TENDER DOCUMENT

FOR

Design, Construction/Fabrication,
Supply, Erection, Testing Commissioning, & Guarantee
Trail-Run including All Necessary Civil, Mechanical, Instrumentation & Electrical Works Etc. Complete including Taking Statutory Approvals

For Refrigeration Plant of Capacity-60KLPD

AT
BHUBANESWAR DAIRY

THE ORISSA STATE CO-OPERATIVE MILK PRODUCERS' FEDERATION LTD.
D-2, SAHID NAGAR
BHUBANESWAR -751007

SEPTEMBER-2016 **Cost Rs. - 10000/- +5% vat**

THE ORISSA STATE CO-OPERATIVE MILK PRODUCERS' FEDERATION LTD, D-2, SAHEED NAGAR, BHUBANESWAR, ORISSA.

TELEPHONES :(0674)-2546121, 2544576, 2540417, 546030, 2540273
GRAM: OMFED **FAX: 0674-2506974**
EMAIL: omfed @ yahoo.com web site: www.omfed.com

TENDER FOR:

Design, Construction/Fabrication, Supply, Erection, Testing Commissioning, & Guarantee Trail-Run Including All Necessary Civil, Mechanical, Instrumentation And Electrical Works Etc. Complete Including Taking Statutory Approvals For Expansion of Refrigeration Plant of Capacity-60KLPD .

LOCATION OF DAIRY SITE	**: - Bhubaneswar, Chandrasekharpur Dist – Khurda, Odisha.**
TENDER REFERENCE	**:PROJ/50(B)/Boiler/Refrigeration/15**
DATE OF COMMENCEMENT OF SALE OF BIDDING DOCUMENT	**: - 01.10.2016 TO 25.10.2016 (FROM 1000 Hrs TO 1400 Hrs)**
LAST DATE FOR SALE OF BIDDING DOCUMENT	**: - 25.10.2016 UPTO 1300 Hrs**
LAST DATE AND TIME FOR RECEIPT OF BIDS	**: - 25.10.2016 UPTO 1400 Hrs**
DATE AND TIME OF OPENING OF BIDS	**: -25.10.2016 AT 1500 Hrs**
PLACE OF OPENING OF BIDS	**: -** OFFICE OF THE ORISSA STATE CO-OP.MILK PRODUCERS FED. LTD. D-2, SAHEEDNAGAR, BHUBANESWAR, ODISHA.
ADDRESS FOR COMMUNICATION	**: -** THE ORISSA STATE CO- OP. MILK PRODUCERS' FEDERATION. LTD D-2, SAHEEDNAGAR, BHUBANESWAR-751007 ODISHA, INDIA.

TABLE OF CONTENTS

SECTION - I

www.omfed.com

The Orissa State Cooperative Milk Producers' Federation Ltd.
D-2, Sahid Nagar, Bhubaneswar-751 007.
Ph No- (0674) 2546030/2540273/2540417,
Fax No (0674) 2540974

TENDER NOTICE

OMFED invites sealed techno-commercial offers in separate envelope from experienced manufacturers / authorised suppliers for supply, installation, testing, commissioning & trial run of "**Refrigeration Plant of Capacity-60KLPD**" at Bhubaneswar Dairy, Chandrasekharpur, Bhubaneswar.

Tender document can be down loaded from website **www.omfed.com** against payment of **Rs.10000/- + 5%VAT (or Rs.10,500/-)** in shape of Demand Draft drawn in favour OMFED drawn on any Nationalized bank payable at Bhubaneswar. The tender document should be duly filled & submitted on due date along with the cost of tender paper. Bids with 1% EMD of the quoted value shall be received up to 1400 hours on 25.10.2016 & shall be opened on the same day at 1500 Hrs. at Omfed Corporate Office, D/2, Saheed Nagar, Bhubaneswar – 751007 in presence of interested bidders. Bids without requisite EMD shall not be considered.

Tenderers are requested to visit OMFED website regularly as any corrigendum / addendum may be published in OMFED website and not in any other media/ news papers.

OMFED reserves the right to accept or reject any or all the tenders or part thereof without assigning any reason.

SECTION II

INSTRUCTION TO BIDDERS -:

1.0 GENERAL INFORMATION

1.1 SCOPE OF WORK	:	Design, Construction/Fabrication, Supply, Erection, Testing Commissioning, & Guarantee Test-Run Including All Necessary Civil, Mechanical, Instrumentation And Electrical Works Etc. Complete Including Taking Statutory Approvals **For Refrigeration Plant of Capacity-60KLPD** **AT** **BHUBANESWAR DAIRY** Chandrasekharpur, Bhubaneswar.Odisha.

1.2 LOCATIONS AND AREA

(A)	Nearest Railway Station	:	Bhubaneswar
(B)	Nearest Airport	:	Bhubaneswar
(D)	Access Roads	:	Pucca

1.3 Period of Completion

The period of completion of work, including supply testing, commissioning, trial run for 30 days, and handing over, shall be **Nine (09) months for Refrigeration plant** from the date of notification of award, which shall include the non-working periods during monsoon and festivals, and the period of commencement.

1.4 IMPORTANT NOTE

i. Period of completion of work is very important for this project. The work has to be carried out strictly as per the work programmer.

ii. The bidders are not allowed to stipulate their own terms & conditions beyond the tender document.
In such case the offer shall not be considered.

2.0 Eligibility and Qualification requirements:-

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2.1 The bidder should have minimum Five years experience in that related field like/supply/installation/Erection & commissioning etc.

2.2 Annual Sales turn over should not to be less than 10 lakhs during the financial year 2012-2013,2013-2014,2014-2015.

3.0 Price basis:

3.1 For supply:

The quoted prices for the equipments shall be on FOR destination basis, inclusive of all taxes, including service taxes, & duties, packing & forwarding charges, transportation, insurance and other incidental charges, loading & unloading charges etc. as applicable. The bidder shall, however, provide a break-up of the prices quoted. "C" forms shall be issued by OMFED, wherever applicable.

Bidders are required to give break up of unit rates & quantities of each & all items to be supplied for the purpose of the contract.

3.2 For erection/installation, testing, commissioning, trial run & handing over:

Bidders shall submit separate rates for complete installation, testing and commissioning, including satisfactory performance trial run for 30 days.

Prices quoted should be on FOR destination basis, inclusive of all taxes & duties, packing & forwarding charges, transportation, insurance and other incidental charges, loading & unloading charges etc. as applicable. The contractor shall be responsible for supply of all sundries / power / fuel as may be required for erection, testing, commissioning & performance trial run for 30 days, including oil and lubricants. However, electrical/ fuel charges during the 30 days period of performance trial run shall be borne by OMFED.

The contractor shall have to create their own storage space for all the equipments & materials and provide watch & ward for it. Insurance of equipments & materials during storage, shifting, installation & testing shall be contractor's responsibility.

4.0 Cost of Bidding

The Bidder shall bear all costs associated with the preparation and submission of its bid, and the Orissa State Cooperative Milk Producers' Federation Limited, hereinafter referred to as "THE OMFED", will in no case be responsible or liable for those costs, regardless of the conduct or outcome of the bidding process.

B. THE BIDDING DOCUMENTS

5.0 CONTENT OF BIDDING DOCUMENTS

5.1 The goods required, bidding procedures and contract terms are prescribed in the bidding documents. In addition to the tender notice, the bidding documents include:

(a) Instruction to bidders;
(b) General Conditions of Contract;
(c) Special Conditions of contract (for Erection works);
(d) Special Conditions of contract (for Mechanical installation);
(e) Special conditions of contract (for Electrical installation);
(f) Technical Specifications and schedule of quantities;
(g) Form of Agreement;
(h) Bid Form;
(i) Schedule of Supp. Information;
(j) Standard Forms of Bank Guarantees;

5.2 The Bidder is expected to examine all instructions, forms, terms and specifications in the bidding documents. Failure to furnish all information required by the bidding documents or submission of a bid not substantially responsive to the bidding documents in every respect will be at the bidder's risk and may result in the rejection of its bid.

6.0 Clarification of Bidding Documents

A prospective Bidder requiring any clarification of the Bidding Documents may notify the OMFED in writing or by Fax or Cable at the OMFED'S mailing address indicated in this document. The OMFED will respond in writing to any request for clarification of the bidding Documents which it receives not later than 15 days prior to the deadline for the submission of bids prescribed by the OMFED. Written copies of the OMFED'S response (including an explanation of the query but without identifying the source of inquiry) will be sent to all prospective Bidders which have received the bidding Documents, and will be attached to the Bidding Documents sold subsequently.

7.0 Amendment of Bidding Documents

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

7.2 The amendment will be notified in writing or by Fax or cable to all prospective Bidders, which have received the Bidding Documents and will be binding on them. The amendment will be attached to the bidding documents sold subsequently.

7.3 In order to afford prospective Bidders reasonable time in which to take the amendment into account in preparing their bids, the OMFED may, at its discretion, extend the deadline for the submission of bids.

8.0 PREPARATION OF BIDS

8.1 DOCUMENTS TO BE SUBMITTED IN THE TECHNICAL BID:

- Audited profit & loss account statement for the year 2012-2013-2014- 2015.
- Proof of sales turn over for last three consecutive years.
- Copy of IT return for the financial year 2013 – 2014-2015.
- Central excise registration number / Service Tax Registration Number..
- TIN / CST No / PAN No.
- Credentials in support of supply of said machineries and installation during last five years.
- Cost of tender paper in shape of Demand Draft only.

8.2 DOCUMENTS TO BE SUBMITTED IN THE COMMERICIAL BID:

- The original bidding document as issued to the bidder signed & sealed in each page by the bidder as a token of having read, understood & accepted the contents, therein.
- Cost of said equipments with details.
- Cost of all incoming / out going cable with all accessories as per actual requirement.
- Installation/commissioning Charges.
- The rate shall include freight, packing, forwarding all taxes including service taxes & duties.
- Demand draft towards EMD@1% of the quoted value.
- The bid form and schedule of quantities**,** provided in the bidding document, completed in accordance with clauses 09 and 10.
- Documentary evidence established in accordance with Clause 11 that the bidder is eligible to bid and is qualified to perform the contract if its bid is accepted.

9.0 Bid form

The Bidder shall complete the bid Form and the schedule of quantities furnished in the Bidding Documents, indicating for the goods to be supplied, a brief description of the goods, quantity and prices.

10.0 Bid Prices

10.1 The bidder shall indicate in the schedule of quantities, provided in this document, the unit prices and total Bid prices of the goods it proposes to supply under the Contract, on FOR destination basis, inclusive of all taxes & duties, packing & forwarding charges, transportation, insurance and other incidental charges, loading & unloading charges etc. as applicable.

10.2 **Bidders shall provide the break-up of their offered prices separately in the following manner**:

(i) The price of the goods, quoted ex-factory, ex-showroom, ex-warehouse or off-the-shelf, as applicable, including all duties and sales and other taxes already paid or payable:

- On the components and raw material used in the manufacture or assembly of goods quoted ex-factory;

Or

- The price of the goods, quoted ex-factory, ex-showroom, ex-warehouse or off-the-shelf, as applicable, including all duties and sales other taxes already paid or payable on the imported goods of foreign origin quoted ex-showroom, ex-warehouse or off-the-shelf.

(ii) Any excise duty, sales and other taxes applicable in India which will be payable on the goods if this contract is awarded;

(iii) Charges for packing and forwarding, inland transportation, insurance and other costs incidental to delivery of the goods to their final destination; and

(iv) The cost of all incidental services required under the contract.

10.3 The bidder's separation of price components in accordance with Para. 10.2 above will be solely for the purpose of facilitating the comparison of bids by the OMFED.

10.4 Fixed Price

Prices quoted by the Bidder shall be fixed during the Bidder's performance of the contract and not subject to variation on any account. A bid submitted with an adjustable price basis for such goods and services will be treated as non-responsive and rejected, pursuant to clause 23.

11.0 Documents Establishing Bidders' Eligibility and Qualifications

11.1 The Bidder shall furnish, as part of its bid, documents establishing the bidder's eligibility to bid and its qualifications to perform the contract if its bid is accepted. The bidder should also give information in the format attached to the Bid document.

