable sanitary mounting arrangement should be provided for the sensors to be installed in pipelines.

The bidder to quantify the number of such elements required, based on the order as well as functional requirement/standard engineering practice & provide accordingly.

5.42.10 PROCESS SWITCHES

Quantity : As per equipment list

Local switches for pressure, differential pressure, temperature, level, proximity etc. shall be having best reliability & accuracy as available in the market & provided as per requirement. The hard-wired signals shall be connected with automation system through I/O stations (smart JB) to DCS system. The switches shall be suitable for Dairy application and field bus communication. The level switches shall be tuning fork type for all process & CIP applications.

The bidder to provide the number of such switches, based on the order as well as functional requirement/ standard engineering practice & provide accordingly.

Set points shall be adjustable throughout the range. Switching differential shall be adjustable.
The O/P shall be 24 V DC type.

5.42.11 FLOW ELEMENTS

Quantity: As per equipment list

Measurement of flow for clean fluids and employing differential pressure principles, flow nozzles or concentric square edge or if ice plates shall be provided. All flow element calculation, design and construction shall be based on BS/ ASME standard.

Beta ratios (d / D) for flow nozzles and orifices shall not be less than 0.5 and not more than 0.70.

Flow nozzles and flow orifice plates shall be316 stainless steel. Accuracy of the primary element shall be plus or minus 0.25% or better.

5.42.12 MAGNETIC FLOWMETERS

Quantity: As per equipment list

Magnetic flow meters to be provided in plant as per functional requirement shall be hardwired type, the hard-wired signals (4-20 mA / 24 v DC) shall be connected with automation system through I/O stations(smart JB) The flow tube material shall be of AISI 304 with PTFE/PFA lining. The electrode material shall be either AISI 316 or 316L depending upon process condition. In general, SMS type process connection may be used for magnetic flow meters. The flow sensors shall be sanitary type & suitable for Dairy application.

Accuracy of magnetic flow meter shall be plus or minus 0.5% of flow rate or better. Digital flow rate as well as totalizer display shall be provided.

Earth ring of AISI 316 shall be provided for proper grounding of magnetic flow meters.

The flow meters of required turn down capacity shall be smart type having required diagnostic features with separate / Integrated local display unit as per requirement The flow meters should be configurable from the field. The contractor to provide the required number of such Magnetic Flow Meters, based on the order as well as functional requirement/standard engineering practice & provide accordingly.
The transmitter shall be hardwired type with 4-20mA /24 v DC Output shall be connected with automation system through I/O stations (smart JB).

5.42.13 MASS / DENSITY FLOWMETERS

Quantity : As per equipment list

The Mass flow meter shall be used for evaporator inlet and outlet service. The Mass flow meter envisaged shall be Coriolis twin Curved tube type suitable to media. The flow sensors shall be sanitary type & suitable for Dairy application. The Mass flow meter shall be capable of measuring mass flow rate, density, temperature, volumetric flow rate and totalized flow.

Mass flow meters shall be true smart type with hardwired signal (4-20mA / 24 v DC) output. The flow tube / wetted parts material shall be AISI 316 / AISI 316L or as per the requirement of process fluid. SMS type process connection may be used for mass flow meters.

Accuracy of Mass flow meter shall be plus or minus 0.2% of flow rate or better.

Digital display of mass flow rate, density, temperature, volume flow rate as well as totalized flow shall be provided.

The flow meters of required turn down capacity shall be smart type having required diagnostic features with separate /Integrated local display unit as per requirement. The flow meters should be configurable from the field. The contractor to provide the required number of such Mass Flow Meters, based on the order as well as functional requirement / standard engineering practice and provide accordingly.

The transmitter shall be hardwired type with 4-20mA / 24 v DC Output shall be connected with automation system through I/O stations(smart JB).

5.42.14 VORTEX FLOWMETERS

Quantity : As per equipment list

Steam, air flow meters shall be vortex type with totalizer. The flow sensors shall be sanitary type & suitable for Dairy application. The steam & air flow meters shall have temperature & pressure compensating system. SMS / flanged end type process connection may be used for the vortex flow meters. The flow meters of required turn down capacity shall be smart type having required diagnostic features with separate local display unit. The flow meters should be configurable the field. The contractor to provide the required number of such VFMs, based on the order as well as functional requirement / standard engineering practice & provide accordingly.

Digital display of flow rate as well as totalizer display shall be provided. The wetted parts material shall be SS 316 / SS 316L or as per the requirement of process fluid.

Accuracy of vortex flow meter should be plus or minus 0.75/ 0.1% of measured flow rate or better.
The transmitter shall be hardwired type with 4-20mA / 24 v DC Output shall be connected with automation system through I/O stations (smart JB).

5.42.15 LEVEL TRANSMITTER

Quantity : As per equipment list

Flange mounted diaphragm seal type level transmitters of sanitary design & required turn down capacity shall be used for level measurement on tanks. The wetted parts shall be of AISI 316 or suitable material to suit process fluid. The process connection with the tank / vessel shall be 3" flanged or as per instrument supplier

The sensor & electronics unit of the level transmitter should be separate or with remote seal to avoid moisture condensation. The level transmitters shall have separate field display (digital) unit having hard wired signals (4-20 mA) with field diagnostic/ configuration facility. Connectivity with automation system shall be through remote I/O stations (smart JB). The transmitter shall be hardwired type with 4-20mA / 24 v DC Output shall be connected with automation system through I/O stations (smart JB).

Accuracy of LTs should be + 0.2 % of measured value or better.

Level gauges shall be of the reflex / transparent / tubular type as per the application area and made of stainless steel and fitted with toughened borosilicate glass Each gauge shall be fitted with top and bottom isolating valves with full bore drain valve at the bottom and plugged vent at the top. Flanged connections, rated same as the vessel, shall be used. Gauges shall be arranged so that the visible length is in excess of the maximum operating range.

Displacement/float type instruments and switches shall be mounted in external cages with flanged connections, rating same as the vessel. This type of instrument shall not be used for applications involving viscous, corrosive or flashing liquids. The cage material shall be carbon steel in accordance with vessel material and the float shall be of AISI 316. Drain and vent shall be provided on the cage.

5.42.16 CONDUCTIVITY ANALYSER

Quantity : As per equipment list

The conductivity analyser may be installed on-line or at a distance connected by sampling line. The necessary mounting of analyser electronic unit shall be taken care suitably. The process connection shall be SMS type.

The conductivity analyser shall be microprocessor based. The electrode and cell material shall be of AISI 316.

Accuracy of conductivity analyser shall be +/- 0.75 of FSD.

Automatic temperature compensation shall be provided with the analyser. The meter shall be 4-20 mA Output compatible. Special cable for connection between electrode and transmitter. The transmitter shall be hardwired type with 4-20mA / 24 v DC Output shall be connected with automation system through I/O stations (smart JB).

5.42.17 CONTROL VALVES

Quantity : As per equipment list

Pneumatic control valves complete with conventional hardwired type electro pneumatic positioners. The control valve sizing shall be done in such a way that the calculated noise level at worst operating condition shall not be more than 85 dBA at 1 m distance.

Valve trim material shall be harder than, but compatible with, the pipe in which it is installed.

All control valves shall have sufficient overload range. At maximum operation, the control valves shall be at 75-80% open. Valve bodies shall be no more than two (2) line sizes smaller than the pipe in which they are installed.

Leakage class ANSI IV : All control valves (independent of their type) shall have a tight shutoff against at least 110% of the maximum design pressure. The stroke/ throughput characteristic shall, depend on the purpose. The valve stems shall be well guided, and the valves shall operate without excessive vibration and noise. The above shall achieve a stable fluid control over the entire flow range. Control valve design and location shall take into account flashing and cavitation conditions.

In case of failure of electric or pneumatic supply or in case of failure of the controller output signal, the actuators shall remain locked in actual position or shall reach a safe position, depending on the particular case.

The valve shall be hardwired type with 4-20mA / 24 v DC Output shall be connected with automation system through I/O stations (smart JB).
The positioner shall be without display type.

5.43 ELECTRICAL DISTRIBUTION SYSTEM

Purchaser shall provide electrical power at incomer of PCC. PCC is in purchaser scope. The scope of the bidder starts from the outlet of Feeder in the PCC. 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 at 415V, 50 Hz AC in sheet steel housing powder coated finished in Siemens grey. The acceptable variation in voltage is +/- 5% & frequency is+/-3%.

The scope would consist of design, supply, installation; testing and commissioning of Intelligent Motor Control Centres with complete switch gears. All motorized feeder shall be communication capable through field bus. Incomer feeder, all outgoing non-motorized feeder. Utility MCCs & all ancillary panels with complete switchgears & electrical shall be Non-intelligent type.

Supply, laying and termination of required quantity of LT power cables, aluminium conductor, XLPE insulated, PVC insulated, Armoured type from PCC to MCCs and MCC to respective motors shall be flexible copper conductor, pvcinsulated, steel braided, rodent proof, FR type cable up to 50sq.mm conductor size & above 50sq.mm copper conductor, XLPE insulated, PVC insulated, Armoured, rodent proof, FR type. Steel braided, copper conductor typecontrol cables & steel braided, flexible copper conductor type Instrument cables with accessories. Necessary SS-304 cage type cable trays with drops (inside the plant & tanker bay). GI perforated cable trayoutside building, inside MCC rooms & Utility area. Necessary SS cage/ perforated cable trays, SS conduit pipes within plant area, earthing conductor, earth pits, rubber mats for panels and emergency stop and motor isolator, DBs 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 outgoing power, control & instrument cables shall be laid through SS cage tray, SS shrouds for all pumps & motors shall be provided. Supply & placement of rubber mat s of proper size as per Electrical Inspectorate rules shall be provided.

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

5.43.1 MCCs

Quantity : 1 Lot
Process Panels : MCC (Entire process and packing area)

- **MCC- FOR PANEER PLANT**

Functional Requirements:

To receive, control and distribute electrical power at 440 V, 50 Hz, AC in sheet steel housing and communicate real time operating parameters to Main PLC Panel. The specifications describe the requirements for the low voltage motor control centre (MCC) which shall fundamentally provide for the following:

- Achieve controls through microprocessor-based systems
- Replace hardwiring by using network technology
- Provide enhanced degree of diagnostic and protective functions.

The MCC shall provide comprehensive protection on motors by MPCB inside the switchboard. The MCC shall communicate with PLC system by remote I/o cards installed in side the MCC panel hooked up with 24 V DC relay

Operating temperatures - 40 deg C/+75 deg C.

Design Requirement and Scope of Supply:

Statutory Requirements:
The MCC shall be suitable for indoor installation in the Compartmental construction for compact configuration with provision for expansion. The motor control centre shall be completely dust & vermin proof conforming to IP 44 standard. The MCC shall be fabricated, as per the technical specifications mentioned under details of items. The bus bar rating of each MCC shall be capable of carrying 1.25 times of full load current of all the feeders of respective MCC plus spare feeders' load and future load of the plant as described in the design basis. For calculating full load current, the connected load of MCC shall be considered.

The Incomer of each MCC shall have 4 poles EDO, ACB or MCCB of suitable rating / Type with built in solid state / Microprocessor based protective devices/ relays with all accessories. Also the Incomer shall have CT's, phase Indication lamps. Multi-function meter) shall be provided in each MCC under this pack for monitoring power condition and energy consumption through system automation being provided for LMP. (Multi-function meter shall have bus communication facility) In place of Load Manager & separate Energy meter bidder to offer Digital Multifunction meter which is having facility to measure all electrical parameters of Load manager & Energy meter with Communication facility with PLC through Field bus. In Air Compressor Incomer shall be 4-pole MCCB of 400 Amp as per specifications.

For Incomer of the panel, the rating of the switchgear shall be 1.25 times of rated full load current of connected load (including spare feeders' load and future expansion load as described in design basis) of the panel. The necessary feeders complete with switchgears for future expansion shall be provided in the MCCs. 10% spare feeders with switchgear without VFD shall be provided in each MCC. The incoming and outgoing cables from the MCCs in the electrical control room shall be laid in cable trays. Cable entry & exit for all the feeders of MCC shall be from the top or bottom as per project requirement.

Motor Control Centre is to be manufactured/ assembled as per the latest applicable Indian Standards, Indian Electricity Rules, Indian Electricity Act, Fire Insurance Regulations and comply with all currently applicable statutory requirements of concerned State Electricity Inspectorate and safety codes in the locality where the equipment will be installed and as per the detailed specifications mentioned below. The manufacturer of the panel must possess a Type Test Certificate from CPRI.

The MCC shall be equipment labelled with the brand name of an international company (MCC designer like ABB/ Schneider/ SIEMENS/ Rockwell) which owns the complete range of the major switchboard components and intelligent devices used in the MCC. The MCC shall provide the flexibility to choose different solutions in motor protection and monitoring functions according to the requirements of critical motors and non-critical motors and relevant loads.

The switchboard manufacturer could be the original designer of MCC (like ABB/Schneider/SIEMENS/Rockwell) or a panel builder with a formal license from the

original MCC designer or having MCC manufacturing experience. All switchgear used in the switchboard shall be of the same manufacturer to allow better interoperability and installation.

Housing Details:
The switchboard shall be fabricated using pressed and shaped cold rolled steel sections structure of adequate thickness. The sheet steel used for panel shall be minimum 14 SWG sheet except that the partition plates, inter-panel barriers and cubical doors may be made of 16 SWG. The switchboard shall consist of free standing front and back open able panels arranged to form a continuous line-up of wardrobe type cubicles of uniform height. Cold rolled sheets shall be used for doors and front covers. Front doors shall be hinged type with quarter turn fasteners and bus bars and cable alleys covers shall be bolted type. Each wardrobe type cubicle shall house 8 to 9 feeders & each Vertical section.

Switch Board shall be extensible at both the ends by addition of vertical sections. Ends of the bus bars shall be suitably drilled for this purpose. Panels at extreme ends shall have openings, which shall be covered with plates screwed to the panel. The switchboard shall be provided with integral base frame. The cable gland plate shall be 2.5 mm thick.

The switchboard shall be totally enclosed, dust, weather and vermin proof and shall conform to degree of protection not less than IP 44 as per IS 2147. Gaskets of durable material shall be provided all-round the perimeter of adjacent panel, panel and base frame, removable covers, doors and other openings.

All hardware shall be corrosion resistant. All joints and connections shall be made by galvanized zinc passivated or cadmium plated high tensile strength steel bolts & nuts. Spring washers shall be provided to secure against loosening.

The switchboard shall be non-draw out wardrobe type design except for the individual ACB cubicles used, if any, for incoming, outgoing and bus coupler. Each wardrobe shall contain 8 to 9 feeder components as per design. The MCC shall be suitable for indoor installation. Suitable cable & bus bar alleys shall be provided if required. All components of the switchboard shall generally be approachable from front. However, MCC can be in double front execution also if specifically asked for. The maximum and minimum operating handle/push button height of any feeder shall not be more than 1900 mm or less than 300 mm with reference to panel bottom. Supporting arrangement and saddles for dressing of power and control cables shall be provided. Maximum shipping length of MCC shall be as per the IEC design. MCC shall be extendable both sides. Space heaters with toggle switches, fuses and thermostat shall be provided in each cable alley.

The maximum height of the panel shall generally be restricted to 2300 mm and maximum length of a shipping section shall be 2500 mm. Each shipping section shall be provided with suitable lifting hooks. These hooks when removed shall not leave any opening in the board. The maximum and minimum operating handle/push button height of any feeder shall be approximately 1900 mm and 300 mm respectively with reference to panel base. Supporting arrangement for dressing of power and control cables in cable alleys also shall be provided.

Minimum depth of cubicle for installing ACB shall be 1000 mm.
Minimum width of cable and bus bar alleys shall be 300 mm.

Internal arc features: The switchboard shall be designed to minimize the risks of occurrence of internal arc and whenever such an arc occurs it shall prevent its effect on operators and material/equipment surrounding the switchboard. The short-circuit withstand capacity of the panel with busbar and supports shall be minimum 50 KA/1 sec.

Painting:
All metal surfaces shall be thoroughly cleaned and degreased to remove all scales, rust, grease and dirt. Fabricated structures shall be pickled and treated to remove any trace of acid. The under-surface shall be prepared by applying a coat of phosphate paint and a coat of yellow zinc chromate primer. The under surface shall be made free from all imperfections before undertaking the final coat.

After preparation of the under surfaces, the panel shall be spray painted with final two coats of approved shade of powder coating (RAL 7032 Siemens grey). Thickness of powder coating shall not be less than 60 microns.

The finished panels shall be dried in stoving ovens in dust free atmosphere. Panel finish shall be free from imperfections like pin holes, orange peels, run-off paint, etc.

All unpainted steel parts shall be cadmium plated or suitably treated to prevent rust, corrosion, etc.

Nameplates:
Apart from panel nameplate highlighting the operating voltage, the nameplates for all incoming & outgoing feeders shall be provided on doors of each compartment. Nameplates shall be fixed by screws only and not by adhesives. Engraved nameplates shall preferably be of 3-ply (Black-White-Black) acrylic sheets or anodized aluminium. Special danger plates shall be provided as per requirement. Lettering size shall be 5mm or 15 mm as directed.

Inside the panels, stickers shall be provided for all components giving identification no. as per detailed wiring diagram.

Cooling Fan & filter assembly, lighting of panels, heater:
Each section of the panel shall be provided with a set of cooling fan, filter assembly and 2' long T5 tube light fitting operating through a SP MCB and door limit switch.
Each section of the panel shall also be provided with heating plate and a suitable thermostat.

Bus bar Sizing Connection and Supports:
The bus bars shall be made from high purity &**high conductivity copper**. The bus bars and supports shall be capable of withstanding the rated and short circuit current stated in the single line diagram/feeder details. Minimum size of power (phase) bus bars shall not be less than 200 Amps rating. Maximum current density permissible **for Copper Bus Bars shall be 1.2** Amps/mm^2**.** A suitable section aluminium earthing bus bar shall be provided in the panel at bottom throughout the length of the panel. Minimum cross section of Al earth bus shall be 300 sqmm. Provision shall be made to connect the earthing bus bar to the plant earthing grid at two ends. All doors shall be earthed using flexible copper connections to the fixed frame of the switchboard. The busbars shall be tinned to protect against oxidation.

The bus bars shall be provided with heat shrinkable PVC insulating sleeves of 1100 V grade. Red, yellow and blue colour shall be used for phase bus bars and black colour

shall be used for neutral bus bars. The sleeves shall be non-inflammable and self-extinguishing type. All joints in main horizontal bus bars and all tap-off connections from the main horizontal bus bars shall be suitably shrouded. Supports for bus bars shall be made of suitable size non-hygroscopic and non-inflammable epoxy compound SMC / DMC blocks and these shall be adequate in number so as to avoid any sag in the bus bars.
Minimum clearance between bus bars phase to phase shall be 25 mm and that between phases to neutral / earth shall be 20 mm.

Power Connection:
For power interconnection within the panel board:

Copper conductor PVC insulated cables of adequate cross section shall be used. However, for current rating above 100 Amps, Copper bus bar strips of adequate rating shall be used. Minimum size of copper conductor to be used shall not be less than 4.0 mm^2. Cable lugs / sockets of suitable size and type shall be used for all interconnections and cable terminations.

For incoming feeders of the MCC, aluminium conductor cable will be used and hence the panel is to be designed for receiving these and wherever required cable boxes with bus bar extensions for receiving more no. of cables, shall be provided in panel by supplier.

For all outgoing motor feeders, the suitable size terminal blocks shall be provided in cable alleys and wiring up to these from contactors shall be done by panel supplier. These terminal blocks shall be heavy-duty type to withstand high starting currents. The cable entry shall be either from top or bottom as specified in feeder details. Removable gland plates of minimum12 gauge thickness shall be provided on top/ bottom of panel (as required), for cable entries. The cable alleys shall also be totally isolated from switchgears by suitable partition plates.

To prevent accidental contacts, all junctions of interconnecting cables and bus bars also shall be shrouded suitably using coloured PVC insulation tape.

Standard colour code of red, yellow and blue for phases and black for Neutral to be followed for all bus bars/conductors.

Auxiliary wiring and Terminals:
Wiring for all controls, protection, metering, signaling etc. inside the switchboard shall be done with 1100 V gray colour PVC insulated FR copper conductors. Minimum size of these conductors shall not be less than 1.5 mm^2. However, CT circuit wiring shall be done with 2.5 mm^2. Control wiring to components fixed on doors shall be flexible type.

The complete panel would be subdivided into different sections by purchaser and each section shall have its own control circuit with MCB and indication. Terminal block (Minimum 3 ways) for control wiring shall be provided for each outgoing Motor feeder in its cubical. 10% spare terminals shall always be available in each terminal block. Control wiring up to these terminal blocks shall be done by supplier.

All conductors shall be terminated using compression type cable sockets / lugs at both the ends.

Each control wiring termination shall be identified at both the ends by PVC ferrules. The identification termination numbers shall match with those on drawings. Suitable

size SP MCB shall be used for tapping power for control circuit wiring.

For all motor starter feeders, provision for control wiring to remote ON/OFF control is to be made. The auxiliary wiring for the same shall be brought up to terminal block in the feeder's cubicle.

Switchgears:

Air Circuit Breakers (ACBs):
These shall be electrically operated, fully draw out type with built-in microprocessor based programmable protection, and suitable for 415 V, 50 Hz supply. Microprocessor based programmable protection unit shall have settings for overload, short circuit, instantaneous and earth fault currents with time delay and LED indicators to show various conditions such as Power ON, Overload, Short-circuit, Instantaneous Earth fault, Percentage load, Self-Diagnostic Test etc.

Mechanical spring charging mechanism stored energy type shall be provided with mechanical indicators to show 'Open', 'Closed', 'Service' & 'Test' positions. The circuit breaker shall be provided with mechanically operated emergency tripping device. This device shall be available on the front of the panel.

The control supply shall be 240 V AC. 6 NO + 6 NC auxiliary contacts shall be provided.

The interlocks shall be as under:

It shall not be possible to plug in a closed-circuit breaker or to draw out a circuit breaker in closed position. It shall not be possible to operate a circuit breaker unless it is in fully plugged-in, test or fully isolated position. In test position, the breaker shall be tested without energizing the power circuit. The ACB feeder cubical door cannot be opened when ACB is "ON". However, it shall be possible to defeat this interlock for inspection purpose. Closing and trip coils shall work under the following voltage variation conditions:

Closing coils	-	85 % to 110 % of rated voltage
Trip coils	-	50 % to 130 % of rated voltage

For series tripping, overload, short circuit and under voltage/shunt trip release shall be provided.

Built-in relays for overload, short circuit, instantaneous and earth fault protection shall be provided for incoming feeders' ACB. Suitable port like RS 485 must be available in ACB for transferring/ communicating data pertaining to operation parameters, to main PLC/ DCS Panel.

Current rating, short circuit current, protection relays etc. shall be as specified in feeder details.

Moulded Case Circuit Breakers (MCCB):
Incomer MCCBs shall always be provided with separate rotary operating handle mechanism with door interlocking. The MCCBs shall be of three / four pole construction (as required in the feeder details) arranged for simultaneous three / four pole manual closing or opening and automatic instantaneous tripping on short circuits. MCCBs shall be provided with adjustable type tripping device with inverse time characteristics for over load protection.

Closing mechanism shall be quick make, quick break & trip free type. Operating handle shall give a clear `ON', `OFF' & `TRIP' indications. Control voltage for MCCB shall be 240 volts. The MCCBs shall be rated for continuous maximum duty as specified. The rating of the MCCBs shall be as per the feeder details.

Minimum rated breaking capacities shall be as under:

MCCBs up to 200 Amps	35 KA
MCCBs above 200 Amps	50 KA

Note: All feeders having 3 pole MCCB shall be provided with neutral link complete with isolating link. However, the MCCB^{s} for incoming and non-motor outgoing feeders shall be of 4 pole construction, unless stated otherwise.

Motor Protection Circuit Breaker (MPCB):
All motors below 40 HP shall be protected by Motor Protection Circuit Breakers (MPCB) having suitable rating thermal overload relays. These shall be used along with contactors as specified in feeder details.

The MPCB will have motor protection tripping characteristics, current limiting and shall have low let through energy. It shall have bi-metallic overload protection and electromagnetic release for short circuit protection. MPCB shall have inbuilt single-phase protection and adjustable overload settings.
In the MPCB, it shall be possible to have accessories like auxiliary contacts, trip alarm contacts, shunt release/under voltage release, as required for motor control and protection. MPCB shall give indication for 'ON'/'OFF' and tripping on fault. The breaking capacity of MPCB shall not be less than 50 KA. MPCB shall have rotary operating mechanism with door interlock and provision to lock it in 'OFF' position with a padlock.

MCBs (Instead of Switch Disconnector fuse units)
The load break switches shall be heavy duty, air break type suitable for continuous maximum rating with manual quick make / break mechanism. These shall have positive isolation with positive indication of contact separation. They shall have high short circuit making and withstanding capacities. Breaking capacity shall correspond to AC 23A utilization category. Mechanical interlock shall be provided to prevent opening of door in switch 'closed' position and prevent closing of switch in door 'open' position. However, it shall be possible to defeat this arrangement for testing purpose. Live terminals of the switch shall be shrouded.

Fuses:
These shall be non-deteriorating HRC cartridge link type with operation indicator which will be visible without removing fuses for the service. These shall be complete with moulded phenolic fuse base and cover. The fuse base shall be so located in the modules to permit insertion of fuse pullers and removal of fuse links without any problem. One set of fuse pullers to cover entire range of fuses used in the panel shall also be provided**.**

Contactors:
The rating of the power contactors shall be as required depending upon the feeder rating indicated in the specifications and as per the feeder details table provided in this specification below. Contactors coils shall be suitable for 240 volts, 50 Hz. unless

otherwise specified. All contactors shall be supplied with minimum 2 NO + 2 NC auxiliary contacts. Additional contacts if required for interlocking etc. shall also be provided. Minimum contactor rating for power shall be 9 Amp. All the three contactors of Star Delta Starter shall be of same rating. Rating of contactors shall be based on feeder rating.

All contactors of motor starters shall be suitable for AC 3 duty unless specified otherwise.

Protective Devices:
Intelligent Motor protection relays are provided for DOL, Soft starter and Star- Delta feeders instead of bimetallic overload relay or other special relays for all outgoing feeder. These shall be fixed on DIN rails or on mounting boards.

The supplier must have a local representative office with qualified support staff to provide training, technical support and service. Please refer to Clause 2.7.13 below for the functional requirements of IMPR for different motors.

The IMPR shall provide the communication ports for the connection to the communication network. It shall be easily integrated into the communication architecture with remote information access.

It shall be an open communications system, which means that it shall be directly connected to the main industrial network protocols, listed below:

- ModBus SL
- ModBus / Ethernet
- Profibus DP
- DeviceNet

The IMPR shall embed the relevant network protocol in built-in (native) mode.

The IMPR supplier shall provide user-friendly software running in a Windows environment to ease the IMPR on-relay configuration. The software shall have menus and icons for easy access to the data required, guided navigation to go through all the data of the same function in one screen and with a file management system.

Timers:
The timers shall be continuously adjustable & electronic type, suitable for 240 V, 50 Hz supply. The timers for Star Delta automatic starters shall have time delay of 0 to 60 seconds between changeover of contacts.

Push Buttons (PBs):
Push buttons shall be complete with actuator and contact block and shall be generally mounted on doors of the cubicles. Colours shall be as follow:

Stop/ open/ emergency - Red
Start/ close - Green

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

Indication Lamps:

All outgoing & incoming feeders shall be provided with 'ON' indication lamps.
Colours shall be as under:

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

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

Current Transformers (CTs):
CTs shall be cast resin insulated type. Primary and secondary terminals shall be marked indelibly. CTs shall preferably be mounted on stationery parts. These shall be capable of withstanding momentary short circuit and symmetrical short circuit current for 1 second and shall have a minimum rating of 15 VA. Neutral side of CTs shall be earthed.

Protection CTs shall be of low reactance, accuracy class "5P" and an accuracy limit factor greater than "10". Instrument CTs shall be of accuracy class "1.0" and accuracy limit factor less than "5.0".

Separate CT's to be provided for protection and metering purpose.

Measuring Instruments:
These shall be of square pattern having approximate dimensions 96 mm X 96 mm, flush mounting type. Necessary auxiliary instruments like CTs etc. are also included in the scope of supply.

All AC meters shall be of Digital type for displaying three phases reading. Suitable selector switch shall be provided if the digital meter does not have provision for simultaneous display of three phase readings.

Voltmeter shall be suitable for direct line connection. Voltmeters shall be connected through MCB^{s} only.

Intelligent Panel Meter (Multi-Function Meter) shall be provided with incoming feeder of the MCC for the measurement and digital display of Multifunctional Electrical Parameters such as voltage, current, active power, reactive power, frequency, power factor, active energy, reactive energy, etc. Data port will be provided to communicate all these parameters to Main PLC Panel through suitable data bus/ signal communication cable.

All motor feeders of 15 HP and above shall be provided with ammeter. Ammeter shall also be provided for all incoming & outgoing ACB / MPCB/MCCB / switches of rating 100 A & above.

Ammeters shall always be CT operated.

Special Requirements:
Feeder details for incoming and outgoing for this project as per battery limit to be worked out by the supplier as per the design requirements of the plant. All motor feeders up to 10 HP shall have DOL starters, above 10 HP will have Soft Starters of suitable rating. Variable Frequency Drive (VFD) Unit will be provided for a motor

feeder irrespective of its rating, only if specifically mentioned by the Purchaser. Suitable Line Chokes will be provided in VFD feeders.

Each motor feeder shall consist of an MPCB/MCCB, contactors (single contactor for DOL and three nos. for star delta started motors), an IMPR (Intelligent Motor Protection relay) start & stop push buttons, AUTO/MANUAL switch , ON/OFF/TRIP indicating lamps and SP MCB for control circuit protection.

Soft Starter must have inbuilt protections for single phasing, phase sequence, over current, overvoltage, under voltage etc. In case of motors having embedded thermistor winding, Soft Starters for these motor feeders shall have in-built thermistor relay.

The following selection table shall be followed for switches & contactors of motor feeders unless otherwise specified :

Sr. No.	415 V Motor HP	Contactor Rating Amps	MCCB Rating Amp.	MPCB Rating Amp.	Type of Starter
1	Up to 10 HP	25	-	16	DOL
2	12.5 to 15 HP		-	25	Star - Delta
3	20 to 25 HP	-	-	40	Soft Starter
5	30 to 35 HP	-	-	50	- Do -
6	40 HP	-	63	-	- Do –
7	45 HP	-	100	-	- Do –
8	50 to 60 HP	-	125	-	- Do -
9	65 to 70 HP	-	200	-	- Do -
10	75 to 90 HP	-	200	-	- Do -
11	100 to 125 HP	-	250	-	- Do -
12	150 to 180 HP	-	400	-	- Do -
13	200 to 250 HP	-	400	-	- Do -
14	275 to 400 HP	-	630	-	- Do -

Switchgears as above alongwith contactors of suitable size to be provided as per requirement. For capacitor feeders, TP MCCB and capacitor duty contactors of suitable rating shall be provided.