11.2 The documentary evidence of the Bidder's qualification to perform the contract if its bid is accepted, shall establish to the OMFED'S satisfaction:

a) That, in the case of a bidder offering to supply goods under the contract which the bidder did not manufacture or otherwise produce, the Bidder has been duly authorized by the goods' manufacturer or producer to supply the goods.

b) That the bidder has the financial, technical and production capability necessary to perform the contract. To this end, all bids submitted shall include the following information along with schedule-I and schedule-II under Section VIII:

i) 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.

ii) Details of experience and past performance of the bidder on equipment offered and on those of similar nature within the past 3 years and details of current contracts in hand and other commitments;

iii) Major items of plant and equipment available/ installed in the Bidder's factory premises;

iv) Qualification and experience of key personnel for successful execution of the contract;

v) Reports on financial standing of the bidder such as profit and loss statements, balance sheets and auditor's report of the past three years, bankers certificates etc;

vi) Information regarding any current litigation in which the bidder is involved.

12.0 <u>Documents Establishing Goods' Eligibility and Conformity to Bidding Documents</u>

12.1 The bidder shall furnish, as part of its bid, documents establishing the eligibility and conformity to the Bidding Documents of all goods and services, which the bidder proposes to supply under the contract.

12.2 The documentary evidence of the goods and services conformity to the bidding documents may be in the form of literature, drawing and data, and shall furnish:

(a) A detailed description of the goods' essential technical and performance characteristics.

(b) 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 OMFED: and

(c) A clause-by-clause commentary on the OMFED'S technical specification demonstrating the goods' and services' substantial responsiveness to those specifications or a statement of deviations and exceptions to the provisions of the technical specification.

12.3 For purposes of the commentary to be furnished pursuant to Clause12.2 (c) above, the Bidder shall note that standards for workmanship, material and equipment, and references to brand names or catalogue numbers designated by the OMFED in its Technical specifications are intended to be descriptive only and not restrictive**. The Bidder may substitute alternative standards, brand names and/ or catalogue numbers in its bid, provided that it demonstrates to the OMFED'S satisfaction that the substitutions are substantially equivalent or superior to those designated in the Technical specifications.**

13.0 Bid Security (Earnest Money Deposit)

13.1 Pursuant to clause 8, the Bidder shall furnish, as part of its bid, **bid security of 1% (one percent) of the total bid value.**

13.2 The bid security is required to protect the OMFED against the risk of bidder's conduct, which would warrant the security's forfeiture, pursuant to para.13.7.

13.3 The bid security shall be in one of the following forms:

(a) A Bank guarantee issued by a Nationalised bank located in India in the form provided in the Bidding Documents, and valid for 30 days beyond the validity of the bid, or

(b) A demand draft in favour of ORISSA STATE CO-OPERATIVE MILK PRODUCERS' FEDERATION LTD., Payable at Bhubaneswar.

13.4 Any bid not secured in accordance with para"s. 13.1 and 13.3 will be rejected by the OMFED as non-responsive.

13.5 Unsuccessful bidder's 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.

13.6 The successful Bidder's bid security will be discharged upon the bidders executing the agreement, pursuant to clause 32, and furnishing the performance security, pursuant to clause 34.

13.7 The bid security may be forfeited:

(a) If a bidder withdraws its bid during the period of bid validity specified by the bidder on the bid form; or

(b) In the case of successful bidder, if the bidder fails;

i. To sign the contract in accordance with clause 31

Or

ii. To furnish performance security in accordance with clause 32.

14.0 Period of validity of bids

14.1 Bids shall remain valid for 90 days after the date of bid opening, stated in the cover page/ tender notice. A bid valid for a shorter period may be rejected by the OMFED as non-responsive.

14.2 In exceptional circumstance, the OMFED may solicit the bidders' consent to an extension of the period of validity. The request and the responses thereto shall be made in writing or by Cable or Fax. The bid security provided under clause-13 shall also be suitably extended. A bidder may refuse the request without forfeiting its bid security. A bidder granting the request will not be required nor permitted to modify its bid.

15.0 Format and signing of bid

15.1 The original bid shall be typed or written in indelible ink and shall be signed by the bidder or a person or persons duly authorised to bind the bidder to the contract. The latter authorization shall be indicated by written power-of-attorney accompanying the bid. All pages of the bid, except for unamended printed literature, shall be initialed by the person or persons signing the bid.

15.2 The bid shall contain no interlineations, erasures or overwriting except as necessary to correct errors made by the bidder, in which case corrections shall be initialed by the person or persons signing the bid.

D. Submission of bids

16.0 Sealing and marking of bids

16.1 The bidders shall seal the original bidding document, along with all relevant documents & drawings, in an envelope.

16.2 The envelope shall:

(a) Be addressed to the OMFED at the following address:

ORISSA STATE CO-OPERATIVE MILK PRODUCERS' FEDERATION LTD., D-2, Sahid Nagar, Bhubaneswar – 751007.

(b) Bear the Tender Reference No., Name of work & Date of opening.

(c) Indicate the name and address of the bidder.

16.3 If the outer envelope is not sealed and marked as required by Para. 16.2, The OMFED will assume no responsibility for the bid's misplacement or premature opening. A bid opened prematurely for this cause will be rejected by the OMFED.

16.4 The bidders shall submit the "Eligibility and post-qualification application "along with the bid.

17.0 Deadline for submission of bids

17.1 Bids must be received by the OMFED at the address specified in cover page / tender notice not later than the date and time specified for receipt of the bids as indicated in cover page / tender notice.

17.2 The OMFED may, at its discretion, extend this deadline for the submission of bids by amending the bidding documents in accordance with Para 7, above in which case all rights and obligations of the OMFED and bidders previously subject to the deadline will thereafter be subject to the deadline as extended.

18. Late bids

Bids received after the deadline for submission of bids will be rejected or returned unopened to the bidder. OMFED shall not bear any responsibility for late delivery of bids submitted by post.

19. Modification and withdrawal of bids

19.1 The bidder may modify or withdraw its bid after the bid's submission, provided that written notice of the modification or withdrawal is received by the OMFED prior to the deadline prescribed for submission of bids.

19.2 The bidder's modification or withdrawal notice shall be prepared, sealed, marked and submitted in accordance with the provisions of Para 16. A withdrawal notice may also be sent by Fax or cable but followed by a signed confirmation copy, post marked not later than the deadline for submission of bids.

19.3 No bid may be withdrawn in the interval between the deadline for submission of bids and the expiration of the period of bid validity. Withdrawal of a bid during this interval shall result in the bidder's forfeiture of its bid security.

E. BID OPENING AND EVALUATION

20.0 Opening of Bids by OMFED

20.1 The OMFED will open bids, in the presence of bidders' representatives who choose to attend, at the time and date specified in the Tender notice, at the office of the ORISSA STATE CO-OPERATIVE MILK PRODUCERS' FEDERATION LTD., D-2, Sahid Nagar, Bhubaneswar-751007, Orissa, India. The Bidders representatives who are present shall sign attendance sheet evidencing their presence during the bid opening.

20.2 The Bidders' names, bid prices, modifications, bid withdrawals and the presence or absence of the requisite bid security and such other details as the OMFED, at its discretion, may consider appropriate will be announced at the opening.

21.0 Clarification of bids

21.1 To assist in the examination, evaluation and comparison of bids the OMFED may, at its discretion, ask the Bidders for a clarification of its bid. The request for clarification and the response shall be in writing.

22.0 Preliminary Examination

22.1 The OMFED 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, and whether the bids are generally in order.

22.2 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. If there is a discrepancy between words and figures, the amount in words will prevail. The total price shall be corrected accordingly. If the bidder does not accept the correction of the errors, its bid will be rejected.

22.3 Prior to the detailed evaluation, pursuant to Para 23, the OMFED will determine the substantial responsiveness of each bid to the bidding documents. For purposes of these clauses, a substantially responsive bid is one, which conforms to all the terms and conditions of the bidding documents without material deviations. The OMFED'S determination of a bid's responsiveness is to be based on the contents of the bid itself.

22.4 A bid determined as not substantially responsive will be rejected by the OMFED.

22.5 The OMFED may waive any minor informality or non-conformity 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.

23.0 Evaluation and Comparison of Bids

23.1 The OMFED will evaluate and compare the bids previously determined to be substantially responsive, pursuant to Para 22. However, bidders are allowed the option to offer discounts. The discounts will be taken into account in the evaluation of bids so as to determine the bid offering the lowest evaluated cost for the OMFED in deciding award.

23.2 The comparison shall be on FOR site basis, (such price to include all costs as well as duties and taxes paid or payable on components and raw material incorporated or to be incorporated in the goods and excise duty payable on finished goods offered) as well as on the cost of installation, testing, commissioning & performing 30 days trial run.

23.3 The OMFED'S evaluation of a bid will take into account, in addition to the bid price and the cost of services including installation, testing, commissioning, performance trial run & handing over, the following factors:

(a) Cost of inland transportation, insurance and other costs incidental to delivery of the goods to their final destination including excise duty;
(b) Delivery schedule offered in the bid;
(c) The cost of components, spare parts and service;
The availability in India of spare parts and after sales services for the equipment offered in the bid;
(d) Deviation in payment schedule from that specified in the special conditions of contract;
(e) The quality and adaptability of the equipment offered.

24.0 Contacting the OMFED

24.1 No Bidder shall contact the OMFED on any matter relating to its bid, from the time of the bid, from the time of the bid opening to the time the contract is awarded, unless invited by the OMFED for discussions / clarifications.

24.2 Any effort by a bidder to influence the OMFED in the OMFED'S bid evaluation, bid comparison or contract award decisions shall result in the rejection of the Bidder's bid.

F. AWARD OF CONTRACT

25.0 Post-qualification

25.1 In the absence of pre-qualification, the OMFED will determine to its satisfaction whether the bidder selected as having submitted the lowest evaluated responsive bid is qualified to satisfactorily perform the contract.

25.2 The determination will take into account the Bidder's financial, technical and production capabilities. It will be based upon an examination of the documentary evidence of the bidder's qualifications submitted by the bidder, as well as such other information as the OMFED deems necessary and appropriate including details of experience and records of past performance. The OMFED may also inspect the works of the bidder to satisfy itself regarding the capability of the bidder.

25.3 An affirmative determination will be a prerequisite for award of the contract to the Bidder. A negative determination will result in rejection of the Bidder's bid, in which event; the OMFED will proceed to the next lowest evaluated bid to

make a similar determination of that Bidder's capabilities to perform satisfactorily.

26.0 AWARD CRITERIA

The OMFED will consider award of contract to the successful bidder whose bid have been determined to be substantially responsive and have been determined as the lowest evaluated bid, pursuant to Para 23 and 25 & who is determined to be qualified to satisfactorily perform the contract.

27.0 OMFED'S RIGHT TO VARY QUANTITES AT TIME OF AWARD.

The OMFED reserves the right at the time of award or performance of the contract, to increase or decrease by up to 15 (fifteen)% the quantity of goods and services specified in the schedule of requirements without any change in unit price or other terms and conditions.

28.0 OMFED'S Right to Accept Any Bid and to reject Any or All Bids

The OMFED 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 or bidders or any obligation to inform the affected bidder or bidders of the grounds for the OMFED'S action.

29.0 Notification of Award

29.1 Within the period of bid validity, the OMFED will notify the successful bidder in writing by registered letter or by cable/ telex/ 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's furnishing of performance security, the OMFED will promptly notify each unsuccessful bidder and will discharge its bid security.

30.0 Signing of Agreement

Within 15 days of receipt of the notification of award, the successful bidder shall prepare & sign the agreement, in the format provided in this bidding document, and send the same to the OMFED along with a duplicate copy. The original contract form shall be retained by the OMFED, & a duplicate copy of the same shall be sent to the contractor, after it has been signed and dated.

Performance Security

31.1 Within 15 days of receipt of the notification of award from the OMFED, the successful bidder shall furnish the performance security deposit in accordance with clause 6 of the general conditions of contract, either in the form of a Bank guarantee valid for 15 months from the expected date of completion of contract (as per the performance security form provided in the bidding document) or in the form of demand draft of required value in favour of OMFED, payable at Bhubaneswar.

31.2 Failure of the successful bidder to comply with the requirement of Para 30 or Para 31 shall constitute sufficient grounds for the annulment of the award and forfeiture of the bid security, in which event the OMFED may make the award to the next lowest evaluated bidder or call for new bids.

31.0 IMPORT LICENCE

No import license shall be provided by the OMFED for goods offered against this bid.

SECTION III.
GENERAL CONDITIONS OF CONTRACT

1. Definitions

1.1 In this contract, the following terms shall be interpreted as indicated.

(a) "The contract" means the agreement entered into between the OMFED and the contractor, as recorded in the contract form signed by the parties, including the notification of award, all attachments and appendices thereto and all documents incorporated by reference therein;

(b) "The contract price" means the price payable to the contractor under the contract for the full and proper performance of its contractual obligations;

(c) "The goods" means all of the equipment, machinery, and/or other materials which the contractor is required to supply to the OMFED under the contract;

(d) "Services" means services ancillary to the supply of the goods, such as transportation and insurance, and any other incidental services, such as installation, testing, commissioning, performance trial run for 30 days, provision of technical assistance, training and other such obligations of the contractor covered under the contract;

(e) The OMFED" means the organization purchasing the goods and services under the contract i.e. ORISSA STATE COOPERATIVE MILK PRODUCERS' FEDERATION LTD.

(f) "The contractor" means the individual(s) or firm(s) supplying the goods under this contract i.e., with which an agreement has been signed by the OMFED for supply of goods & services required elsewhere in this document.

2. APPLICATION

These general conditions shall apply to the extent that they are not superseded by provisions in other parts of the contract.

3. STANDARDS

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 Indian standards.

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 on the date of signing of agreement shall apply, unless otherwise expressly set forth in the contract.

4. Use of Contract and Information

4.1 The contractor shall not, without the OMFED'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 OMFED in connection therewith, to any person other than a person employed by the contractor in the performance of the contract. Disclosure to any such employed person shall be made in confidence and shall extend only so far as may be necessary for purposes of such performance.

4.2 The contractor shall not, without the OMFED'S prior written consent, make use of any document or information enumerated in para.4.1 except for purposes of performing the contract.

4.3 Any document, other than the contract itself, enumerated in Para. 4.1 shall remain the property of the OMFED and shall be returned (in all copies) to the OMFED on completion of the contractor's performance under the contract if so required by the OMFED.

5. PATENT RIGHTS

The contractor shall indemnify the OMFED against all third-party claims of infringement of patent, trademark or industrial design rights arising from use of the goods/services or any part thereof in India.

6.0 PERFORMANCE SECURITY

6.1 Within 15 days of the contractor's receipt of notification of award of the contract, the contractor shall furnish **performance security to the OMFED in the amount of 10% of the contract value, in accordance to clause 31 of the instruction to bidders.**

6.2 The proceeds of the performance security shall be payable to the OMFED as compensation for any loss resulting from the contractor's failure to complete its obligations under the contract.

6.3 The performance security shall be denominated in Indian rupees and shall be in the following form:

a) A Bank guarantee, issued by a Nationalised Bank in India, and in the form provided in the bidding documents.

b) Demand draft in favour of "Orissa State Co-operative Milk Producers' Federation Limited" payable at Bhubaneswar.

Such Bank guarantee shall be valid upto three months after the expiry of the warranty / guarantee period.

6.4 The performance security will be discharged by the OMFED and returned to the contractor not later than 90 days following the date of completion of the contractor's performance obligations, including any warranty / guarantee obligations, under the contract.

6.5 No interest shall be paid on the performance security deposit by the OMFED.

7. Inspection and Tests

7.1 The OMFED or its representative shall have the right to inspect and/or test the goods to confirm their conformity to the contract. The Technical Specifications

shall specify what inspections and tests the OMFED shall notify the contractor in writing of the identity of any representatives, if retained for these purposes.

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

7.3 The inspections and tests may be conducted on the premises of the contractor or its subcontractor(s) / at point of delivery and/or at the good's final destination. Where conducted on the premises of the contractor or its subcontractor(s) / all reasonable facilities and assistance including access to drawings and production data, shall be furnished to the inspectors at no charge to the OMFED. In case of any defects or deficiency notified by the OMFED'S inspection authority, the contractor will rectify and make good the same without delay and not proceed further processing of such items(s) of goods without obtaining approval from the inspection authority.

7.4 Should any inspected or tested goods fail to conform to the specifications/ the OMFED may reject them and the contractor shall either replace the rejected goods or make all alterations necessary to meet specification requirements free of cost to the OMFED.

7.5 The OMFED'S right to inspect, test and, where necessary, reject the goods after the goods' arrival at destination shall in no way be limited or waived by reason of the goods having previously been inspected, tested and passed by the OMFED or its representative.

7.6 Nothing in clause 7 shall in any way release the contractor from any warranty or other obligations under this contract.

8. <u>Packing and Marking</u>

8.1 The contractor 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 handing 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 handing facilities at all points in transit & destination.

8.2 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, required by law, and, subject to clause 18, in any subsequent instructions ordered by the OMFED.

8.3 Each package shall be marked to indicate:

a) Name of the contractor
b) Details of items in the package
c) Name of the consignee
d) Order number
e) Gross/net and tare weights of the item
f) Destination

9. Delivery and documents

9.1 Delivery of the goods shall be made by the contractor for destination, by road.
9.2 The following documents shall be provided by the contractor / contractor:

Original and three copies of:

(I) The contractor's invoice showing order no. Goods description, quantity, unit price, total amount;
(ii) Delivery note/packing list/lorry receipt;
(iii) Manufacturer's/contractor's guarantee certificate;
(iv) Inspection certificate issued by the nominated inspection agency, and the contractor's factory inspection report;
(v) Insurance policy;
(vi) Excise gate pass/octroi receipts, wherever applicable, duly sealed indicating payments made; and
(vii) 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 order. The dispatch particulars including name of transporter, LR no. and date should also be mentioned in the invoice/s.

10. Insurance:

10.1 For supply of equipments:

The manufacturer shall have to arrange **all transit risk insurance warehouse to warehouse basis**, including strike clauses, for an amount equal to 110 % of the FOR destination value of the Goods, valid for a period of not less than 3 months after the expected date of arrival of Goods at destination.

In the event of any damage to/loss of consignment in transit, it will be your responsibility to lodge necessary claims with the carriers/ underwriters and pursue them till settlement. Since the insurance policy will be in our name, if required, we shall give you necessary authorisation letter authorizing you to lodge and pursue claims on our behalf with the carriers/ underwriters. Also you shall have to make good the losses/ damages occurred in transit by making replacement /payment to us in the first instance and if claims are settled by the underwriters and any amounts are realized by us, the amounts thus realized in settlement of claims shall be reimbursed to you. In other words, the prima facie responsibility rests on you for getting compensation of the damage/losses incurred if any, due to all transit hazards.

10.2 During storage at site:

The contractor shall arrange for insurance of all items stored/ received at the site including the items of supply covered under this contract & the contractor shall furnish necessary details of such insurance to the OMFED, on demand. Any default on the part of the contractor due to which any item does not get covered under insurance; the consequential losses shall be charged to the contractor.

The contractor shall arrange for insurance of all the items brought by him to the site for use during the execution of the contract, till handing over of the complete job.

11. Transportation

The contractor is required to deliver the Goods FOR Destination, by road. Transport of the goods to the destination shall be arranged through a reputed and Bank approved transporter having local offices at destination and Bhubaneswar, and shall be paid for by the contractor.

12. Incidental services

12.1 The contractor is required to provide the following services:

a) Performance of on-site assembly, installation, hooking-up to existing system, Start-up, testing, commissioning, performance trial run for a period of 30 days and handing over of the supplied goods;

b) Furnishing of tools & tackles required for assembly and maintenance of the supplied goods;

c) Furnishing of a detailed operations and maintenance manual for each appropriate unit of the supplied goods;

d) Operation, maintenance and repair of the supplied goods for a period of 30 days, provided that this service shall not relieve the contractor of any warranty obligations under this contract; and

e) Conduct of training of the OMFED'S personnel, on-site, in assembly, start-up operation, maintenance and repair of the supplied goods, if required.

12.2 Prices charged by the contractor for the preceding incidental services are to be included in the price of the contract.

13. Spare parts

13.1 The contractor may be required to provide any or all of the following materials and notifications pertaining to spare parts manufactured or distributed by the contractor:

a) Such spare parts as the OMFED may elect to purchase from the contractor, provided that this election shall not relieve the contractor of any warranty obligations under the contract; and

b) In the event of termination of production of the spare parts:

(i) Advance notification to the OMFED of the pending termination, in sufficient time to permit the OMFED to procure its needed requirements; and
(ii) Following such termination, furnishing at no cost to the OMFED, the blueprints, drawings and specifications of the spare parts, if and when requested.

13.2 Contractors 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 six months of placement of order.

13.3 The obligation of contractor stated in Para 13.1 shall continue even after expiry of the contract.

14. Warranty / guarantee

14.1 The contractor warrants that the goods supplied 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 contractor further warrants that the goods supplied under this contract shall have no defect arising from design, material of workmanship or from any act or omission of the contractor that may develop under normal use of the supplied goods in the conditions. The contractor also guarantees that the goods supplied shall perform satisfactorily as per the designed/rated/ installed capacity as provided for in the contract.

14.2 This warranty / guarantee shall remain valid for 12 months after the goods, or any portion thereof as the case may be, have been delivered, commissioned & handed over to the OMFED after the performance of 30 days trial run period.

14.3 The OMFED shall promptly notify the contractor in writing of any claims arising under this warranty.

14.4 Upon receipt of such notice, the contractor shall, with all reasonable speed, repair or replace the defective goods or parts thereof, without costs to the OMFED.

14.5 If the contractor, having been notified, fails to remedy the defects(s) within a period of 30 days, the OMFED may proceed to take such remedial action as may be necessary, at the contractor's risk and expense and without prejudice to any other rights which the OMFED may have against the contractor under the contract.

14.6 This warranty/ guarantee shall not cover any damage/s resulting from normal wear and tear or improper handing by the OMFED or his authorised representatives.

15. Terms of payment

15.1 For Supply of Equipment.

30% advance on acceptance of the order, signing of agreement, submission of Performance Bank Guarantee as per termsof contract / Purchase Order and against a Bank Guarantee for advance payment from any nationalized bankfor 33% value of the contract / Purchase Order.
60% Payment after safe receipt of materials at site.
Balance payment after commissioning and handed over.

All payments are subject to deduction of statutory dues as applicable.

PSD @10% of the bill value shall be retained & shall be released after one year from the date of handing over subject to satisfactory performance.PSD can be released during retentation period against equivalent amount of Bank guarantee.

15.2 <u>For Erection component</u>.

i. Advance payment: 10 % of the contract price shall be paid within 30 days of signed of contract, on submission of claim and a Bank guarantee for a value of 12 % of the contract price valid until the goods are delivered. 75% payment on progress of erection.

ii. On final acceptance: the remaining 15 % of the contract price shall be paid on continuous satisfactory commissioning and one month performance test run of the complete plant and on acceptance of the same by the OMFED.

NOTES-:

i) For all the payments to be made against Bank guarantees, the bank guarantee shall be issued by a nationalized bank located in India.

ii) The bank guarantee for the 10 % advance payment is sought for value of 12% to cover the interest on advance in the event of cancellation of the contract due to default of the contractor in performance of the contract.

iii) Contracts valued at Rs.100,000/- and below are not eligible for advance payment.

iv) Bank guarantees, for 10 % advance payment, shall be released not later than 30 days after the date of delivery of the goods at their final destination.

15.3 The contractor's request(s) for payment shall be made to the OMFED 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 upon fulfillment of other obligations stipulated in the contract.

16. <u>Fixed prices</u>

Prices charged by the contractor for goods delivered and services performed under the contract shall not, vary from the prices quoted by the contractor in its bid.

17. <u>Change orders</u>

17.1 The OMFED may, at any time, by a written order given to the contractor, pursuant to clause 31, make changes within the general scope of the contract in any one or more of the following:

(a) Drawings, designs or specifications, where goods to be furnished under the contract are to be specifically manufactured for the OMFED;

(b) The method of shipment or packing;

(c) The place of delivery; or

(d) The services to be provided by the contractor.

17.2 If any such change causes an increase or decrease in the cost of, or the time required for, the contractor'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, provided that such claims by contractor are reasonable & to the satisfaction of the OMFED. Any claims by the contractor for adjustment under this clause must be asserted within thirty (30) days from the date of the contractor's receipt of the OMFED's change order.

18. Contract Amendment

Subject to clause 17, no variation in or modification of the terms of the contract shall be made except by written amendment signed by the OMFED.

19. Assignment

The contractor shall not assign, in whole or in part, its obligations to perform under the contract, except with the OMFED'S prior written consent.