For incoming feeder of rating up to 630 A, 4 pole MCCB & for rating higher than 630 A, 4 pole ACB shall be provided unless otherwise stated in the feeder details.

MCCB, 4 pole shall be provided (unless stated otherwise) for outgoing feeders of rating 63 Amps and above and preferably these shall be located at the lower portion of the panel. These feeders shall have isolating link for neutral in case 3 pole MCCBs are to be supplied as per the requirement given in feeder details.

Electrical interlocking shall be provided between various feeders as required by the process and specified in feeder details. Interlocking will also be provided in software programme of Main PLC Panel.

ON/OFF operation of all motor feeders shall be possible in both Auto mode (PLC signal operation) as well as Manual mode (Push Buttons) from MCC through A/M selector switch. Indication for ON/OFF/TRIP for all motor feeders shall be provided.

Each incoming feeder shall have independent instrumentation, protection relays, etc.

Provision shall be made to communicate operational parameters / data from all incoming/outgoing feeders to main PLC/ DCS Panel through suitable data bus/ signal communication cable. Operation parameters of motor feeders like ON/OFF status, actual current, trip status etc shall be communicated.

Supplier has to submit GA, control & power circuit drawing for approval to purchaser before starting manufacturing of MCC.

Minimum size of Armoured Copper Cable for various rating of motors (To be laid between MCC & motors)

	Motor rating HP	**Full Load Current (Amp.)**	**Type of Starter**	**Power cable rating (At Ambient Temp. of 45 deg. C)**
	0.5	1	DOL	3 C or 4 C x 1.5 sq. mm
	0.75	1.3	DOL	3 C or 4 C x 1.5 sq. mm
	1	1.9	DOL	3 C or 4 C x 1.5 sq. mm
	1.5	2.6	DOL	3 C or 4 C x 1.5 sq. mm
	2	3.7	DOL	3 C or 4 C x 1.5 sq. mm
	3	4.8	DOL	3 C or 4 C x 1.5 sq. mm
	4	5.2	DOL	3 C or 4 C x 1.5 sq. mm
	5	7.8	DOL	3 C or 4 C x 1.5 sq. mm
	7.5	11.2	DOL	3 C or 4 C x 2.5 sq. mm
	10	16	DOL	3 C or 4 C x 2.5 sq. mm
	12.5	19	Soft Starter	2 X 3 C or 4 C x 4 sq. mm
	15	20.8	Soft Starter	2 X 3 C or 4 C x 4 sq. mm
	20	28	Soft Starter	3 C or 4 C x 6 sq. mm
	25	34	Soft Starter	3 C or 4 C x 10 sq. mm
	30	40	Soft Starter	3 C or 4 C x 10 sq. mm
	40	53	Soft Starter	3 C or 4 C x 16 sq. mm
	50	65	Soft Starter	3 C or 4 C x 25 sq. mm
	60	78	Soft Starter	3 C or 4 C x 35 sq. mm
	75	96	Soft Starter	3 C or 4 C x 50 sq. mm
	100	131	Soft Starter	3 C or 4 C x 70 sq. mm
	125	156	Soft Starter	3 C or 4 C x 120 sq mm
	150	189	Soft Starter	3 C or 4 C x 150 sq mm
	180	227	Soft Starter	3 C or 4 C x 185 sq mm
	215	271	Soft Starter	3 C or 4 C x 240 sq mm
	250	325	Soft Starter	3 C or 4 C x 300 sq mm
	275	360	Soft Starter	3 C or 4 C x 185 sq mm - 2 runs
	300	390	Soft Starter	3 C or 4 C x 185 sq mm - 2 runs
	335	400	Soft Starter	3 C or 4 C x 240 sq mm - 2 runs
	375	N.A	Soft Starter	3 C or 4 C x 300 sq mm - 2 runs

The following selection table shall be followed for cables of motors unless otherwise specified:

.3 Phase	**Aluminium conductor Cable Size :Sq mm**

415 V Motor H.P.	Direct-on-line / Soft Starter		Star-Delta Starter	
	Supply side	Motor side	Supply side	Motor side
60	70	70	70	2 X 35
75	95	95	95	2 X 50
100	120	120	120	2 X 70
125	185	185	185	2 X 95
150	240	240	240	2 X 120
180	300	300	300	2 X 150
200	2 X 150	2 X 150	2 X 150	2 X150
250	2 X 185	2 X 185	2 X 185	2 X 185
275	2 X 240	2 X 240	2 X 240	2 X 240
300	2 X 240	2 X 240	2 X 240	2 X 240

Feeder details for incoming and outgoing for this project, as per battery limit and as per the design requirements of the plant, to be worked out by the supplier.
All motor feeders up to 10 HP shall have DOL starters, above 10 HP feeders will have Automatic Soft Starters. Each motor feeder shall consist of an MPCB, contactors (single contactor for DOL and three nos. for star delta started motors, softstarter shall be with contactor), an IMPR (Intelligent Motor Protection relay), auxiliary relay, start & stop push buttons, ON/OFF/TRIP indicating lamps and SP MCB for control circuit protection.

Wherever needed as per process requirements, Soft Starters and VFD's shall be used and these shall be clearly listed out in the offer. Soft Starters or VFD's (if mentioned specifically), shall be provided for all motors above 15 HP. VFD's shall have input chokes on line side. Load side chokes wherever required are also to be included.

Bidder to submit the SLD and GA drawing for final approval of purchaser before commensing the fabrication work.

NOTE: The incoming cable of suitable from existing PCC to this MCC shall be in the scope of this tender

AUTOMATIC POWER FACTOR CONTROL & 7 % DETUNE FILTER

In addition to the required number of outgoing feeders of individual MCC, feeders (suitable duty) for requisite power capacitor (All PP type) bank + 7 % detune filter for maintaining 0.99 pf (with provision of switchgear to provide & harmonic corrections.
additional capacitor bank during expansion of plant) with microprocessor based Automatic Power Factor Controlling Relay (APFC Relay) shall be provide for each MCC to monitor and correct the power factor continuously. . However, it shall also be possible to switch ON/OFF the capacitor banks through push buttons manually. Ammeters shall be provided for each capacitor bank.

5.43.2 MOTOR ISOLATORS / EMERGENCY PBS

These emergencies stop isolators shall be installed inside the main plant or outside as per the site conditions for isolating the power to all motors. This shall be of thermoplastic/polycarbonate plug & socket (IP 65protection) type of isolator with emergency stop pushbutton up to 10 HP & above 10 HP only emergency stop push button station box shall be provided.

General requirement:

The plug & socket/isolator box should be Al. SS 304, dust, vermin and weather proof suitable for wall/structural mounting. All the mating surface should be provided with round rubber gasket (min 6 mm) in the groove so as to make it effectively dust and vermin proof.

The enclosure box should be of IP 55 class and the minimum size must be 210 x 125 x 75 mm. Each plug & socket/isolator must be provided with emergency push button. One no. hole of required dia. at the bottom for the cable entry must be provided. Connection to motor shall be through flexible copper cable. 30 amps 6-way terminal block is to be provided inside the isolators. All wires / cables must be terminated using suitable crimping type tinned copper lugs. Two nos. brass screws with washers must be provided on either side of box for earthing.

Emergency Stop: The critical sections (e.g. lye and acid concentrate handling) Emergency stop switch are to be used to avoid the chemical spillage in order to avoid the accident.

5.43.3 CABLE TRAYS:

MOC : GI perforated without cover– outside process, Utility room, outside building and MCC room
SS 304 Cage (mesh) - with in process areas and process building.

Functional requirement: Cable trays are used (based on the site condition) for laying the power and control cables inside the plant from PCC to the MCC&MCC to all motors/sub panels and wherever required.

Fabrication: These shall be perforated type, heavy duty, return flange or inward bend shape, manufactured from mild steel conforming to IS-226 and hot dip galvanized as per IS-2629/BS-729. Width of cable tray shall be as per the requirement. Height to be minimum 50 mm and thickness of plate to be 1.5 mm up to 300 mm cable tray width. For cable trays having width more than 300 mm, height to be 75mm and thickness of plate to be 2.0 mm. Cable trays to be supplied to site in standard lengths of 2.5 M. Necessary accessories of cable trays such as coupler side plates for joining cable trays, bends, riser, inside riser, tee etc. must also be factory fabricated. Plain cable tray covers 1.5 mm thick to be supplied if specially required. Sample of cable tray to be got approved from Purchaser before supply. **Cable tray for automation network/instrument/signal cables shall be separate from power & control cables.**
The detailed specifications for various electrical items are provided in the Special conditions of contract- Electrical installation.
Inside process area / building cable tray shall be of SS 304 – cage mesh type &outside process area / building GI perforated type. However, all drop down cable trays from the rack cable tray shall be of SS 304 with Cage type.

5.43.4 CONDUITS & GLANDS:

CONDUITS & GLANDS

SS conduits to be used for processing & packing area

Separate conduits to be laid for power and instrument cables

CONDUITS

For laying of cables under RCC floor, GI class 'B' pipes shall be used. For laying cable in air where cable trays are not being used, SS conduits shall be used. Size of pipe shall depend upon the overall outer diameter of cable to be drawn SS 304 conduits.

The open ends of power/control cables at termination shall be protected through suitable conduit. Instrument/signal cable/wire drops upto termination point shall be also routed through conduits. The automation cables (plant/system/field bus, instrument/signal cables/wires shall be laid in cable trays through GI conduit.

GLANDS

These shall be provided at both ends of armoured/ unarmored electrical cables. Cable glands shall be manufactured as per performance requirements of BS6121, amended as on date, with brass material accurately machined and nickel-plated.

These shall be of heavy duty single compression type for cable conductor sizes above 35 Sq.mm and weather proof double compression type for cable conductor sizes up to 35 Sq.mm. Single compression cable glands 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 glade shall be provided.

5.43.5 LT POWER CABLES (scope starts from PCC onwards to MCC and further to all consumption points)

Power cables from MCC to All Motor & Non Motor Electrical load use on 415 V system shall be of 1100 volt grade, multi stranded copper conductor, steel braided type up to 50 sq.mm, above 50 sq.mm Aluminium conductor, Armoured, rodent proof &, XLPE/PVC insulated, PVC sheathed, armoured and overall PVC sheathed strictly as per IS : 7098 PART 1/1988.

PCC to MCC power cable shall be Aluminium conductor, Armoured, rodent proof &, XLPE/PVC insulated, PVC sheathed, armoured and overall PVC sheathed strictly as per IS: 7098 PART 1/1988

The size of cable shall be as specified in cable selection chart. No copper cable of size less than 1.5 sq. mm. shall be used for power cable.

5.43.6 LT CONTROL CABLES

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

5.43.7 INSTRUMENT CABLES

Instrumentation cables shall be of multi-stranded annealed plain copper conductor, extruded XPLE/PVC type A insulated. Steel braided with Al. Mylar tape along with

tinned copper braided for analog signals. For digital signals cable will be unscreened type. Extruded PVC ST1 inner sheath, armoured. Extruded PVC type ST1 outer sheathed instrument signal cables. All instrument cables shall be rodent proof. Min. Size of the instrument cable shall be 0.50 sq.mm.

5.43.8 RUBBER MATS

To be supplied for complete electrical installation at MCC, Rubber mat shall be as per latest IS 15652:2006

5.43.9 RCBS AND JUNCTION BOXES

To be installed wherever necessary as per detailed engineering. All the JBs in process areas shall be of SS304.UPS DBs MOC shall be of Polycarnet / Thermoplastic.

5.43.10 VFDS & PANEL

The variable frequency drives shall be having fieldbus connectivity with required diagnostic features. The VFDs should be configurable from the HMI/operating console as well as in the field. The VFDs shall have best accuracy & reliability, as available in the market. The contractor to provide the required number of such VFDs based on the order as well as functional requirement/standard engineering practice & provide accordingly.

The VFDs shall have DC choke (inbuilt or separate harmonic filter) apart from external AC line filters as per requirement. In sensitive locations, RFI should be provided to avoid any interference to adjacent electronic unit. The chokes shall be on input and output side of VFDs. The VFDs shall have conformal coating on PCBS to prevent it from Moisture and Dust.The automation system shall be dispatched to site only after testing by simulation.

5.43.11 EARTHING FOR ELECTRICAL POWER & AUTOMATION SYSTEM

Earth Pit

- To provide earth pits and earthing cables to all sections of the plant with a max. earth resistance of one ohm or as per the regulations of local Electrical Inspectorate. Earthing shall be conventional type with plates and pipes.
- The earth pits and earthing system of instrumentation, computers and controls shall not share the earthing system of electrical power equipment.
- All earthing mains shall be galvanized. The earthing to the equipment will be with the help of PVC coated aluminium cable.
- All earth shall preferably be driven to a sufficient depth to reach permanent moist soil. earthing shall preferably be situated in a soil which has a fine texture and which is packed by watering and ramming as tightly as possible. Wherever practicable the soil shall be dug up, all lumps broken and stones removed from the immediate vicinity of the electrodes.
- All earthing shall be tested for earth resistance by means of standard earth test meter. The tests shall take place in dry months preferably after a protected dry spell. If necessary a number of earthing shall be connected in parallel to reduce the earth resistance. In such a case, the distance between the earthings shall preferably be not less than twice the length of the earthing.
- The exact location and number of earthing required at each location shall be determined in the field in consultation with the owner/engineer-in-charge or his

authorized representative, depending upon the soil data and resistivity to meet the ohmic values as per statutory requirement.

- The distance of Earth Pit centre from the nearest building shall not be less than 3 meter. Also, the earth pit to earth pit distance shall not be less than 3 meter.
- Test disconnect facility shall be provided for the earth pits to check their earth resistance periodically.
- All earthing drawings are to be submitted (for insurance purpose as per safety norms)
- Separate Earthing pit to be considered for automation and instrumentation system.
- Copper /GI Plate earthings for the panels and the equipments shall be provided. The earthing pits shall be complete with Plate, electrode, watering pipe and chamber with cover.
- GI plate earthing, Plate size 600 x 600 x 6 mm for MCC panels and equipments
- Copper plate earthing, Plate size 600 x 600 x 3 mm for Automation

Earth Bus, Earthing Lead & Earth Wire/Strip

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. All hardware for earthing installation shall be hot dip galvanized.

Spring washers shall be used for all earthing connections of equipment having vibrations. 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 Ω in Contract to ensure satisfactory operation of protective devices. G.I. wire/ Copper wire shall be connected to the equipment by providing crimping type socket/ lug.

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

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.

5.44 UPS with servo stabilizer, common batteries Control & Automation system (complete)

A suitable capacity on line redundant type UPS with microprocessor controlled with sealed maintenance free battery for providing 60 min back- up. Separate rack to be provided for battery storage/racking system. Battery bank shall also be redundant type.

UPS FOR PLC PACKING MACHINES (PLC)

A suitable capacity on line type UPS with microprocessor controlled with sealed maintenance free battery for providing 30 min back- up. Separate rack to be provided for battery storage/racking system. The centralized UPS shall be provided at a central location near the packing system. The UPS to be designed based on load of all packing machines i.e. present + Future load also

5.45 PIPES, FITTINGS, VALVES AND SUPPORTS

All the piping within battery limits shall be inclusive the supply of necessary fittings, valves, strainers, sight glass, pipe clamps and pipe supports etc. as required to run the plant as per finalized process.

5.45.1 SS Pipes, fittings, Valves & supports structures

Sizes : As required

Type : TIG welded, annealed and de-scaled pipe manufactured as per standard ASTM-A 270. Outer surface of the tubes should be mirror polished/dairy finish and inner surface should be pickled as per dairy standard

Material: All the pipes unless otherwise stated shall confirms to AISI 304. The average wall thickness of tubes should be 1.6 mm up to 76.2 mm diameter and 2.0 mm for diameters above 76.2. The wall thickness at any point shall not vary more than 12.5% over and under from the average wall thickness specified. The ovality on the open ends shall be within the permissible limit specified in the ASTM A270. All pipes subject to cold conditions such as milk / cream / butter milk / rinsemilk etc must be insulated. All pipes subject to heat conditions such as CIP/milk etc lines to be insulated

Pipe supports: AISI 304 RHS sections shall have wall thickness of 2.0 mm within the plant building. Outside building the supports shall be galvanized / MS sections.

Testing: All the process tubes shall be hydraulically tested at the manufacturer's works up to 38.1 mm diameter and for tubes size 50.8 and above. The supplier is required to furnish the test certificate of the tubes with respect to chemical composition, tensile test and mechanical test.

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

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

Bend, Tee, Elbow: These fittings shall be made out of AISI 304 unless otherwise specified, process tube, TIG welded, annealed, de-scaled having outer surface mirror polished and inside pickled, manufactured as per ASTM A270. The thickness of the fittings made from the tube section should not be less than 1.6 mm up to 76.2 mm dia and should not be less than 2.0 mm for above 76.2 mm dia. The wall thickness at any point shall not vary more than 12.5% over and under from the average wall thickness specified.

Bends and elbows shall be free from wrinkles. Tee shall have uniform flaring on the branch connection. The ovality on the open ends shall be within the permissible limit specified in the ASTM A270**.**

5.45.2 SS Sanitary Pneumatic Mix proof, single seat Valves AND OTHER VALVES

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

Material : AISI 316
Sealing : Positive
Controls : Electrically or electronically operated integral (AS-I connectivity)

The Pneumatic valves shall have the following features to cater to fulfill the above functional requirements:

- Housing shall be ball shaped for the ideal flow characteristics to ensure 100% cleanability by CIP.
- Housing closed by cover plates should not create a sump or dead corners.
- Housing interconnections shall be by detachable type Clamp connection/ welded.
- The seals such as housing seals, stem seals and disc seals shall be flush mounted.
- Reliable feed back for the valve position and operated through integral solenoid valves and have profile bus connectivity.
- Digital control top module shall be suitable for two way digital communication, (all actuated valves for utility shall be hardwired type)
- Valves shall have low/very low susceptibility for the pressure surge.
- Valve shall have the short leakage outlet to recognize the leakage immediately.
- Valve shall have open lantern installed between the actuator and the product area of the valve to assure that leakages occurring at the stem seal shall be immediately visible and also shall act as a protection against over heating of the actuator.
- Water / fluid hammering shall be avoided in the opening & closing operation of the value. Flow direction of fluid and valve section for the same shall be strictly kept in mind during execution and commissioning stage.

Mix proof valves shall be used wherever the CIP and the process liquids are inter-crossing in the piping system. The CIP of the isolation area is possible and also the leakage shall be easily identified.

Mix proof valves

Type : Pneumatically operated sanitary valves of mix-proof double seat type with independent seat lifting facility for CIP. The mix proof valve shall have 3 solenoid valve.
Application : The Mix proof Double Seat Valves shall be provided for all valve batteries to ensure mixing free simultaneous product and CIP operation and flexibility in operation.
Control Cap : Shall be IP66 or higher type with internal housing for 3 solenoid valves and control cip. Shall have functions to check the positions and feedback of the valve.
Material : AISI 316
Gaskets : EPDM

SS Pneumatic Single Seat Valves

Type : Pneumatically operated sanitary single seat type ON-OFF and flow diversion valves.
Material : AISI 316 as per requirement
Other details as per specifications of mix proof valves except control modules which shall have only 1 no. solenoid valve.

Pneumatic butterfly Valves / Ball Valves
Type Two way / three way pneumatically operated butterfly / Ball valves ON-OFF valves

Material : AISI 304

All pneumatic connections from the header upto individual valves shall be of SS-304 through suitable SS-304 distribution headers connected with FRL units/moisture separator etc. 500 mm pneumatic flexible tubing to be considered at control unit side for all valves.
The valves should have required diagnostic features, to be monitored from HMI & recorded in the system. The valves should also be configurable from the HMI/operator console. The valve shall be supplied with the control cap having solenoid valve housing, control chip and shall be of IP66 class minimum.

Manual SS Valves
Type : Two way / three way manually operated valves, Ball valves or Butterfly valves or any other SS valves, non-return valves used in plant.
Sizes : As required
Material : AISI 316/AISI 304

a) Manual SS Butterfly valves / Ball valves :
The butterfly valve/ ball valves shall be of sanitary design and all liquid contacting parts shall confirm to AISI 316. The valve sealing gasket shall be EPDM/ Nitrile rubber material suitable for hot water sterilization temperature of 100 Deg. C and hot acid and lye solution of 2% concentration at 85 Deg. C. The valve shall be provided with SS handle. The valve shall be with plain ends shall be suitable for direct welding on the pipes.

b) SS Non-return valve
The non return valve shall be of sanitary design and all liquid contacting parts shall confirm to AISI 304. The valve sealing gasket shall be EPDM / Nitrile rubber material suitable for hot water sterilization temperature of 100 Deg. C and hot acid and lye solution of 2% concentration at 85 Deg. C. The non return valve shall be with plain

ends shall be suitable for direct welding on the pipes.

Manual Utility Valves
Sizes : As required
Material : CS / MS /GI /AISI 304/

Actuated Utility Valves
Sizes : As required
Material : CS / MS /GI /AISI 304

5.48.3 HOT & COLD LINE INSULATION OF PRODUCT LINES

Hot Insulation : LRB
Cold Insulation : PUF Density 45 Kg/cm sq
Size : As required
Insulation Cladding: SS 304 shall be considered for all lines

5.46 RAW / SOFT WATER DISTRIBUTION PIPING, VALVES, FITTINGS & SUPPORTS

As per general description given in basis of design. Raw & soft water pipeline shall be of GI and that of RO water lines shall be of **AISI-304**. All water pipe supports inside the plant/ corridor & tanker bay shall be of SS-304 box section. Pipe supports outside the plant shall be of Galvanised MS section.

Capacity	: Suitable
Qty	: 1 Lot
For water pipes,	
Sizes	: As required
Material	: GI 'B' Class ERW /AISI 304
Fittings	: As required
Valves	: CI butterfly / ball valves / As required
Control valves	: As required
Insulation	: As required
Cladding	: As required
Pipe support	: As required
Pipe clamps	: As required

5.47 STEAM DISTRIBUTION SYSTEM

Steam shall made available at one point in the plant building. Bidder to consider further distribution in including piping, valves & fittings, insulation, support, structure etc in the scope

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

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

Quantity : 1 lot

Insulation : Glass wool of specified thickness covered with GI wire netting generally. Insulation shall be covered with aluminium cladding.

Thickness : As per relevant IS standard.

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

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

INSULATION OF STEAM DISTRIBUTION PIPING

Insulation : glass wool of specified thickness covered with gi wire netting generally. Insulation shall be covered with aluminium cladding.

Thickness : as per relevant is standard

Note: condensate pipes shall be insulated with glass wool/asbestoses ROPE.

5.48 CHILLED WATER DISTRIBUTION

Chilled Water Piping, valves and Fittings with cold insulation

GI 'B' class pipes and fittings to interconnect chilled, chilled water tank and chilled water pump sets. The pipes shall be as per IS 1239 for size 150NB and below & as per IS3589 for sizes above 150 NB. The necessary pipe support, valves, non-return valves etc. as per compact layout Necessary PUF insulation is included in the scope. All required insulations for the chilled water pipe lines, fittings & valves shall be in the scope of the bidder. Please refer special conditions of the contract for insulation details.

For chilled water pipes, PUF/ armaflex insulation is to be provided with aluminium cladding.

Sizes	: As required
Material	: GI 'B' Class ERW /AISI 304
Fittings	: As required
Valves	: CI butterfly / ball valves / As required
Control valves	: As required
Insulation	: As required
Cladding	: As required
Pipe support	: As required
Pipe clamps	: As required

5.49 COMPRESSED AIR DISTRIBUTION PIPING, VALVES, FITTINGS& SUPPORTS FOR ENTIRE PLANT

The compressed air transmission from compressed air room to the SS receivers to be installed in the plant area shall be from GI- 'C' Class- Heavy duty piping. Further distribution from the SS receiver up to the individual consumption points and including the main header shall be from SS 304 piping.

All compressed air pipe supports inside the plant/corridor & tanker bay shall be of SS-304 box section. Pipe supports outside the plant shall be of Galvanised MS section.

Sizes	: As required
Material	: AISI 304
Valves	: SS ball/SS globe/SS diaphragm valves / As required
Fittings	: As required
Air filter and regulators	: As required
PU tube and fittings	: As required
Pipe support	: As required
Pipe clamps	: As required

5.50 SUPPORTING STRUCTURE & WORKING PLATFORMS FOR ENTIRE PLANT

a. SS Structures
Quantity: 1 Lot

According to site situation and description provided in technical specifications

b. MS / GI Structures
Quantity: 1 Lot

According to site situation and description provided in technical specifications

5.51 STEAM & WATER MIXING BATTERIES

Quantity : 1 Lot

With necessary steam & raw water mixing chamber, temperature control arrangement consisting of regulator, temperature gauge, hose & nozzle/gun with 15 M long hose for washing floors/ equipment should be provided. LP steam shall be used from the nearest header

5.52 INSTALLATION, TESTING & COMMISSIONING

Quantity : 1 Job

Labour job for installation, testing & commissioning of complete Dairy plant equipment and accessories being supplied as part of this tender. Since the contract is Turnkey

entire responsibility of installation, testing & commissioning of the items supplied under this tender shall be with the supplier. Please refer special conditions of the tender document for more details area wise.

The scope of E & C includes unloading at site, unpacking, shifting, positioning, erection, testing and commissioning of all above items/equipment (As mentioned in technical tender) including the following;

1) The supplier has to carry out the complete erection, testing and commissioning of the Equipment for paneer processing & packing section considering the expansion work in a running dairy

   Bidder to assess the situation at site for such equipment and shall quote accordingly. No extra cost what so ever shall be given at a later date for such work.

2) The works shall be carried in the standard workmanship in conformity to the relevant codes of practices of BIS or international standards applicable for Dairy Process, mechanical and electrical installations.

3) While Unloading the equipment, Erection, testing and commissioning of Paneer processing all the safeties related to men, machinery and material shall be in the scope of the contractor hence every care has to be taken along with necessary insurance coverage till the handing over of the machineries in working conditions to the Milk Union.

4) The erection works including the following;

   - shifting of equipment from the unloaded place, decorating, aligning, fixing to foundations, placing on foundation,
   - Connecting to the pipelines of product and utilities and installation of piping.
   - Connecting to the electrical power Control Centre, MCC, Power cables, control cables with proper termination and providing of Communication cables, etc. and preparation of single line Diagram etc is part of this job.
   - Starting and commissioning and trail runs.

5) Supplier shall arrange and demonstrate the commissioning & performance trial runs of the entire plant as per the technical rated parameters offered in the technical proposals.

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

7) Training of the personnel of purchaser at different stages of assembling, installation and operations etc. should be provided. Service Engineer/key person shall stay for minimum 30 days for assistance and train the Milk Union personnel in running of the plant (after product trial).

8) The Statutory Obligations related to various equipment such as Boiler / electrical including getting statutory approvals will be part of this job. AND it is the sole responsibility of the turnkey contractor/firm to ensure the said statutory approvals from electrical inspectorate /KEB or any other bodies required to be taken, shall be obtained and produced while commissioning of the Plant. Fees for such approval shall be reimbursed by purchaser on submission of receipt.

Special Notes to Bidders

1) The successful bidder shall provide 2 sets of manuals test certificates & drawings
2) If the manufacturers upgrade their technology or change existing technology, shall ensure to render service and supply spare parts for the existing /supplied, period of minimum 15Years
3) Any deviation in the technical specification has to be clearly mentioned and it is the decision of purchaser to accept OR reject.
4) The Layout drawings are attached for reference. Bidder to submit all data mentioned in the "Drawing, data & documentation section" along with the offer failing to which bid shall be considered non-responsive and shall be rejected without giving any reason thereof.

5.53 SERVICE COVER & TRAINING

Quantity : 1 Job

SERVICE COVER

The Indian representative of the contractor shall attend the project for three days each month throughout two years following commissioning / product trial. These visits shall cover meetings, training, equipment adjustment, & servicing. These visits shall not cover guarantee work, which shall be undertaken separately.
The objectives of service covers are intended to ensure that the efficiency of the plant is maintained at the optimum level and to help improve operating and maintenance procedures.

- To keep the plant adjusted for optimum energy efficiency, product quality and minimum product losses.
- To arrange for service visits by specialists to inspect, service and carry out reports.
- To carry-out and audit of plant operating efficiency at regular intervals.

TRAINING

Training shall form an important component of Project Management and shall be undertaken by the contractor for a period of three months. The contractor would train all levels of staff of the client in operating the plant and automation systems including managers, engineers, supervisors, operators and maintenance personnel.

Training would be given both at site and at the manufacturer's works, and a schedule should be proposed by the contractor, together with the content of training programs, their duration and venue.

Training should commence during the erection period Six months include 30 man days of trainer's time as follows:

- Management operations and factory control using automated systems and automated process- 10 man days <1>.
- Supervision of personnel and plant operations in an automated plant -10 man days <2>.

- Familiarization with automation systems hardware and automated equipment operation 15 man days <3>.
- Fault finding& maintenance on control systems & control equipment, including electronic circuits &micro processor -20 man days <3>.
- Familiarization with the basic principles of control systems software, process coding, programming & instructions on how to correct, modify and re-write programs -15 man days <3>.
- Familiarization with start-up procedures, control during operation & adjustment-20 man days <3>.

<1> Managers & Senior personnel training.
<2> Supervisors & Section heads training.
<3> Supervisors, operators and maintenance staff.