20. Subcontracts

The contractor shall notify the OMFED in writing of all subcontracts awarded under the contract if not already specified in his bid, such notification, in his original bid or later, shall not relived the contractor from any liability or obligation under the contract.

21.0 Delays in the contractor's performance

21.1 Deliveries in the goods and performance of services shall be made by the contractor in accordance with the time schedule specified by the OMFED, in Section –I of the bidding documents.

21.2 An unexcused delay by the contractor in the performance of its delivery obligations shall render the contractor 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.

21.3 If at any time during performance of the contract, the contractor or its subcontractor(s) should encounter conditions impending timely delivery of the goods and performance of services. The contractor shall promptly notify the OMFED in writing of the fact of the delay, its likely duration and its cause (s). As soon as practicable after receipt of the contractor's notice, the OMFED shall evaluate the situation and may at its discretion extend the contractor's time for performance, in which case the extension shall be notified to the contractor by amendment of the contract.

22.0 Time for completion

Subject to any requirement in the contract as to completion of any section of the works before completion of the whole, the whole of the works shall be completed, within the time stated in section–I of the bidding documents or such extended time as may be allowed under clause 23 hereof.

23.0 Extension of Time of Completion

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

24.0 Penalty for Delay

24.1 If the contractor shall fail to achieve completion of the works within the specified time, then the contractor shall pay to the OMFED the sum at the rate of 0.5 % (half percent) of the total value of work done under the contract, as a penalty, for every week or part of the week which shall elapse, between the time prescribed & the date of certified completion of the work. The OMFED may without prejudice to any other method of recovery, deduct the amount of such penalty from any payment in its hands, due or which may become due to the contractor. The payment or deduction of such penalty shall not relieve the contractor from obligations to complete the works, or from any other of his obligations and liabilities under the contract.

24.2 The aggregate maximum of the penalty for delay payable to the OMFED under this clause shall be subject to a maximum of 10 % of the total value of work.

24.3 The criteria for deriving the penalty for delay shall be the actual value of works executed and the amended time of completion.

24.4 Any incremental taxes and levies due to the delay in the performance of the contract by the contractor shall be to the contractor's account.

25. Termination for default

25.1 The OMFED may, without prejudice to any other remedy for breach of contract, by written notice of default sent to the contractor, terminate the contract in whole or in part,

(a) If the contractor fails to delivery an or all the goods within the time period (s) specified in the contract, or any extension thereof granted by the OMFED pursuant to clause 17, 21, & 22;

Or

(b) If the contractor fails to perform any other obligation(s) under the contract.

25.2 In the event the OMFED terminates the contract in whole or in part, pursuant to Para. 25.1, the OMFED may procure, upon such terms and in such manner, as it deems appropriate, goods similar to those undelivered, and the contractor shall be liable to the OMFED for any excess costs for such similar goods. However, the contractor shall continue performance of the contract to the extent not terminated.

25.3 Consequent to such termination of contract, the OMFED shall recover the advance paid, if any, to the contractor 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 contractor.

26. Force Majeure

26.1 Not withstanding the provisions of clauses hereof, the contractor shall not be liable for forfeiture of its performance security, liquidated damages or termination for default, if and to the extend that, its delay in performance or other failure to perform its obligations under the contract is the result of an event of force majeure.

26.2 For purposes of this clause, “force majeure” means an event beyond the control of the contractor and not involving the contractor’s fault or negligence and not foreseeable. Such events may include, but are not restricted to, acts of the OMFED either in its sovereign or contractual capacity, wars or revolutions, fires, floods, epidemics, quarantine restrictions and freight embargoes.

26.3 If a force majeure situation arises, the contractor shall notify the OMFED in writing of such condition and the cause thereof, within 7 days. Unless otherwise directed by the OMFED in writing, the contractor 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.

27.0 Termination for Insolvency

The OMFED may at any time terminate the contract by giving written notice to the contractor, without compensation to the contractor, if:

(a) The contractor becomes bankrupt or otherwise insolvent,

(b) The contractor 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 OMFED.

28.0 Termination for Convenience

28.1 The OMFED, may by written notice sent to the contractor, terminate the contractor, in whole or in part, at any time for its convenience. The notice of termination shall specify that termination is of the OMFED’S convenience, the extent to which performance of work under the contract is terminated, and the date upon which such termination becomes effective.

28.2 The goods that are complete and ready for shipment within 30 days after the contractor’s receipt of notice of termination shall be purchased by the OMFED at the contract terms and prices. For the remaining goods, the OMFED may elect:

(a) To have any portion completed and delivered at the contract terms and prices; and /or

(b) To cancel the remainder and pay to the contractor an agreed amount for partially completed goods and for material and parts previously procured by the contractor.

29.0 Settlements of Disputes

29.1 If the contractor considers any work demanded of him to be outside the requirements of the contract, or considers any drawings, record or ruling of the engineer on any matter in connection with or arising out of the contract or the carrying out of the work to be unacceptable, he shall promptly ask the engineer in written instructions or decision. There upon the engineer shall give his written instructions or decision within a period of fifteen days of such request.

29.2 Upon the receipt of the written instructions or decisions the contractor shall promptly proceed without delay to comply with such instructions or decisions.

29.3 If the engineer fails to give his instructions or decisions in writing within a period of fifteen days after being requested, or if the contractor is dissatisfied with the instructions and decisions, he shall appeal to the OMFED, which shall afford an opportunity to the contractor to be heard and to offer an evidence in

support of his appeal. The OMFED shall give a decision within a period of thirty days after the contractor has given the said evidence in support of his appeal.

29.4 If the contractor is dissatisfied with this decision, the contractor within a period of thirty days from the receipt of the decisions shall indicate his intension to refer the dispute to arbitration, failing which the said decision shall be final and conclusive.

30.0 Arbitration

All disputes or differences in respect of which the decision is not final and conclusive shall, on the initiative of either party, be referred for adjudication as per the Arbitration And Conciliation Act 1996

31.0 Applicable law

The contract shall be interpreted in accordance with the laws of the union of India.

32. Notices

32.1 Any notice given by one party to the other pursuant to the contract shall be sent in writing or by telegram/ fax/ cable and confirmed in writing to the address specified for that purpose in the special conditions of contract.

32.2 A notice shall be effective when delivered or on the notice's effective date, which ever is later.

33. 0 Taxes and Duties

The contractor shall be entirely responsible for all taxes, duties, license fees etc. incurred until handing over of the contractor goods and services to the OMFED. All Government fees paid for inspections and approvals by statutory authorities shall be reimbursed by the OMFED on production of copy of treasury Challan for same. Service charges for depositing the govt. fees or submission of requisite forms with the statutory authorities shall be not being admissible.

32.0 Right of use defective equipment

If after handing over of the equipments and within the guarantee and warranty period, the operation or use of the equipment(s) proves to be unsatisfactory, the OMFED shall have the right to continue to operate or use such equipment

Until rectifications of defects errors or omissions by repair or partial or complete replacement is made, without interfering with the OMFED'S operation.

35.0 Jurisdiction

For the settlement of any dispute arising out of the contract against this bid, only the courts at Bhubaneswar shall have jurisdiction.

SECTION-IV

SPECIAL CONDITIONS OF CONTRACT

ERECTION & COMMISSIONING OF EQUIPMENT

1.0 Sufficiency of Tender

The contractor by bidding shall be deemed to have satisfied himself as to all the conditions and circumstances affecting the contract price, as to the possibility of executing the works as shown and described in the contract, as to the general circumstances at the site of the works, as to the general labour position at site, and to have determined the prices accordingly.

2.0 Programme of installation and commissioning.

Within 30 days of receipt of letter of acceptance of the bid, the contractor shall submit to the OMFED for approval a comprehensive programme in the form of PERT Network / bar chart and any other form as may be required by the OMFED showing the sequence of order in which the contractor proposes to carry out the works including the design, manufacture, delivery to site, erection, hooking–up, commissioning, trial run & hand-over, thereof. After submission to and approval by the OMFED of such programme, the contractor shall adhere to the sequence of order and method stated therein. The submission to and approval by the OMFED of such programme shall not relive the contractor of any of his duties or responsibilities under the contract. The programme approved by the OMFED shall form the basis of evaluating the pace of all works to be performed by the contractor. The contractor shall update the PERT network every month, submit it to the OMFED and shall inform the OMFED the progress on all the activities falling on schedule for the next reporting date.

3.0 Preparations of drawings for approval

The contractor should visit the site to acquaint himself in respect of existing site conditions and to know the details/ information required for understanding the nature and type of civil construction works involved in the project.

The contractor shall submit to the OMFED for approval:

a) Within the time given in the specification or in the programme, such drawings, samples, patterns and models as may be called for therein, and in numbers therein required.

b) During the progress of works and within such reasonable times as the OMFED may required such drawings of the general arrangement and detailed of the works as the OMFED may require.

The specifications/conditions concerning the submission of drawings by the contractor are detailed as under:

Within four weeks from the date of receipt of the order, contractor shall furnish all necessary drawings, in three sets, (as briefly described below) for

approval, identifying each drawing by a serial number and descriptive title. The list given below may be revised and extended if necessary, during the progress of work depending on the nature of the contract also.

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

Brief list of drawings:

i) Equipment drawings for fabricated items.

ii) Service piping layout in production and service blocks.

iii) Electrical cable, conduit/cable tray layout.

iv) Other miscellaneous drawings as required for erection work.

Drawings showing fabrication details, dimensions, layouts and bill of materials submitted for approval shall be signed by responsible representative of contractor and shall be to any one of the following sizes in accordance with Indian standards: AO, A1, A2, A3, and A4.

All drawings shall show the following particulars in the lower right hand corner in addition to contractor's name:

i) Name of the OMFED

ii) Project title

iii) Title of drawing

iv) Scale

v) Date of drawing

vi) Drawing number

vii) Space for OMFED'S drawing number.

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 up-dated.

All dimensions on drawings shall be in Metric Units.

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

Drawing prepared by the contractor and approved by the OMFED shall be considered as a part of the specification. However, the examination of the drawings by the OMFED shall not relieve the contractor of his responsibility for engineering design, workmanship, and quality of materials, warranty obligations and satisfactory performance of equipments, services & installation covered under the contract.

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

4.0 Operation and maintenance manual:

The contractor shall furnish to the OMFED before the works are taken over, operating and maintenance instruction together with drawings of the works as completed, in sufficient detail to enable the OMFED to maintain, dismantle, reassemble and adjust all parts of the works, unless otherwise agreed, the works shall not be considered to be completed for the purposes of taking over until such instruction and drawing have been supplied to the OMFED.

5.0 Contractor's superintendence and deployment of erection team and conduct of personnel

The contractor shall employ one or more competent representatives, whose name or names shall have previously been communicated in writing to the OMFED by the contractor, 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 OMFED may give to the said representative of the contractor shall be deemed to have given to the contractor.

The said representative shall have full technical capacities and complete administrative and financial powers to expeditiously and efficiently execute the work under the contract.

The contractor shall, execute the works with due care and diligence within the time for completion and employ contractor'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 contractor shall ensure adequate work force to keep the required pace at all times as per the schedule of completion. The contractor shall also ensure availability of competent engineers during commissioning / start up, trial runs, operation of the plant / equipment till handing over of the plant.

The contractor 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.

When the contractor or his 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 OMFED 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 OMFED shall be deemed to have been given to the contractor.

The contractor shall furnish to the OMFED a fortnightly labour force report showing by classifications the number of employee engaged in work. The contractors' employment records shall include any reasonable information as may be required by the OMFED. The contractor should also display necessary information as may be required by statutory regulations, and shall comply with all statutory obligations as required under the prevailing rules of the state & country.

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

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

In the execution of the works no persons other than the contractor, sub-contractor and their employees shall be allowed on the site except by written permission of OMFED.

6.0 OMFED'S Instructions

The OMFED may in his absolute discretion, issue from time to time drawings and/or instructions, directions and clarifications which are collectively referred to as OMFED'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 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 Contractor, which are unacceptable to the OMFED and the substitution of any other material thereof. Removal and/or re-execution of any work erected by the Contractor, which are unacceptable to the OMFED.

Dismissal from the work of any persons employed there upon who shall in the opinion of the OMFED, misconduct himself, or be incompetent or negligent.

Opening up for inspection of any work covered up.

Amending and making good of any defects.

7.0 Rights of the OMFED

7.1 Rights to direct works:

The OMFED shall have the right to direct the manner in which all works under this contract shall be conducted, insofar 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 OMFED.