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

Dairy staff for:
- Operation of process, services utilized and process technology
- Operation of machinery and equipment

Maintenance & Electrical staff for:
- On the job training for technical personnel
- Maintenance of plant and equipment

Instrumentation staff:
- On job training covering calibration
- On the job training for technical personnel regarding set points
- Fault finding and maintenance
- Training of hardware& software.
- Process logic
- Fault finding and maintenance

- Services to be provided by Purchaser:
  - Classrooms with chairs and tables for theoretical training
  - Persons selected for training will have a good basic technical education
  - Continuity in training and their assistance during start up of the plant

LIST OF EQUIPMENTS FOR 3 MT/DAY CAPACITY PANEER MANUFACTURING PLANT (EXPANDABLE TO 5 MT/DAY CAPACITY)

BOQ Item No.	ITEM DESCRIPTION	Capacity	Quantity
5.1	Line from Existing PMST distribution header to SMSTs/Paneer Milk tanks including pneumatic valves & fittings	Suitable	1 Lot
5.2	Standardized Milk Storage tanks (SMSTs) with Platform for Paneer Milk Storage	15,000 Lit.	2 No.
5.3	Standardized milk transfer pump from SMSTs to Milk heating module (VFD Operated)	3 KLPH	1 No.
5.3.1	Milk return line from Existing SMSTs distribution header to Raw milk tank of Process Section-Dharuhera Plant including pneumatic valves & fittings	Suitable	1 Lot
5.3.2	Self Priming CIP return Pump for SMSTs (Standardized Milk storage tanks of Paneer Section)	Suitable	1 No.
5.4	Skid Mounted Regenerative Milk Heating module and Whey cooling Module	3 KLPH	1 Set
5.5	**Citric Acid Preparation cum Storage System**		
5.5.1	Citric Acid Solution tank with Platform	2500 Liter	2 Nos.
5.5.2	Metering Pump for Citric Acid Solution dosing	4000 LPH	2 Nos.
5.6	Paneer vat	1500 Liter (Geometric cap. 2,000 Liter)	4 Set
5.7	Self Priming CIP Solution return Centrifugal Pump for Paneer Vat	Suitable	1 No
5.8	Paneer Hoops	Suitable to Prepare 10 Kg Paneer blocks	180 Nos.
5.9	Wheel Mounted SS trolleys for Paneer Hoops transfer	Suitable & as required	1 Lot
5.10	Paneer Press / Paneer Pressing Station	4 Set/ 6 Heads with 4 Hoops pressing/Head	6 Set
5.11	**Paneer Blocks Cooling Vat (Insulated) with Cooling water recirculation pump, water chiller, Filtration, UV & Ozonization System**		
5.11.1	Paneer Block Cooling Vat (Insulated)	2000 Liter (each for 90 blocks)	2 Nos.
5.11.2	Self Priming CIP Solution return Pump for Paneer Cooling vat	Suitable	1 No.
5.11.3	Cooling water circulation Pump	Suitable	1 No.
5.11.4	Cooling Water Chiller (To maintain cooling water temp 4 deg C)	5 KLPH	1 Set
5.11.5	Cooling water Duplex Filter with change over facility	Suitable	1 Set
5.11.6	UV treatment System	Suitable	1 Set
5.11.7	Ozonization System	5 KLPH	1 Set
5.12	Wheel Mounted SS trolleys from Paneer Cooling	Suitable	1 Lot

BOQ Item No.	ITEM DESCRIPTION	Capacity	Quantity
	Vat to Cold store/Packing Room		
5.13	SS tables for blocks demoulding & Paneer Packing	Suitable	1 Lot
	Paneer whey collection System		
5.14	Whey Balance tank for collection of Paneer whey	200 Lit	1 No
5.15	Whey transfer Pump to regenerative PHE	5 KLPH	1 No.
5.16	Cooling tower water pump for whey cooler	Suitable	2 Nos. (1 W+1 Standby)
5.17	Chilled Whey storage tank (intermediate, Insulated VMST)	15,000 Liter	1 No..
5.18	Whey transfer pump to Whey Pasteurizer	5 KLPH	1 No.
5.19	Self priming CIP return Pump for Chilled Whey storage tank	Suitable	1 No.
5.20	Whey Pasteurizer; Design Temp Prog. (6-30-78-4 °C) 93% regeneration efficiency	5 KLPH	1 Set
5.21	Pasteurized Whey Storage tank	15,000 Liter	2 Nos.
5.22	Self priming CIP return Pump for Past Chilled whey storage tanks	Suitable	1 No.
5.23	Whey Dispatch Pump	20 KLPH	1 No
5.24	Electronic Mass flow meter	20 KLPH	2 No
5.25	Whey dosing Pump for Butter Milk thermizer balance tank (VFD Based)	3 KLPH	1 No
5.26	Whey Dispatch Chiller (7 deg C to 3 deg C)	20 KLPH	1 No
5.27	Whey tanker dispatch Hose (Food grade)	63 mm & suitable length	1 Set
5.28	Paneer Block Cutting Machine (200 gm & 500 gm)	300 Kg/Hr	2 Nos.
5.29	Paneer Vacuum Packing machine	400 Kg/Hr	1 Nos.
5.30	Wheel mounted SS trolleys for transfer Packed Paneer blocks to Paneer Sterilizer	Suitable, (as required)	1 Lot
5.31	**Hot Water Sterilizer**		
5.31.1	Packed Paneer Sterilization Vat (Insulated with Platform)	2000 Packets per Hr	1 Nos.
5.31.2	Hot Water Circulation Pump	Suitable	1 Nos.
5.31.3	Hot water PHE	Suitable	1 Nos.
5.31.4	Hot Water Filters	Suitable	1 Set
5.31.5	Mono rail and Pulley System	Suitable	1 Set
5.32	Wheel Mounted SS trolleys for transfer sterilized Packed Paneer Blocks to Cooling room/ Cartoning	Suitable	1 Lot
5.33	Inkjet Printing Machines with belt conveyor for batch coding	Suitable	2 Nos.
5.34	Manual Cartoning tables	Suitable	1 Lot
5.35	Metal Detector for Finished goods cartons	Suitable	1 Set
5.36	Weighing Scales with SS tables	2 kg and 50 Kg capacity, 5 Nos. of tables	2 kg Cap.-6 Nos., 50 Kg cap.-02 Nos.

BOQ Item No.	ITEM DESCRIPTION	Capacity	Quantity
5.37	Hoops Cleaning System/tanks	3000 Lit / Suitable	1 Set
5.38	Paneer shredding / Paneer mincer with SS table for rework	Suitable	1 No.
5.39	Paneer Paste Making Machine	Suitable	1 No.
5.40	Cooling tower with Pump & Accessories	Suitable	1 No.
5.42	**CIP Kitchen for Paneer Plant**		
5.41.1	Acid/ Lye Dosing System with Pumping & Piping	Suitable	1 Lot
5.41.2	Lye Solution Tank:	3000 Liters	1 No
5.41.3	Acid Solution Tank	3000 Liters	1 No
5.41.4	Hot water tank	3000 Liters	1 No
5.41.5	Recuperation or Rinse Water tank	3000 Liters	1 No
5.41.6	Sterilization Tank	500 Lit	1 No
5.41.7	CIP Forward Pump (VFD Operated)	20 KLPH	1 No
5.41.8	Bucket type Duplex filters	20 KLPH	1 No
5.41.9	Tubular Heat Exchanger for CIP solution Heating	20 KLPH	1 No
5.41.10	Automatic Pumping Trap for Heater	Suitable	1 No
5.41.11	Recirculation Pump for Acid and Lye tank	Suitable	1 No
5.41.12	CIP return pump for Paneer Processing equipment-Self Priming	Suitable	1 No.
5.42	**Automation & Field instruments**		
	Automation		
5.42.1	Automation Hardware	suitable	1 lot
5.42.2	Operator Console PC (OS + ES)	suitable	1 lot
5.42.3	Printer	suitable	1 lot
5.42.4	Network Hardware	suitable	1 lot
5.42.5	Automation/ System Software	suitable	1 lot
5.42.6	Control Desk and Cabinate	suitable	1 lot
	Field Instruments		
5.42.7	Process transmitter	suitable	1 lot
5.42.8	Process gauges	suitable	1 lot
5.42.9	Temperature elements	suitable	1 lot
5.42.10	Process switches	suitable	1 lot
5.42.11	Flow elements	suitable	1 lot
5.42.12	Magnetic Flow meters	suitable	1 lot
5.42.13	Mass flow meters	suitable	1 lot
5.42.14	Vortex Flow meters	suitable	1 lot
5.42.15	Level transmitter	suitable	1 lot
5.42.16	Conductivity Analyzer	suitable	1 lot
5.42.17	Control Valves	suitable	1 lot
5.43	**Electrical distribution system**		
5.43.1	MCCs	suitable	1 lot
5.43.2	Motors Isolators	suitable	1 lot

BOQ Item No.	ITEM DESCRIPTION	Capacity	Quantity
5.43.3	Cable trays	suitable	1 lot
5.43.4	Conduits and glands	suitable	1 lot
5.43.5	LT Power Cables	suitable	1 lot
5.43.6	LT Control Cables	suitable	1 lot
5.43.7	Instrument cables	suitable	1 lot
5.43.8	Rubber mats	suitable	1 lot
5.43.9	RCBs and Junction Boxes	suitable	1 lot
5.43.10	VFD & Panel	suitable	1 lot
5.43.11	Earthing for Electrical Power and Automation	suitable	1 lot
5.44	UPS with servo stabilizer, common batteries Control & Automation system (complete)	suitable	1 lot
5.45	Pipes, fittings, valves and supports	suitable	1 lot
5.46	Raw / soft water distribution piping, valves, fittings & supports	suitable	1 lot
5.47	Steam distribution system	suitable	1 lot
5.48	Chilled water distribution	suitable	1 lot
5.49	Compressed air distribution piping, valves, fittings & Supports for entire Plant	suitable	1 lot
5.50	Supporting structure and working platforms for entire plant	suitable	1 lot
5.51	Steam & water mixing batteries	suitable	1 lot
5.52	Installation, testing & commissioning	suitable	1 Job
5.53	Service Cover & Training	suitable	1 Job

Important Note:

1. **In BOQ item No.5.2** "Standardized Milk Storage tanks (SMSTs) for Paneer Milk Storage-Capacity: 15000 Lit, Quantity: 02 Set", & **For BOQ item No.5.21** Pasteurized Whey Storage tank, Capacity:15000 Lit, Quantity: 02 Set". Purchase will provide Agitator set for All 04 Nos. tanks. Bidder shall consider erection value for same & design 15,000 Liter tanks accordingly.

2. **In CIP Kitchen of Paneer Plant,** Purchaser will provide BOQ Item No.5.41.2, 5.41.3, 5.41.4, 5.41.5 (3000 Lit Capacity tanks, Quantity: 03 Nos.), Bidder shall consider erection value for same & design CIP kitchen accordingly.

3. The complete refrigeration system supply i.e. Freon based standalone refrigeration system for Blast Room and Finished good cold store, Forced Air Ventilation System is not in scope of Bidder. The same items will be arranged by Purchaser.

LIST OF PREFERRED MAKES OF MAJOR BOUGHT OUT ITEMS

LIST OF PREFERRED MAKES OF MAJOR BOUGHT OUT ITEMS

Item Description	Makes
PANEER MILK RECEPTION, PROCESSING & PACKING	
SS MILK, CIP & HOT WATER PUMPS	ALFA LAVAL / FRISTAM / APV / IDMC
PHE	GEA / Tetra Pak/ APV / ALFA LAVAL / KELVION / IDMC
THE	HRS / IDMC / Equivalent
MILK & CIP HOSES	SAINT GOBIN / BLAUDIECK / GECITECH
CIP RETURN PUMP (SELF PRIMING)	ALFA LAVAL /APV / FRISTAM / Tetra Pak / IDMC
TANK AGITATOR (Side mounted)	STELZER / JONGIA /PRG/ LENKA SLOW SPEED
CIP spray	ALFA LAVAL / GEA
CUTTING & DICING MACHINE	BLISS ENGINEERS / ALFA GENESIS / NITIN ENGINEERS (Fillpack Technology)
PANEER VAT	REPUTED FABRICATORS
PANEER HOOPS	REPUTED FABRICATORS
VACUUM PACKING MACHINE	PACK MACK / INDVAC OR EQUIVALENT
Paneer Packing Machine in Pouch	HASSIA OR EQUIVALENT
THERMOFORM PACKING MACHINE	MULTIVAC / ULMA
STANDALONE REFRIGERATION SYSTEM / AIR COOLING UNITS	DANFOSS/BLUESTAR / ICEMAKE / RENAC / ARCTIC / FRICK / COOLERS & CONENSERS
EPS / PUF INSULATION MATERIALS	LLOYDS / BEARDSELL / FRICK OR OTHER ISI APPROVED
SADDLES FOR COLD INSULATION	GOOD WITH 120 KG/CU M DENSITY
INSTRUMENTATION, CONTROLS & AUTOMATION	
VFD	SIEMENS / SCHNEIDER / DANFOSS /AM TECH / YASKAWA
LEVEL TRANSMITTER & INDICATOR	E&H / EMERSON / SIEMENS/ ANDERSON NEGLE
TEMPERATURE / PRESSURE TRANSMITTER	E&H / EMERSON / SIEMENS/ ANDERSON NEGLE / BAUMER
CONDUCTIVITY & PH TRANSMITTER	E&H / EMERSON / YOKOGAWA / ANDERSON NEGLE

DENSITY TRANSMITTER	E&H / EMERSON
RTD	ALTOP / GIC / RADIX / ANDERSON NEGLE
PID CONTROLLER	YOKOGAWA / JUMO / HONEYWELL / REDIX
FLOW SWITCH	DANFOSS / SWITZER / IFM, GMBH/ ANDERSON NEGLE
PROXIMITY SWITCH	IFM / SICK / P&F
LEVEL SWITCH (VIBRATING FORK TYPE)	E&H / EMERSON / SIEMENS / ANDERSON NEGLE / BAUMER
LEVEL SWITCH (FLOAT TYPE)	PUNE TECTROL OR EQUIVALENT
VORTEX / MAGNETIC FLOW METER	E&H / EMERSON / SIEMENS /INCONEL
MASS FLOW METER	E&H / EMERSON / SIEMENS
CONTROL VALVE	DANFOSS/BURKET/ SAMSON
PRESSURE SWITCH / TEMP. SWITCH / THERMOSTAT	DANFOSS / SWITZER / E&H / ORION / WIKA / ALCO
PRESSURE & TEMPERATURE GAUGE	GIC / WIKA / WAAREE / RADIX / BAUMER
DUAL TYPE PRESSURE / TEMP GAUGES	GIC / WIKA / WAAREE / RADIX / BAUMER
TEMPERATURE DIGITAL INDICATOR / CONTROLLER	YOKOGAWA / RADIX / HONEYWELL
LOAD MANAGER / POWER / ENERGY MONITOR	ALLEN BRADLEY / SIEMENS / ABB / L&T / SCHNEIDER
PC (PERSONAL COMPUTER)	HEWLETT-PACKARD/IBM LENEVO/ DELL
SCADA SYSTEM & AUOTMATION SYSTEM	SIEMENS /ROCKWELL (ALLEN BRADLEY)/ SCHNEIDER
ELECTRICALS	
ELECTRIC MOTORS	SIEMENS / CROMPTON / ABB / BHARAT BIJLEE
AIR CIRCUIT BREAKER	SCHNEIDER / SIEMENS / L&T / ABB
MCCB	SCHNEIDER / SIEMENS / L&T / MDS-LEGRAND
MPCB	SCHNEIDER / SIEMENS / L&T / ABB
CONTACTORS	SCHNEIDER / SIEMENS / L&T
STARTER OVERLOAD RELAYS	SCHNEIDER / SIEMENS / L&T