Whenever in the opinion of the OMFED, the Contractor has made marked departures from the schedule of completion or when circumstances or requirement force such a departure from the said schedule, the OMFED, 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 Contractor.

If in the judgment of the OMFED it becomes necessary at any time to accelerate the overall pace of the plant erection work, the Contractor, when directed by the OMFED, shall cease work at any particular point and transfer Contractor's men to such other point or points and execute such works, as may be directed by the OMFED and at the discretion of the OMFED.

7.2 Right to order modifications of methods and equipment

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

7.3 Right to inspect the work

The OMFED representative shall be given full assistance in the form of the necessary tools, instruments, equipment and qualified operations to facilitate inspection.

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

In the event the OMFED's inspection reveals poor quality of work/materials, the OMFED shall be at liberty to specify additional inspection procedures if required, to ascertain Contractor's compliance with the specifications of erection work.

Even though inspection is carried out by the OMFED or their representatives, such inspection shall not, however, relieve the Contractor of any or all responsibilities as per the contract, nor prejudice any claim, right or privilege which the OMFED may have because of the use of defective or unsatisfactory materials or bad workmanship.

8.0 Contractor's functions

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

The Contractor 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 OMFED.

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

Night work will be permitted only with prior approval of the OMFED. The OMFED may also direct the Contractor 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 Contractor at no extra cost. The Contractor should employ qualified electricians and wiremen for these facilities. In case of Contractor's failure to provide these facilities and personnel, the OMFED has the right to arrange such facilities and personnel and to change the cost thereof to the Contractor, on actual cost basis.

8.1 Third Party Insurance

Before commencing the execution of the works the Contractor, but without limiting his obligations and responsibilities, shall insure against his liability for any material or physical damage, loss or injury which may occur to any property, including that of the OMFED, or to any person, including any employee of the OMFED, or by arising out of the execution of works or in the carrying out of the Contract.

The Contractor shall, produce to the Engineer/OMFED the policy or policies of insurance and the receipts for payment of the current premiums, as and when required.

The terms shall include a provision whereby, in the event of any claim in respect of which the Contractor would be entitled to receive indemnity under the policy being brought or made against the OMFED, the insurer will indemnify the OMFED against such claims and any costs, charges and expenses in respect thereof.

Such insurance shall be for an amount not less than Rs.1, 00,000/- per occurrence, with the number of occurrences unlimited.

8.2 Compensation for accidents or injury

The OMFED 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 Contractor or any sub-Contractor, save and except an accident or injury resulting from any act or default of the OMFED, his agents, or servants. The Contractor shall indemnify and keep indemnified the OMFED against all such damages and compensation, save and except as aforesaid and against all claims, proceedings, costs, charges and expenses whatsoever in respect thereof or in relation thereto.

The Contractor shall insure against such liability with an insurer approved by the OMFED, 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, on demand, produce to the OMFED or OMFED'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-Contractor, the Contractor's obligations to insure as aforesaid under this sub-clause shall be satisfied if the sub-Contractor shall have insured against the liability in respect of such persons in such manner that the OMFED is indemnified under the policy, but the Contractor shall require such sub-Contractor to produce the OMFED or OMFED's representative, on demand, such policy of insurance and the receipt for the payment of the current premium.

8.3 Duties of contractor Vis-à-vis other contractors:

Whenever proper execution of the work under the contract depends on the jobs carried out by some other Contractor, in such cases the Contractor should inspect all such erection and installation jobs and report to the OMFED regarding any defects or discrepancies. The Contractor's failure to do so shall constitute as acceptance of the other Contractor's installation/jobs as fit and proper for reception of Contractor's works.

The Contractor should also report any discrepancy between the executed work and the drawings.

The Contractor shall extend all necessary help/co-operation to other Contractor's working at the site in the interest of the work.

8.4 VARIATIONS

8.4.1 The OMFED 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 Contractor to do and the Contractor shall do any of the following:

(a) Increase or decrease the quantity of any work included in the contract.

(b) Omit any such work.

(c) Change the character or quality or kind of any such work.

(d) Change the levels, lines, position and dimensions of any part of the works, and

(e) 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.

8.4.2 No such variations shall be made by the Contractor without an order in writing of the OMFED. 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 OMFED shall consider it desirable to given any such order verbally, the Contractor shall comply with

such order and any confirmation in writing of such verbal order given by the OMFED, 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 Contractor shall within seven days confirm in writing to the OMFED and such confirmation shall not be contradicted in writing by the OMFED within 14 days, it shall be deemed to be an order in writing by the OMFED.

8.4.3 All extra or additional work done or work omitted by order of the OMFED shall be valued at the rates and prices set out in the contract if in the opinion of the OMFED, the same shall be applicable. If the contract does not contain any rates or prices applicable to the extra or additional work, then suitable rates or prices shall be agreed upon between the OMFED shall fix such rates or prices as shall, in his opinion, be reasonable and proper.

8.4.4 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 OMFED, 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 OMFED and the Contractor. In the event of disagreement of the OMFED shall fix such other rate or price as shall, in his opinion, be reasonable and proper having regard to the circumstances.

Provided also that no increase or decrease under sub-clause 8.4.1 of this clause or variation of rate or price under sub-clause 8.4.2 of this clause 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:

a) By the Contractor to the OMFED of his intention to claim extra payment or a varied rate or price.

Or

b) By the OMFED to the Contractor of his intention to vary a rate or price.

8.4.5 If on certified completion of the whole of the works, it shall be found that a reduction or increase greater than 15 percent 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 agreed between the Contractor and the OMFED or failing agreement, fixed by the OMFED having regard to all material and relevant factors, including the Contractor's site and general overhead costs of the contract.

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

No final or interim claim for payment for any such work or expense will be considered which has not been included in such particulars. Provided always that the OMFED shall be entitled to authorize payment to be made for any such work or expense, notwithstanding the Contractor's failure to comply

with this condition, if the Contractor has, at the earliest practicable opportunity, notified the OMFED in writing that he intends to make a claim for such work.

Note: This clause shall not be applicable for complete turn-key jobs.

8.5 Duties of the Contractor Vis-à-vis the OMFED

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

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

8.6 Preparation of foundation surfaces etc. for Erection of equipments:

Contractor shall carry out final adjustments of foundations, leveling and dressing of foundation surfaces, bedding and grouting of anchor bolts, bed plates etc, required for seating of equipment in proper position. The Contractor seal be responsible for the reference lines and proper alignment of the equipment. However, all minor civil works which form and inseparable part of the installation and erection job like digging trenches for laying of cables, conduits and underground pipes, making cut-outs in walls, floors and ceilings for pipelines, adjustment, leveling, dressing and grouting of foundations, grouting of supports are to be carried out: by the Contractor at no extra cost. The necessary refilling/repairs of these cutouts, pockets and trenches shall be done by the Contractor: The Contractor should arrange for laying the supports, cut-outs, grouting of bolts, etc, when the civil works are in progress, so as to avoid refilling/repair works. The damages occurring to civil and other works are to be made good by the Contractor at Contractor's own costs.

9.0 Supply of tools, tackles and materials

The Contractor shall, at his own expense, provide all the necessary equipment, tools and tackles, haulage power, consumables, lubricants & sundries necessary for effective execution and completion of the works during erection, testing, commissioning & trial run.

10.0 Protection of plant

The OMFED 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 Contractor or any his sub-Contractor's even though such tools and equipment may be furnished, rented or loaned to the Contractor or any of his sub-Contractors. The acceptance and / or use of any such tools and equipment by the Contractor or his sub-Contractor shall be construed to mean that the Contractor accepts all responsibility for and agrees

to indemnify and save the OMFED from any and all claims for said damages resulting from the said use, misuse or failure of such tools and equipments.

The Contractor or his sub-Contractor shall be responsible during the works, for protection of work, which has been completed by other contractors. Necessary care must be taken to see that the Contractor's men cause no damage to the same during the course of execution of the work.

All other works completed or in progress as well as machinery and equipment that are liable to be damaged by the Contractor's work shall be protected by the Contractor and protection shall remain and be maintained until its removal is directed by the OMFED.

The Contractor 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.

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

Adequate lighting, guarding and watching at end near all the storage, handling, fabrication, reassembly and erection sites for properly carrying out the work and for safety and security shall be provided by the Contractor at his cost. The Contractor should adequately light the work area during nighttime also. The Contractor should also engage adequate electricians/wiremen, helper etc. to carry out and maintain these lighting facilities. If the Contractor fails in this regard, the OMFED may provide lighting facilities as he may deem necessary and charge the cost thereof to the Contractor.

The Contractor 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 Contractor and to the satisfaction of the OMFED. The Contractor shall also be liable for any loss of or damage to the works occasioned by the Contractor or his sub-Contractor in the course of any operations carried out by the Contractor or his sub-Contractors for the purpose of completing any outstanding work or complying with the Contractor's obligations.

11. Unloading, transportation and inspection

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

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

The Contractor shall be responsible for the reception and safe storage on site of all plant and equipment delivered or handled over to the Contractor, for the purposes of the contract.

The Contractor shall safely transport/shift the unloaded materials/equipment to the storage area and/or the place of work, as the case may be.

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

In case of equipments / materials to be supplied by the OMFED, all the materials / equipments received from OMFED prior to arrival of the Contractor at site, shall be handed over to the contractor who shall, thereupon, inspect the same & furnish the receipt to OMFED.

Detailed inventory of various items shall be prepared clearly listing the shortages, breakages / damages after checking the contents with respect to the Contractor's packing list, OMFED's order and approved drawings. The contractor shall also check every equipment for any shortage/shortcoming that may create difficulty at the time of installation, commissioning & trial run.

All the information and observations by the Contractor shall be furnished in the form of `INSPECTION REPORT' to the OMFED with specific mention/suggestions which in the opinion of the Contractor should be given due consideration and immediate necessary actions, to enable the OMFED 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.

The protection, safety and security of the materials shall be the responsibility of the contractor, until they are handed over to the OMFED after erection, commissioning and testing and performance trial run as per the terms of the Contract.

12.0 Storage of equipment.

The Contractor shall be responsible for the proper storage and maintenance of all materials/equipment under the Contractor's custody. The Contractor 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 OMFED. The following procedure shall apply for the same:

The Contractor'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 Contractor 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 OMFED and OMFED's advice taken regarding the repairs/rectifications. The Contractor shall there upon carry out such repairs/rectifications at his own cost. In case the Contractor is not competent to carry out such repairs/rectifications, the OMFED reserves the right to get this done by other competent agencies at the Contractor's responsibility and risk and the entire cost for the same shall be recovered from the Contractor's bills.

The Contractor'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.

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

If the commissioning of equipment is delayed after installation of the equipment, the Contractor shall carry out all protective measures suggested by the OMFED during such period.

Adequate security measures shall be taken by the Contractor to prevent theft and loss of materials under the Contractors custody. The Contractor shall carry out periodical inventory checks of the materials stored and installed by the Contractor and any loss noticed shall be immediately reported to the OMFED. A proper record of these inventories shall be maintained by the Contractor. The Contractor should not sell, assign, and mortgages, hypothecate or remove equipment or materials, which has been installed or stored at the site under Contractor's custody without the written consent of the OMFED.

Suitable grease recommended for protection of surfaces against rusting (refined from petroleum oil with lancline minimum (70 DEG.CENT.) and water in traces) shall be applied over all equipment as required once in every three months. Quality of grease is to be approved by OMFED.

All equipment shall be stored inside a closed shed or in the open depending upon whether they are of indoor or outdoor design. Adequate storage area, as required, shall be made available by the contractor, within the site premises.

All the necessary items/goods required for protection as described above shall be arranged by the Contractor and such cost shall be included in the Contract price.

13.0 Approvals

The contractor shall obtain the necessary approvals of Factories & Boilers Inspectorate, Electrical Inspectorate, Legal Meteorology dept., Explosives Inspectorate and any other state/local authorities, as may be statutorily required or as may be directed by OMFED, and the cost of obtaining such approvals shall be included in the Contract price.

All the necessary details, drawings, submission of application and proformas will be furnished by the Contractor to the OMFED for verification/signature, and shall therefore be submitted to the appropriate authorities for approval.

The Contractor on behalf of OMFED shall submit the necessary application duly filled-in, together with the prescribed fees to the appropriate authorities. However, all the actual statutory fees paid by the Contractor shall be reimbursed by OMFED upon production of receipt. The contractor shall also make all necessary arrangements for inspection of the works by the statutory authorities, as and when required. Cost of all such inspections shall be included in the contract price.

Whenever necessary or required, the contractor 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 of obtaining these certificates shall be included in the contract price.

In case of capacity enhancement of existing plants, the contractor shall arrange for and obtain necessary approvals, as stated herein, for the entire expanded plant, either in phases or in whole as the case may be & the cost of obtaining such approvals shall be included in the Contract price.

Any modifications or changes required or advised by the appropriate authorities during the course of inspection and/or the contractor at his own cost shall carry out approval.

14.0 Review and co-ordination of erection work

The Contractor shall depute senior and competent personnel to attend the site co-ordination meetings that would generally be held at the site every month. The Contractor shall take necessary action to implement the decisions arrived at such meetings and shall also update the erection schedule, accordingly.

SECTION -IV (A)

SPECIAL CONDITIONS OF CONTRACT

(FOR MECHANICAL INSTALLATION)

MECHANICAL INSTALLATION

The installation work would comprise of:

a) General installation i.e. positioning and installing all the equipments as per approved layout drawings and as per the contract.

b) Supply and installation of structural platforms and tables.

c) Supply and installation of all service piping including ancillary items.

d) Insulation and cladding of piping equipment and electrical auto tracing of LSHS, including supply of materials.

e) Interconnections of services and electrical with equipment.

f) Guide line for expansion work.

g) Clean up of work site.

h) Supply of all cleaning chemicals and lubricants,

i) Testing, commissioning and start-up.

j) Painting including supply of paints as approved by the OMFED.

k) Training of personnel.

Detailed specifications are given in the subsequent clauses.

2.0 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, decrafting and placing on the foundation wherever required. All the civil foundations as per the manufacturer / Contractor's drawings shall be arranged by the **bidder.** The Contractor 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 Contractor shall be responsible for obtaining correct reference lines for purpose of fixing the alignment of various equipment. Tolerances shall be as specified in equipment manufacturers drawings or as stipulated by the

OMFED's Engineer. No equipment shall be permanently bolted down to foundations or structure until the alignment has been checked by the Contractor and witnessed by the OMFED. The Contractor 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 Contractor shall supply all the necessary foundation / anchor bolts and bedplates without extra cost.

The Contractor 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 Contractor 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 OMFED. The Contractor 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 milk / milk products. These platforms and tables shall be fabricated keeping stability and other functional as well as aesthetic requirements into consideration as approved by the OMFED. 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.

3.0 SERVICE PIPING INSTALLATION.

3.1 General Guidelines.

All piping systems shall comply with the latest editions of the following regulations wherever applicable.

3.1.1 Indian Boiler Regulations.

3.1.2 Regulations of explosives inspectorate.

3.1.3 All applicable Indian Standards.

3.1.4 All applicable State Government / Central Government laws / act

3.2 Scope of Supply

The Contractor shall supply all piping materials like pipes, fittings, flanges measuring instruments and all other items as shown in the flow diagram / specifications and schedule of quantities. All the pipes & fittings and insulation material etc, should be of class and make as approved by the OMFED. The Contractor for the class and make of all materials must obtain prior approval of the OMFED. The Contractor should furnish the details of makes selected by him, in the Proforma given in Annexure I.

3.3. Scope of Piping Erection

This to be performed by the Contractor as outlined below:

3.3.1 The scope of erection for piping, includes all system covered in the flow diagrams and specifications.

3.3.2 The Contractor's work commences / terminates at the pipe connections with valves or flanges as specified in flow diagrams/battery limits.

3.3.3 The Contractor shall also install necessary piping and any specialties furnished with or for equipment such as relief valves, built-in-pass and other items of this type.

3.3.4 The Contractor shall install primary elements for flow measurements, control valves and on-line metering equipment.

3.3.5 The contractor shall perform necessary internal machining of pipes for installing orifices, slow nozzles, control valves etc.

3.3.6 The contractor shall install all pipes, valves and specialties being procured from other sources.

3.4 Testing of Piping

3.4.1. The Contractor shall test all piping systems mentioned below including valves and specialties and instruments as per procedure mentioned under 3.4.4

a)	H.P.steam	b)	L.P.Steam
c)	Glycol	d)	Soft, raw & chilled water
e)	Air	f)	Furnace oil/LS HS
g)	SS Piping	h)	Ammonia

3.4.2 All piping shall be internally cleaned and flushed by the Contractor after erection in a manner suited to the service and as directed by the OMFED.

3.4.3 For hydrostatic testing and water flushing, the Contractor shall furnish necessary pumps. Equipment, instruments and piping etc.

3.4.4 The details of testing pressures for various pipelines are mentioned below:

Sl.No:	Name	Test pressure	Test-medium
i.	Steam pipe lines	27 Kg / Sq-cm	Water
ii.	Water pipe lines (Soft, raw, chilling and glycol)	8 Kg / Sq-cm	Water
iii.	Furnace oil/LS HS	16 Kg/Sq-cm	Water
iv.	SS Pipes	6 Kg / Sq-cm	Water
v.	Air	12 Kg / Sq-cm	Air
vi.	Ammonia pipelines a) Suction b) Discharge	 16 Kg / Sq-cm 24 Kg / Sq-cm	 Air Air

Note:

1. Duration of test shall be 30 minutes for all pipes mentioned at i, ii, iii, iv & vi with no allowable pressure drop.

2. For air lines duration of test is 8 hrs. With allowable pressure drop of 0.1 Kg/Sq-cm.

3. For ammonia line duration of test is 24 hrs with allowable pressure drop of 0.2 Kg/Sq-cm.

4. The OMFED / Engineer-In-Charge shall provide only water at available supply point from which the Contractor's temporary piping shall be connected.

3.5 Other Guidelines

3.5.1 Colour code shall be used to identify pipe material. The Contractor shall be able to identify on request all random piping prior to field fabrication.

3.5.2 The Contractor 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.

3.5.3 All piping supports, guides, anchors, hangers, rollers with structural framework shall be supplied and erected by the Contractor. The kinds of pipe supports like CI clamps, wooden saddles, rollers supports and support framework shall be as per the design approved by the OMFED prior to taking up the work.

3.5.4 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 Contractor to avoid all interference while locating hangers and supports.

3.5.5 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 they cannot become disengaged by any movement of the support pipes.

3.5.6 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 service-ability of the pipes.

3.5.7 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 OMFED.

4.0 SPECIAL INSTRUCTIONS AND SPECIFICATIONS

4.1 Steam piping work can be classified into two categories:

a) High-pressure steam piping when the working pressure of steam is more than 3.1 kg / sq-cm (50 psi).

b) Low-pressure steam piping when the working pressure of steam is below 3.1 kg / sq-cm (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 authenticate certificates to this effect.

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 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 of welded construction. Whenever welding is done for pipes of smaller size special care should be exercised to avoid clogging of flow area with the welding material.

5.0 INSTALLATION OF PIPING AND EQUIPMENT

5.1 Insulation of Chilled Water and Ammonia Pipeline

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

5.1.1 Before starting insulation work all pipelines shall be tested for 8.5 kg / sq-cm pressure.

5.1.2 The surface of the pipes to be insulated should be properly cleaned.

5.1.3 Hot bitumen of 80/40 or 85/25 conforming to IS 702 should be applied uniformly @ 1.5 kg / sq.m. on the surface of the pipes.

5.1.4 A similar layer of bitumen should be applied on the inner surface and on the edges of the insulation sections.

5.1.5 The sections should then be stuck to the coated pipes with the joints staggered. Adjacent sections should be tightly pressed together.

5.1.6 All joints should be properly sealed with bitumen.

5.1.7 A thick vapour seal of hot bitumen @ 2.5 Kg / Sq-cm should be applied uniformly on the outer surfaces of the pipe sections and allowed to dry.

5.1.8 In case the insulations 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 Contractor's cost.

5.1.9 The thickness of insulation may be as per Annexure II.

5.2 Insulation of Chilled Water Tank

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

5.2.2 A coat of bitumen of 85/40 m or 85/25 conforming to IS 702 at 1.0 Kg/Sqm shall be applied over the flooring and alkathene sheets shall be press-laid to act as a vapour barrier.

5.2.3 Bitumen shall then be applied on the alkathene sheets and one side and edges of the insulation slabs to ensure total rate of 2.00 Kg / Sqm between contacting surfaces. The slabs shall then be fixed in position, making sure that there shall be no joints between slabs.

5.2.4 For double layers insulation bitumen shall again be applied on all contacting surfaces to ensure total rates of 1.5 Kg / Sqm between contacting surfaces.

5.2.5 A coat of bitumen at 1.5 Kg / Sqm shall be applied over the insulation surfaces.

5.3 **Insulation of Steam, Condensate & Hot Water Pipe Line**

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.

5.3.1 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.

5.3.2 It should then be covered with GI wire netting of 20 mm X 24 SWG.

5.3.3 In case the insulation does not have the desired insulation properties, the entire insulation will have to be redone at the Contractor's cost to give the desired results.

5.3.4 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 **Aluminum Cladding / Cement Plaster**

5.4.1 The chilled water, glycol, ammonia, steam & hot water lines after insulations may be covered by Aluminum cladding or cement plaster as per the instructions of the engineer in-charge. The payment will be made as per the executed items.

5.4.2 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.

5.4.3 In case of cement plaster, the finishing will be done with 12 mm thick sand cement plaster (1:4) over chicken wire mesh.

5.5 All the necessary materials of quantity and make approved by the OMFED, required for carrying out insulation, cladding and other works mentioned above, shall be supplied by the Contractor.

6.0 INTER CONNECTIONS OF SERVICE AND ELECTRICALS WITH EQUIPMENT

6.1 The Contractor shall lay service piping and provide connections with the equipment complying strictly with the equipment manufacturers' instructions. The Contractor 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 contractor shall carry out also electrical connections for equipments 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 equipments. Connections regarding instruments, float switches, limit switches, pressure switches, thermostats and other miscellaneous equipments shall be done as per manufacturers drawings and instructions.

7.0 GUIDELINES FOR INTERCONECTION / TAPPING WORK

7.1 Shutdowns

Plant shutdowns shall be required for making tapings / interconnections of the new equipment proposed to be installed. These shut down should be planned carefully well in advance to enable the OMFED to take suitable actions for ensuring normal plant operations. The details of shutdowns, the numbers and durations should be worked out and intimated to the OMFED for approval, at least 30 days in advance. The contractor should ensure completion of all the necessary works well within the allowed time so that no inconvenience is caused in regular operation.

7.2 Cleanliness

Wherever the contractor is required to work in plant area he should take due care and extra precautions to ensure absolute cleanliness and minimum hindrance for the plant.

7.3 Changeover/hooking

The programs for change over/hooking up plant system should be prepared by the contractor in consultation with local officers of OMFED & submitted for approval of project authority, at least 30 days in advance.

7.4 Modification and rectifications of plant and equipment

During work, the contractor shall be required to carry out modifications, repairs / replacements, to accommodate for the future increase in capacity of the plant. The alterations/modifications not specified in the contract / order and are minor in nature requiring not more than 24 man hours for each item, will be carried out by the contractor at no extra cost. However, if the modifications are of major nature, i.e. requiring more than 24 man hours for each item and if not specified in the contract / order, the contractor shall be paid for such works based on man hour rates, on the basis of minimum wages of various categories of workers, involved for such work. Any additional goods, other than consumables & sundries, used shall be paid for an actual basis, if rate for such items is not separately mentioned in the contract. No overhead charges shall be allowed for such types of alterations / modifications.

8.0 CLEAN UP OF WORKS SITE

8.1 All Soils, filth other materials of an offensive nature taken out of any trench, drain or any other places shall not be deposited on surfaces, but shall at once be carted away by the contractor from the site of work for proper disposal.

8.2 The contractor 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 contractor 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 materials to avoid fire hazards and hindrance to other works.

8.3 If the contractor fails to comply with these requirements in spite of written instructions from the OMFED, the OMFED will proceed to clear these areas and the expenses incurred by OMFED in this regard shall be payable by the contractor. Before completion of the work, the contractor 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 OMFED. Any packing materials received with the equipment shall remain as the property of OMFED and may be used by the contractor on payment of standard charges to the OMFED and with prior approval of the OMFED. At the completion of his work and before final payment, the contractor shall remove and shall restore the site to neat workman like condition at his cost.