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

PLUG & SOCKET	LEGRAND / CLIPSAL/ SCHNEIDER / HENSEL
POTENTIAL TRANSFORMERS	KAPPA / BHARTI / AE / ASHMORE
TERMINAL BLOCKS	WAGO / CONNECT WELL / ELMEX / LAPP INDIA
ROTARY SELECTOR SWITCH	KAYCEE / SALZER / L&T / SIEMENS / SCHNEIDER
CABLE GLANDS	COMMET / EX-PROTECTA / DOWELS / LAPP KABEL
CABLE LUGS	DOWELS / COMMET / LAPP KABEL
MECHANICAL INTERLOCK	L&T / SCHNEIDER / ABB
ELECTRONIC SOFT STARTER	L&T/ SIEMENS / ALLEN BRADLEY / SCHNEIDER / ABB
Programmable Protection Relay	MINILEC
SERVO VOLTAGE STABILIZER	SUVIK / EMERSON / HI-REL / CRYCARD / NEEL / APLAB / MICROTEK
UPS	EMERSON-LIEBERT / HI-REL / APC /Neo watt
SMF BATTERY	YUASA-ROCKET / FURUKAWA / EXIDE / PANASONIC / AMARAJA
HT VCB	Siemens /ABB
VALVES & PIPES (MS & GI)	
WATER VALVES (BUTTERFLY / BALL)	AUDCO / SAUNDERS / INTERVALVE / BDK / CRESCENT / FESTO / DELVAL/ LEADER
WATER VALVES (DIAPHRAGM)	SAUNDERS / BDK / DELVAL
NON-RETURN VALVE FOR WATER	AUDCO / INTERVALVE / BDK / LEADER/ DELVAL
WATER FOOT VALVE	KIRLOSKAR / GG / LEADER/ DELVAL
GI PIPES FOR WATER	TATA / JINDAL / MST / ZENITH / TISMETUL (KALYANI)
MS PIPES FOR AIR, STEAM, CONDENSATE	TATA / JINDAL / TISMETUL (KALYANI) / MST
NRV FOR AIR / OIL LINE	INTERVALVE / AUDCO / LEADER / DELVAL
SOLENOID VALVE FOR WATER LINE	DANFOSS / AVCON / ROTEX / BURKERT / SMC/FESTO
VORTEX WATER FLOW METER	E&H / EMERSON

FO FLOW METER	E&H / EMERSON
HP / LP Steam / condensate Valves	AUDCO / SPIRAX / ARM STRONG, USA / THERMAX / FORBES MARSHALL
RESIN BONDED MINERAL WOOL	LLOYD / UP TWIGA / ROCKWOOL/ MINWOOL
STEAM RELIEF VALVE, TRAPS & STRAINERS	SPIRAX / ARM STRONG USA / THERMAX / FORBES MARSHALL
STEAM PRESSURE REDUCING VALVE	SPIRAX / ARM STRONG, USA / THERMAX / MAZDA// FORBES MARSHALL
SS PIPES & VALVES	
SS PIPES	APEX TUBES / NEEKA TUBES/ RENSA / ALFA LAVAL / RATNAMANI
SS SEAT TYPE PNEUMATIC VALVES	GEA TUCHENHAGEN / ALFA LAVAL/ TETRAPAL
PNEUMATIC SS BUTTERFLY VALVES	GEA TUCHENHAGEN / ALFA LAVAL/ CIPRIANI/ TETRA PAK
SS MANUAL VALVES & FITTINGS	ALFA LAVAL / IDMC / CIPRIANI / TETRA PAK / GEA
AIR COMPRESSORS & AIR LINE FITTINGS	
AIR COMPRESSOR (SCREW)	ATLAS COPCO / INGERSOLL RAND/ IMPORTED REPUTED MAKE
REFRIGERATED AIR DRYER	ATLAS COPCO / INGERSOLL RAND / ELGI / SABROE/CHICAGO PNEUMATICS/HIRAS
AIR LINES ACCESSORIES	FESTO / LEGRIS / SMC / ROTEX / NUCON / AIRMATIC / SHAVO NORGEN
AUTO DRAIN VALVE	ULTRA FILTER / ZANDER
STEAM DISTRIBUTION	
STEAM DISTRIBUTION ACCESSORIES	FORBES MARSHALL / THERMAX
MISCELLANEOUS ITEMS	
GEARED MOTOR / GEAR BOX	PBL / POWER MASTER / ELECON / IC BAUER
STEAM-WATER MIXING BATTERY	SPIRAX / ARMSTRONG, USA / FORBES MARSHALL
STRUCTURAL STEEL	SAIL / TISCO / RINL / IISCO / ESSAR

GEARED MOTOR / GEAR BOX	PBL / POWER MASTER / ELECON / 1C BAUER / BONFIGOLIOC / EURODRIVES
LED FITTINGS	PHILIPS /HAWELLS / SYSKA
AIR CONDITIONERS	BLUESTAR/LLYOD/VOLTAS/CARRIER/DIAKIN/MITSUBUSHI
PC	DELL/ DELL / HP
PRINTER	HP / HCL / WIPRO
ELECTRONIC WEIGH SCALE	METTLER TOLEDO / AVERY / SARTORIUS

- (Note : In case the make of specific items/ equipment is not available in the above list, the bidder may indicate the same in their bids. However the acceptance of the make of specific items/ equipment is discretion of the purchaser.) All makes needs to be approved from Purchaser before placement of order to vendors.

IMPORTANT NOTE:

(1) Supplier shall visit Dudhmotisagar dairy & understand the requirement prior to submission of techno-commercial offer. Vendor shall read the inquiry specifications thoroughly & revert back to us for any querry prior to submission of techno-commercial offer.

(2) This will be total turn-key project hence all piping or any other requirement not mentioned but required during actual execution shall be considered.

(3) Automation, where ever is required or considered shall be in supplier scope. 10% spare kit shall be considered for each type of automation valves. All field instruments shall be selected as per requirement.

(4) Hand shaking with LMP Plant for milk receiving at Paneer section shall be considered & the same line shall be CIP cable through system. pneumatic control valve shall be installed in milk forward & CIP return line shall be considered

(5) Support structure shall be in multi layer (2 tiers / 3 tiers) as per site requirement.

(6) Isolation valve shall be put before each use point or valve cluster (all air, chilled water, steam, condensate & raw / soft water application)

(7) Removing of old piping / structures / cable tray with support / platform etc at existing Paneer section shall be in the scope of supplier. old insulation from piping shall also be removed from piping prior to shifting to scrap yard. All inlet/outlet piping shall be removed from source or up to destination.

(8) **This will be total turn-key project hence all piping or any other requirement not mentioned but vendor shall have to consider required piping & fittings as per site situation.**

(9) This is Turn Key basis Job & includes Erection, Shifting, Positioning, Leveling, Erection & Commissioning, Process Piping & Utility Piping, Electrical & Automation work

(10) Successful supplier shall make PERT chart (Activity chart) considering priority & pre requisites & strictly follow it.

(11) Identification Tag on Acrylic Sheet with SS supports or on radium Stickers for all Machineries, equipments, Flow plates & for Process piping & utility piping with Arrow mark shall be in the scope of vendor. Color code & size shall be decided at the time of execution of the work. Arrow stickers shall be provided where ever required. P & ID & Process flow Diagram shall be framed & displayed in the Section by successful supplier.

(12) All the SS piping shall be welded using TIG welding with inert Gas. (Purging Method only). All weld joints are to be ground smooth and finished to150 grit. All stainless steel surfaces are to be polished to 150 grits.

(13) Drawings shall be approved by DSD Authorities prior to manufacturing for all equipments.

(14) Mehsana Union reserve the right for minor changes in layout or specifications.

Sub -Section 6
Battery limits

BATTERY LIMITS

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

STEAM:
LP Steam shall be provided at one point outside building at 3.5 Bar pressure. Further distribution including piping, valves & fittings, insulation, supports, structure for the entire section shall be in the scope of supply and execution shall be done accordingly.

POWER:
Power shall be made available at one feeder in the outlet of PCC. From this point onwards, PCC to MCC cable, MCC, Power & Control cable, all equipment earthing, cable trays, SS/MS conduits, support, gland termination etc. shall be in the scope of this tender. Refer Scheme given in Design basis.

RAW WATER:
Raw water shall be provided at one point outside building at required pressure. Further distribution for the entire section including pipes, valve and fittings, support, structure shall be in the scope of supply and execution shall be done accordingly. Refer Scheme given in Design basis.

SOFT/ROWATER:
Soft/RO water shall be provided at one point outside building at required pressure. Further distribution for the entire plant shall be in the scope of supply and execution shall be done accordingly.

PASTEURISED MILK:
Milk shall be provided by purchaser at the outlet of the milk distribution header in LMP section. Distribution thereafter including all pumps, pipes supports, valves (manual & pneumatic), NRVs, insulation, instruments, controls etc.,shall be in the scope of this tender.

CIP CHEMICALS:

CIP chemical shall be provided by purchaser at the outlet of the bulk storage tank. Transfer &Distribution thereafter shall be in the scope of this tender.

COMPRESSED AIR:

Compressed air shall be provided at one point outside building at required pressure. Further distribution for the entire plant including pipes, supports, Header, flexible connection, instant fitting etc shall be in the scope of this tender. Refer Scheme given in Design basis.

REFRIGERATION:
Chilled water shall be provided at one point outside building at required pressure/temperature. Further distribution for the entire plant shall be in the scope of supply and execution shall be done accordingly. Refer Scheme given in Design basis Whereas refrigeration system required for Forced Air Ventilation System, Blast Room and Cold store will be arranged by Purchaser.

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

Exhaust Air
Shall be let out at height of 2 M above the building by supplier or shall follow Local Pollution control norms whichever is applicable.

Automation
Communication with LMP PLC or any third party shall be in scope of the bidder. All the hardware and software including modification in the existing LMP PLC shall be considered in the scope of supply.

Further for generation of MIS report,All instruments required to be installed in the utilities lines including electrical MFM for power consumption data shall be considered in the scope of supply

Raw Materials, Packing Materials and Consumables

Purchaser shall provide raw materials, packing materials, CIP detergent, milk, etc. as required for trial runs, commissioning and performance demonstrations.

Effluent:
To be taken care by Purchaser however bidder to provide sufficient information for effluent to be generated and other relevant information for the plant designed by supplier.

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

EXCLUSIONS FROM SUPPLIER SCOPE

1) Any feed, product, condensate, CIP & utilities (steam, chilling water, soft / RO water, cleaning chemicals) piping outside the battery limits.
2) All civil works including design, foundations, construction, RCC beams, stair case, roof, and weather cover for the plant.
3) Supply of consumables, cleaning chemicals, Laboratory facilities & quality control equipment.
4) Any statutory approvals related to utilities such scope as Electrical, ETP Etc.
5) Plant illumination, lightening arrestor, etc.
6) All types of treatment to effluent, handling and distribution of treated effluent is not within the scope of the offer. The effluent as generated shall be left at the Generation point to be taken in drainage system.
7) D G set of suitable capacity
8) Any item and service not explicitly mentioned in scope of supplies / outside battery limit.

Sub -Section 7
Deviations from Technical Requirement

7. DEVIATION FROM TECHNICAL REQUIREMENT

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

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

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

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

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

Table 3 **Technical Deviation Statement Form**			
Sr. No	**Clause Reference**	**Deviation**	**Remarks (Justification)**

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

Anything specifically not mentioned in Deviation statement but mentioned elsewhere in the offer shall be ignored and not considered.

Date

Signature of Authorised Signatory of Bidder/Supplier

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

Sub -Section 08
OPTIONAL ITEMS

8. OPTIONAL ITEMS

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

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

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

Sub -Section 09

DRAWING, DATA & DOCUMENTATION SUBMISSION

9 DRAWINGS ENCLOSED WITH THE TENDER

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

9.1 DOCUMENTS REQUIRED FROM THE BIDDER

9.1.1 **The Bidder must enclose the following Drawings with the Offer:**

- Existing dairy Layout (provided by purchaser) with incorporation of proposed equipment/services/amenities.
- GA drawings tanks
- P & ID for all processes, service and product piping, controls instruments, automation, etc.
- CIP equipment arrangement and flow diagram.
- Utilities flow diagram including utility equipment, interconnection piping, controls, instruments, automation etc.
- Single line diagram for electrical distribution system.
- The bidder should follow the guideline for preparation of drawing as described in general. Any deviation in thickness of material of construction and general arrangement will be specifically mentioned in the drawing as remark.

9.1.2 **The Bidder must enclose the following Charts/details with the Offer**

- Load histograms/peak and average load for:
  a) Steam
  b) Electrical Power
  c) Water (Soft & raw)
  d) Compressed Air

  Each histogram/consumption data is to be based on 24-hours basis and is to show clearly the hourly consumption, total daily consumption, peak load and average load.
- Hourly equipment wise Process Time Schedule (PTS) based on 24-hour time scale.
- Bar chart for project execution including personnel training program.

9.1.3 **The Bidders must enclose the following information in their Offer:**

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

9.2 PERFORMANCE TESTS

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

9.2.2 **FORMATS OF GUARANTEES:**

- Guarantees for throughput of various sections of plant supplied.
- Product quality.
- Weight and Measurement tolerance.
- Milk solid loss to ETP & Product Loss.
- Service consumption.
- Formats for performance tests.
- Procedure for carrying out the tests.
- Method of measurement
- Test duration
- Evaluation methodology

9.2.3 **UTILITIES CONSUMPTION**

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

Utilities Consumption Data		
Steam	Peak Load Kg/hr Average Load Kg /Hr Total Load Kg/day Tolerance ± %	
Power	Peak Load kW Total Load kWh/day Tolerance ± %	
Soft Water & Raw Water (Separately)	Peak Load lt/hr Average Load Lt/Hr Total Load lt/day Tolerance ± %	
Air	Peak Load Nm3/hr AvergeLoad:Nm3/Hr Total Load Nm3/day Tolerance ± %	
Chilled Water	Peak Load TR/hr Average Load TR/Hr Total Load TR/day Peak Chilled Water flow Lit / Hr Tolerance ± %	

9.3 PRODUCT RECOVERY DATA (wherever applicable)

Product loss assuming rated capacity operations follows

Milk Loss	Handling Loss & Packing loss	
	Losses to ETP	

9.4 DETAILS OF CONSUMABLE MATERIALS

Bidder is to provide full details of all consumable materials and chemical used in the plant.

Details of Consumable Materials		
CIP chemical	Lye 100%	
	Acids 100%	

Sub -Section 10

Process Performance and Consumption Guarantee

10. PROCESS PERFORMANCE & CONSUMPTION GUARANTEE

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

EQUIPMENT PERFORMANCE

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

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

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

SERVICES REQUIREMENT

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

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

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

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

MAXIMUM LIABILITY

The maximum liability of suppliers on all counts of penalties including above, Liquidated Damages clause and other liabilities of any kind shall not exceed 10% of Contract value.

Sub-Section 11
Criteria for
Technical Check of Bids

11. TECHNICAL CHECK OF BIDS

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

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

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

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

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

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

11.6 Consumption of consumable materials.

11.7 Space requirement.

11.8 Cost of spare parts.

11.9 Advance technology offered.

11.10 Utility and raw material consumptions provided by the bidder.

Sub-Section 12
Bidders Meetings

12 BIDDERS MEETINGS

Details of the proposed pre-bid meeting are contained in instruction to bidder's section- II. This will be general meeting at which all purchasers of the tender document may attend.

12.1 Bidders may also request technical discussions with the purchaser/ client's project team before the tender closing date. Subjects for discussion at the technical meeting may include:

- Project management
- Technical clarifications
- Scope of supply
- Concept of the design
- Processes
- Equipment designs
- Equipment suppliers
- Automation
- Plant management
- Quality control
- Existing equipment to be utilized in the job
- Battery limits
- Acceptable alternatives
- Equipment suppliers

This will be the only opportunity for bidders to discuss the project in detail with purchaser before the commercial bid opening, and all technical matters should be resolved at meetings.