9.0 CLEANING CONDITION AND LUBRICANTS

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

10.0 TESTING, COMMISSIONING AND START UP

10.1 The contractor shall operate, maintain and give satisfactory trial run of the plant for a period of continuous **30 days (Thirty Days)** at the rated output, after satisfactory commissioning and start-up of the plant. All rectification of damages / defects and routine troubleshooting should be carried out by the contractor. The contractor shall incorporate / execute necessary minor modifications during the trial period for maximising operational efficiency. The contractor should also execute minor modifications as may be suggested by the manufacturer / OMFED. The contractor shall suggest recommended log sheet proformas for recording necessary operating data and pass it on to the OMFED in proof of satisfactory rated output and performance of the equipments / plant.

10.2 **The commissioning shall also include the following for each equipment:**

10.2.1 Field dis-assembly and assembly.

10.2.2 Clean out of lubrication system including chemical cleaning wherever required.

10.2.3 Circulation of lubricant to check flow.

10.2.4 Clean out and check out of all the service lines.

10.2.5 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 OMFED before start-up.

10.2.6 Recharging or make-up filling of lubricant oil up to the desired level in the lubrication system of individual machine.

10.2.7 Operation in empty condition to check general operation details wherever required and wherever possible.

10.2.8 Closed loop dynamic testing with water wherever required.

10.2.9 Operation under load and gradual load increase to attain maximum rated output.

10.2.10 Trouble shooting during the trial period.

10.3 The Contractor shall demonstrate proper working of all mechanical and electrical controls; safety and protective device, in presence of the OMFED's engineer and the same should be duly recorded.

10.4 After conducting testing, in case a particular equipment is not working properly or not giving rated output the Contractor will furnish a detailed report to the OMFED stating therein the detailed account on the performance of the equipment with possible reasons for improper or not working of the same in case such equipment is supplied by OMFED.

The OMFED after receipt of report from the Contractor would take up the matter with the manufacturers and if required would invite the representative of original manufacturers. In case the OMFED considers that

the nonperformance of equipment is only due to in-experience of the Contractor, then the charges incurred for the manufacturer's representative visit would be debited to the Contractor's account.

10.5 In case of turnkey contracts, the contractor shall furnish a detailed account of the performance of all the equipments. In case any particular equipment fails to perform properly or at its rated output, then the contractor shall take up the matter with the original manufacturer, under intimation to OMFED. In case OMFED considers it necessary, the contractor shall invite, at his own cost, the technical personnel of the original manufacturer to visit the site & carry out necessary rectification/modifications to get the rated performance. In case the contractor fails to do so within 7 days of receipt of instructions from OMFED, the OMFED shall take necessary action to invite the representatives of the Original manufacturer to visit the site & the cost of such visit(s) shall be debited to the contractor's account.

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

a) The Contractor has no previous experience of commissioning and start-up of the similar equipment.

b) The OMFED is of the opinion that the Contractor is not capable to commission and start-up of certain specific equipment.

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

10.7 After satisfactory commissioning and start-up the Contractor shall keep his representatives under whose supervision the OMFED's staff shall be operating and maintaining the plant and equipment for the trial run period of 30 days. The Contractor's representatives should be present at all times during the running and operation of plant and equipment. During this period the Contractor shall ensure proper working of complete plant and equipment and attend any works required to be done and shall also take complete responsibility for proper operation and maintenance of the complete plant and equipment.

11.0 PAINTING

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 off erection / commissioning shall be given double coat of paint of approved shade over a double coat of anti-corrosive 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 Contractor.

Lettering and other markings, including capacity and flow direction markings, shall also be carried out by the Contractor on the tanks, pipe lines, starter's, 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 Annexure-III must be adhered to. Supply of all paints and all other materials required it included in the scope of supply of the Contractor under this contract/order.

12.0 TRAINING OF PERSONNEL

Necessary staff as may be deputed by the OMFED shall be trained by the Contractor for operating the plant. The personnel will be associated for the training during the installation, testing, commissioning, start-up and trial run period and the training tenure shall be extended for a minimum period of one month from the date of commissioning and start-up.

GENERAL GUIDELINES OF SPECIFICATIONS FOR PIPES AND FITTINGS

Sl. No.	Type of piping	Pipe and fittings	Valves	Erection
1	H.P. steam piping (IBR approved & stamped	Seamless, MS heavy duty schedule 40 ASTM A 53	Cast iron body globe valve /NRV with SS working parts, flanged type above 20mm NB , & below.	Piping to be welded type with flanged wherever required
2	L.P. stem piping	ERW MS heavy duty (C Class) BIS 1239:3601	Cast iron body globe valve /NRV with SS working parts, flanged type above 20mm NB, screw type 20mm NB & below. For size upto 25mm NB cast steel body ball valves with SS working parts, 3 section design, weld-able end type can also be used.	Piping to be welded type with flanged wherever required
3	Water Piping (Water Supply, Chilled Water, Cooling & Glycol)	Galvanized steel medium duty (B class) BIS 1239:3601,4736	Cast iron body butterfly valve water type with EPDM seat for sizes 50mm and above For size upto 40mm NB cast steel body ball valves with SS working parts, 3 section design, weld-able end type can also be used.	Piping to be welded type with flanged wherever required.
4	LSHS/FO piping	ERW MS heavy duty (C Class) BIS 1239:3601	Cast iron body butterfly valve water type with BLACK Nitrile seat for sizes 50mm NB and above Cast steel body ball valves with SS working parts, 3 section design, weld-able end type (for sizes 25mm NB & below)	Piping to be welded type with flanged wherever required.
5	Air piping	ERW MS heavy duty (C Class) BIS 1239:3601	Cast iron steel body NRV Gunmetal working parts, flanged type. Cast steel body ball valves with SS working parts, 3 section design, weld-able end type	Piping to be welded type with flanged wherever required

Sl. No.	Type of piping	Pipe and fittings	Valves	Erection
6	Refrigerant system Piping (30 Deg Cent & below)	Hot furnished seamless steel pipes ASTM A 333 Grade-1	Globe valve suitable for refrigerant piping	Welded type first route run by TIG welding with purge of argon nitrogen gas inside the pipes and subsequently runs by argon arc welding with purge of gas.
7	Refrigerant Piping	ERW MS heavy duty (C Class) BIS 1239:3601	Globe Valve Suitable For Refrigerant Piping	Piping to be welded type with flanged wherever required
8	Edible oil piping	ERW MS heavy duty (B Class) BIS 1239:3601	Cast iron body butterfly valve water type with EPDM seat for sizes 50mm NB and above Cast steel body ball valves with SS working parts, 3 section design, weld-able end type (for sizes 50mm NB & below.	Piping to be welded type with flanged wherever required
9	Piping (Dairy)	TIG welded, annealed and de-scaled AISI-304 pipes, mirror polished on outside, inner surface pickled as per dairy standard. Thickness 1.65mm for pipes upto 63.5mm dia and 2.0mm for higher size ASTM -A270	Stainless steel completely, plug type valve with union or as specified in the drawings.	All milk/ cream /product pipelines to be joint by SMS union, CIP lines with welded joints with argon arc welding to be added with grinding and polishing. For milk lines welding can be adjusted after trial specific application.

Annexure I

MAKES OF BOUGHT OUT ITEMS:

Sl. No.	Name Of Item	Makes selected by Contractor

1. Steam piping

a) MS 'C' class pipes (seamless)

b) Cast steel globe valves

c) Bronze globe valves

d) Non-return valves

e) Pressure reducing valves, safety valves, Expansion joints and other steam fittings.

f) Pressure and temperature gauges

2. Furnace oil piping/air piping

a) MS 'C' class pipes (seamless)

b) Cast steel globes/bronze globe/ Gunmetal gate valve

c) Pressure gauges

3. Water piping

a) GI 'B' class pipe

b) CI globe valve

c) Gun metal gate valve

d) Gun metal globe valves/strainers/ Non-return valves

e) Water pump

4. Insulation Materials

i. Expanded polystyrene

b) Glass/mineral wool

Important note: The makes of each and every brought out shall be approved by the consultant and contractor should supply the materials/items of approved makes only.

ANNEXURE -II

RECOMMENDED THICKNESS OF EXPANDED POLYSTYRENE FOR PIPE INSULATIONS NORMAL PIPE SIZES

Temp in ºC	**15 mm 1/2"**	**20 mm 3/4"**	**25 mm 1"**	**32 mm 1 x 1/4"**	**40 mm 1 x 1/2"**	**50 mm 2"**	**65 mm 2 x 1/2"**	80 mm **3"**	**100 mm 4"**	**125 mm 5"**	**150 mm 6"**
20	25	25	25	25	25	25	40	40	40	50	50
10	25	25	25	40	40	40	40	40	50	50	50
0	40	40	40	50	50	50	50	50	50	50	75
(-) 10	50	50	50	50	65	65	75	75	75	75	75
(-) 20	50	50	65	65	65	75	75	75	100	100	100
(-) 30	65	65	65	75	75	100	100	100	100	100	100

Above data is based on average conditions and should be modified to suit the individual technical requirements.

ANNEXURE-III

CODE OF PRACTICE FOR PAINTING OF SERVICE PIPE LINES, EQUIPMENT AND STRUCTURAL WORK

1.0 PAINTING OF SERVICE PIPE LINES

1.1 On Non-Insulated Pipe Line

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

1.1.2 Colour bands to be applied near every valve and branch connections as well as in every room near entry.

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

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

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

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

1.2 On Insulated pipeline but Without Aluminum Cladding

Procedure same as above.

1.3 On Insulated Pipeline With Aluminum Cladding

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

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

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

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

1.3.5 The valves should be painted with the same color as the ground color.

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

1.5 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.

1.6 Where no colour bands have been recommended, only the ground colour is to be applied as per the above procedure. If only one colour is recommended the same should be 4" wide and applied on the ground color. 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.

1.7 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.

2.0 PAINTING OF EQUIPMENT AND STRUCTURAL WORK

2.1	All milk storage equipment with outer M.S	Pale cream shade No. 352 of ISI
2.2	All M.S platforms / pipe supports / pipe Bridges and any other structures	Dark admiral gray shade No. 632 of ISI
2.3	Can scrubber, can steaming block, can Conveyers, caseinpress, casein shredder Casein drier, casein grinder, ghee tin Seaming machine, equipment trolley, Washing trough, feed water tank, water Softening plant.	Dark admiral gray
2.4	Hot water set, vacuum-heating set, water Pumps, geared motor of tanks and vats Butter churn, gearbox and supports.	Original colour
2.5	Coal handling equipment	Black
2.6	Boiler chimneys, power plant chimney and Generator exhaust.	Aluminum paint
2.7	Refrigeration compressors and air Compressors	Original colour
2.8	Air handling units of cold store and deep freeze and butter packing, making room and lab including ducting.	Aluminum paint
2.9	Can washer	Lower half in dark Aluminum gray upper half in aluminum paint or original colour
2.10	Milk weigh scales	Original colour
2.11	Refrigeration plant receiver	Dark admiral gray
2.12	Atmospheric condensers	Bitumen paint
2.13	HT and LT panels	Original colour
2.14	LT distribution switchboards	Dark admiral gray

COLOUR CODE FOR PIPELINES AS PER IS 2379-1963

Sl.No.	Services	Application	Ground colour
1.	Cooling water	1.Ref.comp.jacket cooling 2.Cream past. Well water-cooling 3. Condenser water piping for ref. & Powder plant	Sea green
2.	Boiler feed water	Boiler feed water piping	Sea green
3	Condensate	Condensate drain and return piping	Sea green
4	Hot water	1. Milk pasteuriser hot water 2. Defrosting line for diffusers 3. Can washer	Sea green
5	Drinking water	Water lines for water coolers	Sea green
6	Treated water	Soft water lines	Sea green
7	Cold water	Chilled water supply & return lines	Sea green
8	Untreated water	Raw water lines	Sea green
9.	Compressed Air	All compressed air pipelines	Sky blue
10	Vacuum	1.Cream pasteuriser 2. Powder plant 3. Butter Churn	Sky blue
11	Steam	All HP & LP steam piping	Silver Gray
12	Diesel	Diesel generating set	Light Brown
13	Lubricating oil	Oil returns line from oil separator To ref. compressor & other oil Purging lines	Light Brown
14	Drainage	All drain lines from equipment Building & OH water tank.	Black
15	Ammonia	All ammonia gas & liquid lines	Signal R

SECTION -IV (B)
SPECIAL CONDITIONS OF CONTACT
FOR ELECTRICAL INSTALLATION

1.0 SCOPE

The intent of this specification is to define the requirements for the installation, testing and commissioning of the electrical system like high tension switch yard with accessories and equipments, transformers, HT panels, oil circuit breakers, LT panels and power control centers, Distribution boards, capacitors and banks panels, power and control cables, remote push button stations, motors, earthing network, etc. Requirement of a particular project shall be as specified in schedule of quantities / approved drawing of the OMFED or as per the battery limits fixed by the OMFED.