Sub Section 13
Technical Qualification Application

Table 3 Technical Competency		
Classifications		
SN	**Category**	**Please (√)**
1	Manufacturer	
2	Clearing & Forwarding Agent	
3	Stockist	
4	Wholesale Dealer	
5	Authorized Reseller	
6	Authorized Service Agent	
7	Retailer	
8	Trader	
9	Others (please specify)	

Details on Plant		
SN	**Plant**	**Details**
1	Location	
2	Description	
3	Type	
4	Size of building	
5	Is property on lease or free hold?	
6	If on lease, indicate date of expiry of lease in each case.	
7	Others (please specify)	

Plant Facilities			
SN	**Facilities**	**Ans**	**Remark**
1	Space available for manufacturing (in m^2)		
2	Space available for storage (in m^2)		
3	Space available for inspection (in m^2)		
4	Are buildings fire resistant? (Y/N)		
5	Are premises approved by Municipal fire Department? (Y/N)		
6	Are buildings under Municipal fire protection? (Y/N)		
7	Are power & fuel supply adequate to meet production requirements? (Y/N)		
8	Are adequate transportation facilities available? (Y/N)		
9	Are safety measures adequate for performance of proposed contract? (Y/N)		
10	Is adequate material handling equipment available? (Y/N)		

Testing Facilities		
SN	**Facilities**	**Details**
1	List testing equipment available	
2	Give details of tests to be carried out on items offered.	
3	Details of the testing organizations available.	

Quality Control Organization		
SN	**Quality Control Method**	**Response**
1	Are goods offered subject to Batch Test, Random Sampling or full 100% test for quality?	
2	Are tests carried out by factory employees or by a separate testing agency?	
3	Are independent Quality Control Organization checks made and certificates issued?	

Manufacturing Capacity			
SN	**Description of**	**Capacity**	**Units Manufactured**

	Equipment		Current year	Last Year	2nd last year
1					
2					

Personnel/ Organization				
SN	Personnel in	Numbers in levels		
		Managerial	Supervisory	Skilled Workmen
1	Production			
2	Marketing			
3	Installation and commissioning			
4	Service			
5	Spare parts			
6	Administrative			

Service Center nearest to our site location	
Location	
Phone no	

SN	Information required on	Details
1	Number of skilled employees	
2	Number of unskilled employees	
3	Number of engineering employees	
4	Number of administrative employees	
5	List of special repair/ workshop facility available	
6	The storage space available for spare parts (in m^2)	
7	Value of minimum stock of spares available at all the service centres in respective currency	
8	List of the models/ types of equipment serviced by the Centre in last 2 years	

References[2]						
SN	**Name of Organization**	**Address, Telephone, Fax, Contact Person**				
1						
2						
List of components usually subcontracted						
1						
2						
Workload for the current and forth coming financial year on quarterly basis						
SN	**Financial Year**	**Quarterly Workload as % of Total Capacity**				
		I	**II**	**III**	**IV**	
1	Current Financial Year					
2	Next Financial Year					
List of major projects of similar size and nature previously executed						
SN	**Name of the client**	**Project**	**Year of award**	**Year of completion**	**Capacity/ Products**	**Value (Currency)**
1						
2						
3						
4						
Type of equipment manufactured and supplied (M & S) during last 2 years						
SN	**Equipment**	**Capacity**	**Qty**	**Projects**	**On Hand Order Qty**	
1						
2						
3						
4						

[2] Names of two buyers to whom similar equipment are supplied, installed and commissioned in the past and to whom reference may be made by the Purchaser regarding the Bidder/Supplier's technical and delivery ability:

Type of equipment manufactured, supplied, installed and commissioned (MSIC)					
SN	**Equipment**	**Capacity**	**Qty**	**Projects**	**On Hand Order Qty**
1					
2					
3					
4					
Schedules for furnishing technical data and certified drawings after receipt of orders					
1					
2					
Number of weeks required for preparing a bid proposal					

Section VI
Bidding Terms Deviation

Bidding Terms Deviation Statement Form			
Sr No	**Clause Reference**	**Deviation**	**Remarks (Justification)**

Date:

Signature of Authorised Signatory of Bidder/Supplier

NOTE:

- Above are the particulars of deviations from the requirements of the bidding conditions/ terms taken by the Bidder/Supplier.
- Where there is no deviation, the statement should be returned duly signed with an endorsement indicating "No Deviations" above.

Section VII

BID FORM & PRICE SCHEDULE PROFORMA

BID FORM & PRICE SCHEDULE

(To be furnished in the letterhead of the company and submit online)

Date
To ,

Dear Sirs,

Sub:
Ref:

Having examined the Bidding Documents, including the Addendum _____we, the undersigned, offer to supply and / or supply and deliver Goods and Services including installation and commissioning as detailed in the price schedule, in conformity with the said Bidding Documents including the technical specifications and drawings (except to the extent of deviation statement furnished in our bid) and the Conditions of Contract as mentioned in tender

We accept all the conditions of the Bidding Document in this Bid Form and this acceptance shall prevail over any other conditions, if any, given in our Bid.

We undertake, if our bid is accepted, to commence and complete delivery of all the Goods and Services as specified in the Schedule of Requirements of the Bid Document, from the date of receipt of your Purchase Order/Notification of Award.

If our bid is accepted we will obtain the bank guarantee as per the conditions of the Contract for the due performance of the Contract.

We agree to abide by this bid for the period mentioned in the IFB from the date fixed for bid opening and it shall remain binding upon us and may be accepted any time before the expiration of that period.

Until a formal contract is prepared and executed, this bid, together with your written acceptance thereof and your Purchase Order / Notification of Award of Contract (NOAC), shall constitute a binding Contract between us.

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

Dated this day of 2021

Duly Authorized to sign bid for and on behalf of

Name of witness :

Section VIII
Qualification Application

SECTION VIII

Qualification Application Form

You must submit this form (Table 2 and 3), duly filled in, along with the supporting as per following checklist given in Table 1:

Table 1 **Checklist for Supporting**	
Supportings Required	**Please (√)**
Latest Balance sheet filed with (Name of Authority) on (Date)	
Latest Profit & Loss Statement **from (**date**) to (**date**)** filed with (Name of Authority) on (date).	
Audited copies [3]of annual accounts and P & L account of **past 3 years**	
Certificate of Financial Soundness from Bankers of Bidder/Suppliers	
Income Tax Clearance Certificate (Latest)	
Sales Tax Clearance Certificate (Latest)	
Details of Income Tax Registration	
Details of Sales Tax Registration	
Organization Chart	
Annual Report of last three years	

[3] Indigenous Bidder/Suppliers must attach copy of accounts audited under section **44 AB of Income Tax Act**. In case the accounts need not be audited, a Charted Accountant or Manager of a Nationalized Bank should attest the information in this statement.

Table 2 **Financial Soundness**			
General Information			
Name			
Address			
Phones			
Mobile			
Fax			
E-mail			
Contact Personnel with designation			
Financial Information			
SN	**Description**		**Value (Rs)**
1	**Cash Balance**	In Bank	
		In Hand	
		Total	
2	**Fixed Assets**	Gross	
		Net	
3	**Current Assets**	Inventories	
		Others	
		Total	
4	**Current liabilities**	Bank Cash Credit	
		Sundry creditors	

		Others	
		Provisions	
		Contingent Liabilities (including claims not acknowledged, please specify)	
		Total	
5	**Capital**	Share capital	
		Free reserves	
		Other reserves (please specify)	
6	Term loans from financial institutions and banks		
7	Working capital		
8	Net worth		
9	Debtors and advances considered good	More than 6 months	
		Less than 6 months	

Significant Financial Ratios			
SN	**Ratio**	**Definition**	**Value**
1	Current	Current Assets to Current Liabilities	
2	Acid Test	(Cash + temporary investment held in lieu of cash + current receivable) / current liabilities	
3	Solvency	Total Liability to Net Worth	

Net Profit before Tax		
SN	**Period**	**Value**
1	Current period	
2	During the last Financial Year	
3	During the year before last Financial Year	

Financial Arrangements		
SN	**Resources**	**Amount**
1	Own	

2	Bank Credits	
3	Others (Specify)	

Sales			
SN	**Category of Customers**	**Value of orders to be executed/ anticipated Sales**	
		Current	**Next Financial Year**
1	Government Department		
2	Commercial		
3	Others		
	Total		

Annual Turnover		
SN	**Financial Year (Please begin with current year)**	**Turnover**
1		
2		
3		
4		
5		
6		

Rate Contracts for the items to be supplied			
SN	**Organization**	**Items**	**Valid till**
1	Directorate General of Supplies & Disposal, Government of India.		
2	National Cooperative Consumers' Federation of India Ltd		
3	Kendriya Bhandar		
4	Central Equipment Stores Purchase Organization for State		

	Governments		
5	GCMMF/ other member union Dairies		
6	Others		

Section IX
Collaborators' Authorisation Form

Collaborators' Authorisation Form

Reference Dated

Managing Director

Mehsana District Co-Operative Milk Producers' Union Limited.

C/O Dudhsagar Dairy

Mehsana

Dear Sir,

Bid Reference: _____

We, (Name of the Collaborator), an established and reputable supplier of Technology and goods (Name of Technology & Goods) do hereby authorize (Name and address of **Agents**) to bid, negotiate and conclude the contract with you against above mentioned Bid Reference for the above technology & goods supplied by us.

No company or firm or individual other than (Name of your sole agent/ distributor) are authorized to bid, negotiate and conclude the contract in regard to this business against this specific Bid. (Strike out this, if not applicable)

We hereby extend our full guarantee and, warranty for the technology and goods offered for supply against this invitation for bid by the above firm.

Yours faithfully,

(NAME)

For and on behalf of

(Name of Manufacturers)

Note:

This letter of authority should be on the Letterhead of the Collaborators' concern and should be signed by a person competent and having the power of attorney to bind the Supplier.

Appendices I

Contents

Form of BG for Performance Security

(On the Non-Judicial Stamp Paper as per the Stamp Act of State Government)

Bank Guarantee Number Date:

This deed of performance guarantee made this _____ day of 2020 (Two thousand Twenty) by (Name and address of the Bank) (herein referred to as the Bank) which expression shall unless repugnant to the context and meaning thereof includes its legal representatives, successors and assignees and the **Mehsana District Co-operative Milk Producers' Union Limited.**(hereinafter referred to as the MDCMPUL) which expression shall unless repugnant to the context and meaning thereof include its legal representative, successors and assignees.

Whereas, MDCMPUL /its clients has awarded a Contract and Purchase Order bearing Number __ dated _____ on (Name and address of the party) (hereinafter referred to as the `Bidder/Supplier') for the supply/ supply and erection and commissioning of __. And whereas, the Bidder/Supplier has agreed to submit a performance guarantee in the form of a Bank Guarantee to the MDCMPUL in terms and conditions of the Bidding Document and the Contract which will be kept valid up to __ calendar months from the date of Bank Guarantee (the period should be till end of warranty period). And whereas, the Bank and its duly constituted agent and officer has already read and understood the contract made between the MDCMPUL and the Bidder/Supplier.

In consideration of the MDCMPUL having agreed to award the contract/purchase order on the Bidder/Supplier, we, (name of the Bank), do hereby guarantee, undertake, promise and agree to with the MDCMPUL, its legal representatives, successors and assignees that the within named (name of the Bidder/Supplier) their legal representatives and assignees will faithfully perform and fulfill everything within the Bidding Document and the Contract/Purchase order on their part to be performed or fulfilled, at the time (time being the essence of the contract) and in the manner therein provided, do all obligations thereunder and we further undertake and guarantee to make payment to the MDCMPUL of Rs _ (Rupees __ only) being the 10% of the contract value, without any demur in case the Bidder/Supplier, their legal representatives and assignees do not faithfully perform and fulfill everything within the Bidding Document and the Contract/Purchase order on their part to be performed or fulfilled, at the time and in the manner therein provided and do not willfully and promptly do all obligations hereunder.

In case, the Bidder/Supplier fails to perform or fulfill the Contract/ Purchase Order as per the terms and conditions agreed upon, the MDCMPUL is entitled to demand an amount equal to 10% of the Contract value from the Bidder/Supplier and the demand made by the MDCMPUL by itself will be conclusive evidence and proof that the Bidder/Supplier has failed to perform or fulfill his obligations and neither the Bidder/Supplier nor the Bank will be entitled to raise any dispute regarding the reasons for the failure of performance or fulfillment, on any ground.

We, (name of the Bank), do hereby undertake to pay an amount equal to 10% of the order value, being the amount due and payable under this guarantee without any demur, merely on a demand from the MDCMPUL which has to be served on us before the expiry date of Bank Guarantee i.e. --/--/-- stating that the amount claimed is due by way of non-performance of the contractual obligations as aforesaid by the Bidder/Supplier or by reason of the Bidder/Supplier's failure to perform the said contractual commitments/Purchase Order, any such demand made on the Bank shall be conclusive as regards the amount due and payable by the Bank under this guarantee. However, our liability under this guarantee shall be restricted to an amount not exceeding Rs -- (Rupees _ only) being the amount equal to 10% of the total order value.

We, (name of the Bank), further, agree that the performance guarantee herein contained shall remain in full force and effect for a period of -- calendar months from the date of Bank guarantee (the period should be till end of warranty period) and till the MDCMPUL certifies that

the terms and conditions of the said contract/ purchase order have been fully and properly carried out by the said Bidder/Supplier and accordingly discharge the guarantee, unless a demand or claim under this guarantee is made on us in writing by the MDCMPUL on or before _ , we shall be discharged from all liabilities under this performance guarantee thereafter.

We, (name of the Bank), further agree with the MDCMPUL that the MDCMPUL shall have the fullest liberty without our consent and without affecting in any manner our obligations hereunder to vary any of the terms and conditions of the said Bidding Document and the Contract/Purchase order or to extend the time of performance by the said Bidder/Supplier from time to time or postpone for any time or from time to time and any of the power exercisable by the MDCMPUL against the Bidder/Supplier and to forebear or enforce any of the terms and conditions relating to the said Bidding Document and the Contract/Purchase Order and we shall not be relieved from our liability by reason of any such variation, or extension being granted to the said Bidder/Supplier, or for any forbearance, act or omission on the part of the MDCMPUL to the said Bidder/Supplier by any such matter or thing whatsoever which under the law relating to sureties would but for this provision have effect of so relieving us.

This guarantee shall be in addition to and without prejudice to any other securities or remedies which the MDCMPUL may have or hereafter possess in respect of the goods supplied or intended to be supplied and the MDCMPUL shall be under no obligation to marshal in favour of the Bank any such securities or funds or asset that the MDCMPUL may be entitled to receiving or have a claim upon and the MDCMPUL at its absolute discretion may vary, exchange, renew, modify or refuse to complete to enforce or assign any security or instrument.

The Bank agrees that the amount hereby guaranteed shall be due and payable to the MDCMPUL on serving us with a notice before expiry of bank guarantee, requiring the payment of the amount and such notice shall be deemed to have been served on the Bank either by actual delivery thereof to the Bank or by dispatch thereof to the Bank by Registered Post at the address of the Bank.

In order to give full effect to the provisions of this guarantee the Bank hereby waives all rights inconsistent with the above provisions and which the Bank might otherwise as a guarantor be entitled to claim and enforce.

We, __, undertake to renew the Bank Guarantee provided the request for the Bidder/Supplier before the expiry of Bank Guarantee makes renewal.

We, __, (Name of the bank) lastly undertake not to revoke this guarantee during its currency except with the previous consent of the MDCMPUL in writing and the guarantee shall be a continuous and irrevocable guarantee up to a sum of Rs __ (Rupees __ only).

Notwithstanding anything stated herein before: (i) our liability under this guarantee is restricted to Rs __ (Rupees _ only) (ii) The Bank Guarantee shall remain in force till __/__/20__ and (iii) The Bank is liable to pay the guarantee amount or any part thereof under this Bank Guarantee only if the MDCMPUL serves upon the bank a written claim or demand on or before __.

Signature

Seal
Code Number

Place: Date:

Notes:

Bidder/Suppliers should ensure that the bankers, before submission of the bank guarantees, put seal and code number of the signatory.

Stamp paper is not required in case of foreign Bidder/Suppliers.

The value of stamp duty should be as per latest stamp act of local state government where the bank guarantee issued.

Contract Form

(On the Non-Judicial Stamp Paper as per the Stamp Act of State Government)

THIS AGREEMENT made the __ day of __ 20__ between Mehsana **District Co-operative Milk Producers' Union Limited.**, Mehsana, (hereinafter "the purchaser") of the one part and __ (hereinafter "the Bidder/Supplier") of the other part.

WHEREAS the Purchaser is desirous that certain goods and ancillary services should be provided by the Bidder/Supplier, viz (brief description of goods and services) and has accepted a bid submitted by the Bidder/Supplier in response to the Purchaser's Bidding Document Reference _____for the supply of those goods and services in the sum of Rs _ (Rupees ___) (hereinafter "the contract price").

NOW THIS AGREEMENT WITNESSETH AS FOLLOWS:

In this agreement words and expressions shall have the same meaning as in the Terms and Conditions mentioned in Section III and Section IV and in other sections in the above-referred Bidding Document. The following documents shall be deemed to form, read and construe as part of this agreement:

- The offer and the price schedule submitted by the Bidder/Supplier and as accepted by the purchaser;
- The schedule of requirement/ list of items and the technical specifications in the above referred Bidding Document;
- The terms and conditions in the above-referred Bidding Document;
- The Purchaser's purchase order Number _____: dated

In consideration of the payments to be made by the Purchaser to the Bidder/Supplier as hereinafter mentioned, the Bidder/Supplier hereby covenants with the Purchase to provide the goods and services and to remedy defects therein in conformity in all respects with the provisions of the Purchaser's purchase Order and Bidding Document.

The Purchaser hereby covenants to pay the Bidder/Supplier in consideration of the provision of the goods and services and the remedying of defects therein, the contract price or such other sum as may become payable under the provisions of the purchase order at the times and in the manner prescribed in the Purchase order and bidding document.

IN WITNESS whereof the parties hereto have caused this agreement to be executed in accordance with their respective laws the day and year first above written.

Signed, sealed and delivered by the authorized signatory for the Purchaser)

In the presence of:

1.

2.

Signed, sealed and delivered by the authorized signatory for the Bidder/Supplier)

In the presence of:

1.

2.

Pro forma of Completion Certificate

(To be issued by the purchaser after successful commissioning of the supplied goods)

Reference Date

Subject: Certificate of commissioning of supplied goods/ PLANT

This is to certify that the plant section as detailed below has been received in good condition along with all the standard and special accessories (subject to short supply mentioned) in accordance with the Contract/ Specifications. The same has been installed and commissioned. The Performance Test has been done to our entire satisfaction and operators have been trained to operate the plant. The Bidder/Supplier has fulfilled his contractual obligations satisfactorily (subject to unfulfilled obligations mentioned)

Completion Certificate		
S N	**Item**	**Description**
1	Contract Number & Dated	
2	Description of the plant	
3	Quantity	
4	Bill of Lading/ AWB (for Import Contract)/ LR/ RR & Dated	
5	Name of the vessel/ transporters	
6	Consignment Note Number & Dated	
7	Name of the consignee	
8	Date of Commissioning & Performance Test	

Details of short supply and recoveries to be made		
SN	**Description**	**Amount to be recovered**
1		
2		

Details of unfulfilled contractual obligations		
SN	**Description**	**Amount to be recovered**
1		
2		

Signature

Name, Designation & Stamp

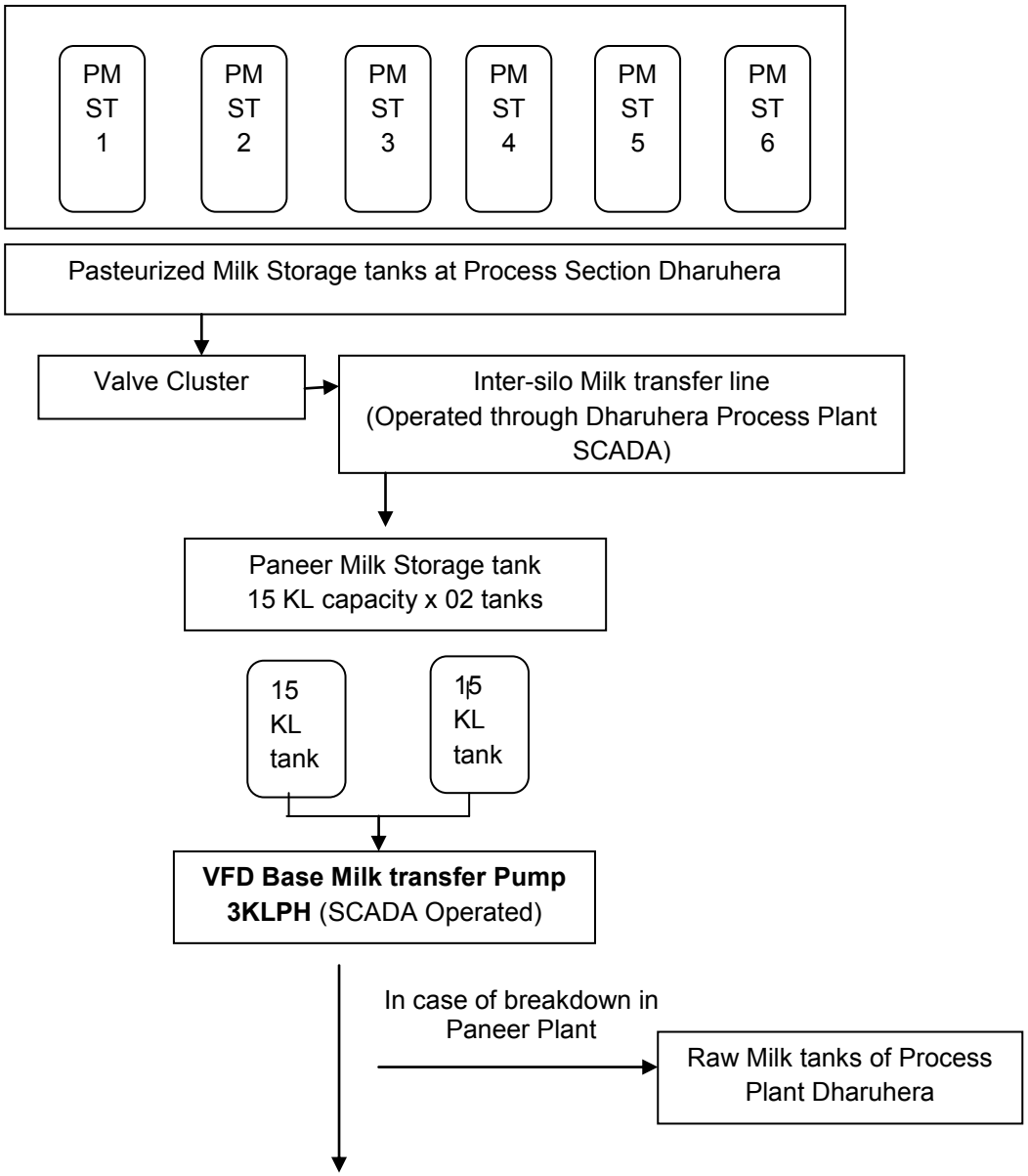
Explanatory Notes for filling up the certificates on contractual obligations of the Bidder/Supplier

- Bidder/Supplier has adhered to the time schedule specified in the contract in dispatching the documents/ drawings pursuant to technical specifications.
- Bidder/Supplier has installed and commissioned the plant in time (within the period specified in the contract) from the date of the intimation by the Purchaser in respect of the installation and commissioning of the units.
- Training of personnel as per contractual obligation by the Bidder/Supplier has been done.
- In the event of documents having not been supplied or installation and commissioning of the plant have been delayed on account of the Bidder/Supplier, the extent of delay should always be mentioned.

********** **END OF TENDER DOCUMENT PART B** **********

PANEER MANUFACTURING PLANT AT DHARUHERA PLANT

CAPACITY: 3 MTPD EXPANDABLE TO 5 MTPD



Regenerative PHE Plate pack 3 KLPH Capacity (PLC SCADA controlled)
6 Sections

1. **PHE 1:** Regenerative section – to heat the milk thorough hot whey
2. **PHE 2 :** To heat the milk to 90 Deg C with hot water (to be designed for heating milk from 4 deg C to 85 deg C) with holding tube for 10 min Hold
3. **PHE 3 :** To cool the heated milk from 90 deg C to 75-78 deg C with the incoming milk for Paner Preparation in Paneer Vat
4. **PHE 4 :** To cool the whey with cooling tower water
5. **PHE 5 :** To cool the whey from 35 deg C to 4 deg C with chilled water.
6. **PHE 6 :** For hot water generation through steam heating

Paneer Vat of 1.5 KL Capacity x 04 Nos.

(Geometric Cap. 2 KL each, Rectangular, insulated Paneer Vat, milk transfer by SCADA, Manual agitation with shovels)

metering Pump, Cap 4000 LPH (SCADA) 1% citric acid dosing timer base

1.5 KL cap Paneer Vat

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2.5 KL

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Citric Acid Solution tank 2.5 KL x 02 tanks, jacketed for steam injection & temp. Controller to maintain 75 deg C

Whey

200 Lit. cap Whey Balance tank

5 KLPH Pump

Paneer Coagulum Collection manually

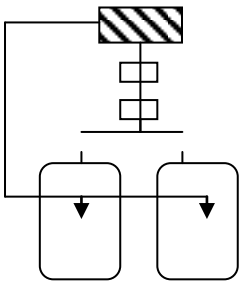
Paneer Hoops
10 Kg capacity Qty: **180 Nos**.
Size: 325 x 329 x 68 mm

Manual transfer through trolleys

Paneer Pressing Station 2 kg/cm sq for 7 min.
6 Stations each head having 4 moulds stacking capacity

Manual transfer through trolleys

Insulated Paneer Block Cooling Vat
2 KL capacity x 02 Nos. for 180 Nos. blocks cooling, Past. Chilled water 2-4 deg circulation to bring from Paneer temp upto 25 °C in 2-2.5 Hrs.



1. Dual Filters for each
2. PHE 5 KLPH
3. UV treatment Unit
4. Ozonization Unit

Blocks De-hooping & transferring to

6 MT capacity Cold store for storage at 4° C, cooling blocks 25 °C to 15° C & overnight storage, for next day packing, (**Freon base standalone cold store)**

Manual transfer through trolleys to Packing Rooms

Whey Chilling to 4 deg C Regenerative PHE as above

Intermediate whey storage tank, 15 KL Cap.

Whey Pasteurizer
(6-30-78-4 C)
5 KLPH Capacity, 93% reg. efficiency (SCADA base)

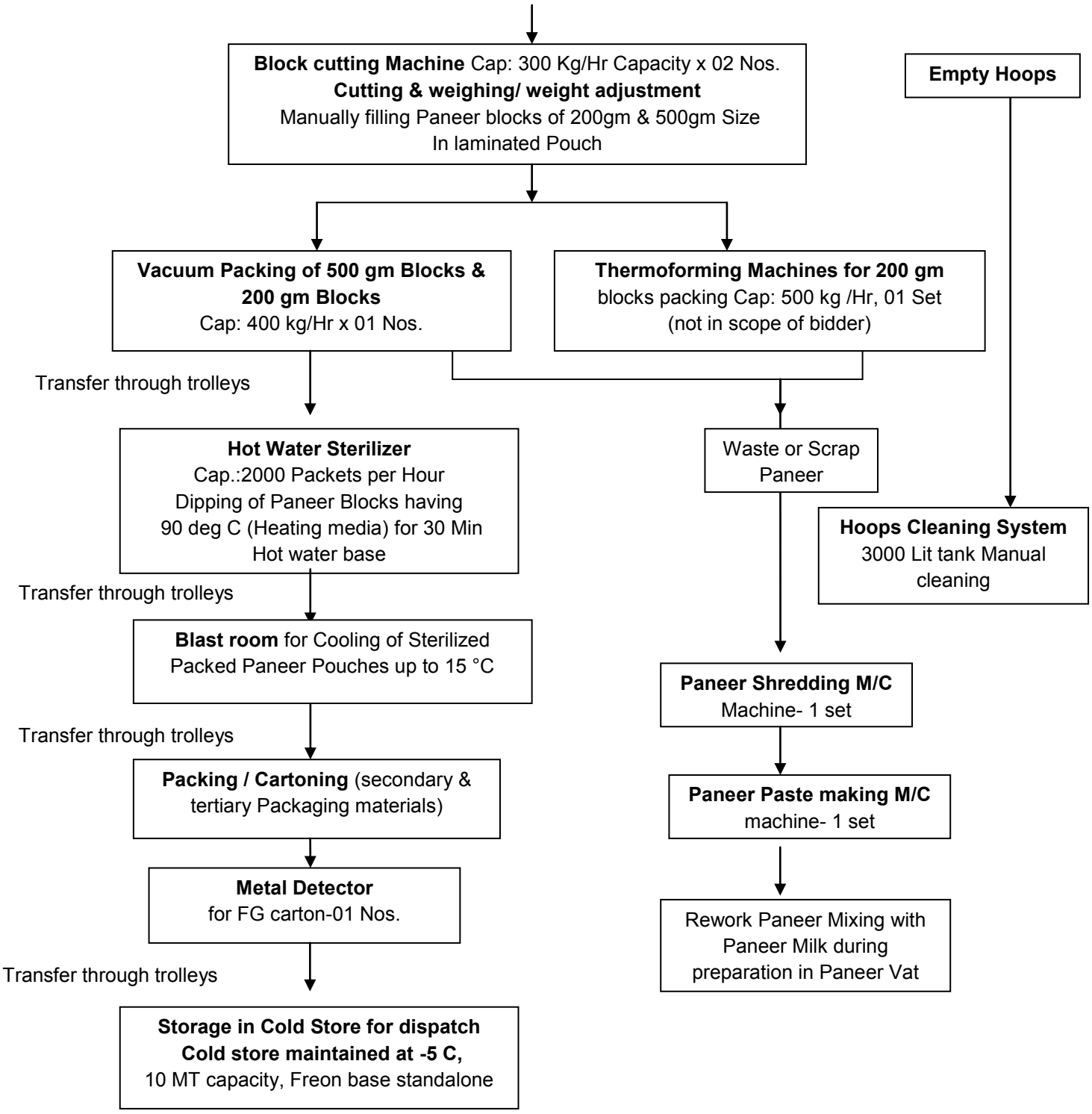
Whey storage tank
15 KL Cap. X 02 Nos,

Whey Chiller
20 KLPH cap.

Butter Milk thermizer
Balance tank

20 KLPH Pump

Whey Dispatch to other Plant through Tanker



Additional:

1. Paneer Plant CIP Kitchen (SCADA base) 3 KL tanks
2. Forced Air Ventilation System in packing room
3. Cooling tower 1 Set for cooling whey
4. Weighing Scales 6 Kg capacity -02 Nos, 2 kg capacity: 06 Nos.
5. Ink Jet Printers -02 Nos for coding secondary Packaging materials

PLC SCADA control envisaged for following Operations:

1. Transferring milk from Process Section silos to Paneer Milk Silos of Paneer Section

2. Paneer Milk transfer to regenerative PHE
3. Milk transfer from PHE set to Paneer Vat
4. Dosing of citric Acid solution
5. Whey Chilling, Storage and dispatch to tanker & transfer to Butter milk thermizer