2.0 STANDARDS

2.1 The work shall be carried out in the best workman like manner in conformity with this specification, the relevant specification / codes of practice of the Indian Standards Institution, approved drawings and the instructions issued by the Engineer-in-charge or his authorised representatives, from time to time. Some of the relevant Indian Standards are listed in Annexure-IV.

2.2 In addition to the standards as mentioned in 2.1, all works shall also confirm to the requirements of the following:

a) Indian electricity act and rules framed there under.
b) Fire Insurance Regulations.
c) Regulations laid down by the chief electrical inspector of the state / Electricity board.
d) Regulations laid down by the factory Inspector of the state.
e) Any other regulations laid down by the local authorities.
f) Installation & operating manuals of original manufacturers of equipments.

3.0 **EQUIPMENT AND ACCESSORIES –SPECIFICATIONS**

This defines specifications and requirements mainly for the equipment and accessories which are generally supplied by the erection agencies 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 OMFED.

All materials, fittings and appliances to be supplied by the contractor shall be of best quality and shall confirm to the specification given here under. The equipment shall be manufactured in accordance with current Indian Standard Specifications wherever they exist or with the BS or NMA specifications, if no such ISS are available. In the absence of any specification, the materials shall be as approved by the OMFED or his authorized representatives.

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

Makes of bought out items selected by the Contractor must be furnished by him as per the Performa given in Annexure-V.

3.1 **Power Cables (HT)**

Three core, aluminum conductor, screened, XLPE insulated, armored shielded and PVC sheathed cables suitable for 11/12.7/22/33 KV, earthed system, conforming to IS 7098 (Part II) amended up to date.

3.2 **Power Cables (LT)**

Power cables for use on 415 V system shall be of 1100 volt grade, aluminum conductor, PVC insulated, PVC sheathed, armored and overall PVC sheathed, strictly as per IS: 1554 (Part I) – 1976. Unarmored cable to be used only if specifically mentioned in schedule of quantities.

The size of these cables shall be as specified in schedule of quantities or as per erection drawings. If neither of these drawings are available, the size of cable shall be as specified in cable selection chart enclosed at Annexure – VI. NO CABLE OF SIZE LESS THAN 4 SQ.MM. SHALL BE USED.

3.3 **Control Cables**

Control cables for use on 415 V system shall be of 1100 volts grade, copper conductor, PVC insulated, PVC sheathed, armored and overall PVC sheathed, strictly as per IS: 1554 (Part I) – 1976. Unarmored cable to be used only if specifically mentioned in schedule of quantities.

The size of these cables shall be as specified in schedule of quantities or as per erection drawing. THE MINIMUM CONDUCTOR DIAMETER SHALL BE 2.5 SQMM.

3.4 Cable Trays

These shall be channel type, fabricated from slotted MS. Sheets (14 gauge minimum), hot dip galvanized, complete with all accessories such as bends, tees and reducers. Only aluminum flat clamps with GI / chrome plated bolts-nuts/screws to be used for clamping cables. Sizes of these trays shall be as specified in schedule of quantities or approved by Engineer-in-Charge.

3.5 Cable Glands

Cable glands shall be of heavy-duty compression type of brass, chrome plated. These shall have a screwed nipple with conduit electrical thread and check nut. These shall be suitable for armored/unarmored cables, which is being used.

3.6 Cable connectors

Cable connectors, lugs/sockets, shall be of copper/aluminum alloy, suitably tinned, solder 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.)

3.7 Cable Route Markers

These shall be galvanised Cast Iron plate with marking (LT/HT) diameter 150 mm with 600 mm long 25x25 mm MS. Angle riveted/bolted with this plate.

3.8 Cable Indicators

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

3.9 G.I. Pipes for Cables

For laying of cables under floor, G.I. class `A class' pipes shall be used. MS. Conduits are not acceptable for this purpose. All accessories of pipes shall be threaded type. Size of pipe shall depend upon the overall outer diameter of cable to be drawn through pipe. NO G.I. PIPE LESS THAN 40 MM DIA SHALL BE USED FOR THIS PURPOSE. To determine the size of pipe, assume that 40% area of pipe shall be free after drawing of cable.

3.9.1 Motor Isolators

These shall be in Aluminum cast housing, completely dust, vermin and weather proof, suitable for 25A, 415 volts, 50 Hz with rotary type switch and reroll type metallic plug, complete with cable gland for incoming and outgoing cables. Operating hand to be of metal and final finish of housing to be buffer mirror. Sample to be got approved before supply.

3.11 Motor Junction Box

These shall be in Aluminum cast housing, completely dust, vermin and weather proof, suitable for 25 A. 415 Volts, 50 Hz, with heavy duty bakelite connector, complete with cable/conduit gland. Refer detailed drawing. Sample to be got approved before use.

3.12 Remote Push Button stations (For Dairies)

These shall be floor / wall-mounted type as specified in schedule of quantities. These shall be fabricated from 1.6 mm thick stainless steel sheets (S.S: 304). In case of floor-mounted stations, these shall be supported on 51 mm `A' class MS, pipe cladded with S.S. pipe. Front cover shall be removable type with suitable rubber gaskets to make them dust, vermin and moisture proof. All outer S.S. surfaces shall be polished to 150 grit finishes.

Each push button station shall be provided with one lockable (key operated) push button to control supply to station. Each feeder of station shall be provided with name plate (white bakelite), indication lamp, one "ON" (Green) push button and one "Off" (Red) push button with latch to prevent accidental starting when required, Green and Red push button shall have contact elements having 1 NO + 1 NO. Number of feeders shall be specified in schedule of quantities. The indication lamp can be combined with `ON' push button.

4.0 ERECTION OF EQUIPMENT

The cases containing the equipment (being supplied by the OMFED) shall be handed over to the Contractor. The Contractor 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 authorised representative. These empty packing cases shall be returned to the stores 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.

4.1 Power control centers, distribution boards, control panels & bus ducts

4.1.1. Erection

Electrical panels and bus duct shall be delivered in convenient shipping section by the manufacturers. The Contractor shall be responsible for final assembly and inter-connection of bus bars / wiring. Foundation channel shall be grounded in the flooring by the contractor. Switchgear 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 switchgear. The contacts or the draw-out circuit breakers shall be checked for proper alignment and inter-changeability.

After erection the switchboard shall be inspected for dust and verminproofness. Any hole, which might allow dust or vermin etc, to enter the panel, shall be plugged suitably without any extra cost.

If the instrument transformers are supplied separately they shall be erected as per the direction of the Engineer-In-Charge. The Contractor shall fix the cable glands after drilling the bottom top plates of all switchboards with suitable holes without any extra cost.

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

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.

4.1.2 Testing

Before electrical panel is energised, 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.

The following tests shall be performed on all circuit breakers during erection:

i. Contact alignment and wipe shall be checked and adjusted where necessary in accordance with the breakers manufacturer's instructions.

ii. 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.

iii) All adjustable direct acting trip devices shall be set using values given by the Engineer-In-Charge / manufacturer.

iv) The dielectric strength of insulating oil wherever applicable shall be checked.

Before switchgear is energised the following tests shall be performed on each circuit breaker in its test position.

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

ii. Test tripping of the electrically operated circuit breaker by operating mechanical trip device.

iii. Test operation of circuit breakers latch, check carriage limit switch if provided.

iv. Test proper operation of lock out device in the closing circuit, wherever provided by simulating conditions which would causes a lockout to occur.

v. 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:

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.

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

The Contractor 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 Contractor, payment for above work shall be deemed to have been included in the erection of switch boards/control panels.

4.1.3 <u>Proforma for PCC, DB, Motor control centers test</u>

1. Circuit (breaker or Contractor module designation/bus no.)
2. Insulation Resistance Test (Contacts open, breaker racked in position).

a) Between each phase of bus : Mega Ohm

b) Between each phase and earth : Mega Ohm

c) DC and AC control and auxiliary Circuits : Mega Ohm

d) Between each phase of CT/PT and between CT and 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 o 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

(This Proforma shall be jointly signed by the Engineer-in-Charge and the Contractor)

4.2 Battery and battery charger

Batteries shall be erected on wooden stands and insulators supplied by the manufacturer of the batteries. Electrolyte shall be filled as per the manufacturer's instructions. Interconnections shall be made with leads supplied by the manufacturer. Filling of electrolyte (supplied by the manufacturer), charging, discharging, recharging shall be carried out under the supervision of the Engineer-in-Charge. or his authorised representative. Lamp bank (loads) for discharging shall be provided by the Contractor under this contract. Erection of battery charger and DC board will be carried out by the Contractor under the supervision of the Engineer-In-Charge or his authorised representative. The Contractor shall also offer such facilities as may be required for carrying out the tests on the complete battery charger and DC board / AC board.

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

4.3 Motors

4.3.1 Erection and testing

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 the insulation resistance of the motors will be measured and recorded by the Contractor. 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, checking of fans coupling with bodies etc. The Contractor shall take adequate precaution and care while executing the work. For all damage due to negligence etc. the Contractor shall be responsible to replace / repair at his own cost.

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.

Motor 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.

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

Check the setting of the thermal overload protection/single phase prevention. Testing of these devices is to be done wherever required as per the instructions of the Engineer-In-Charge.

All motors shall run uncoupled for a maximum period off 4 hours before the driven equipment is placed in regular service.

4.3.2 Performa for motor testing

1. Name plate details: Voltage_____ HP_____ KW_____
   Mounting_____Current____RPM_____
   Frame size_____Make_____S no._____
   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 : R phase Amps
   Y phase Amps
   B phase Amps

5. Full load current : R phase Amps
   Y phase Amps
   B phase Amps

6. **Temperature rise after 4 hours run:**

On no load	O ºc.
On full load	O ºc.
Ambient temperature during test	O ºc.

7. **Operation of thermal overload relay:**

i) At normal FL current of motor

ii) At twice FL current of motor trip in seconds.

(The Engineer-In-Charge and the Contractor shall jointly sign this Performa.)

4.4 Installation of cable network

Cable network shall include, power, control, lighting cables which shall be laid in underground trenches, Hume 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 glands sockets at both ends, isolators, junction boxes, remote push buttons stations, etc. shall be under the scope of the Contractor.

4.4.1 General requirements for handling of cables

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

4.4.1.2. 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 cable shall laid 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.

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

4.4.1.4. 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.

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

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

4.4.1.7. Joints in the cable throughout its length of laying 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.

4.4.1.8. A minimum loop of 3 M shall be provided on both ends of the cable, or after every 50 M of un-jointed 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 laying.

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

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

4.4.1.11 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.

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

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

4.4.2 Laying of Cables (underground system)

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

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

4.4.2.3 Sand bedding 75mm tick shall be made below and above the cables. A layer of bricks (full size) shall be laid on the edge, above sand bedding on the sides of cables and a flat brick to cover cable completely. More than

one cable can be laid in the same trench by providing a brick on edge between two cables. However the relating location of cables in trench shall be maintained till termination. The surface of the ground after back filling the earth shall be made good so as to conform in all respects to the surrounded ground and to the entire satisfaction to the Engineer-in-charge.

4.4.2.4 For all underground cables, route markers should be used.

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

b) Route markers should be grounded in ground with 1:2:4 cement concrete pedestal size 250x250x300 mm.

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

4.4.2.5 RCC Hume pipe for crossing road in cable laying shall be provided by OMFED. No deduction shall be made for cable laying in Hume pipe for not providing bricks, sand and excavation. RCC Hume pipe at the ends shall be sealed by bituminous compound after laying and testing of cable by electrical contractor without may extra charge.

4.4.3 Laying of Cables Under Floors

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

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

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

4.4.3.4 Exact location of equipment motor/isolator/push buttons etc. shall be ascertain prior to laying of pipe.

4.4.4 Laying of cable in Masonry Trenches

4.4.4.1 Masonry/concrete trenches of laying of cable shall be provided by OMFED. However steel members such as MS angles/flats etc. shall be provided & grouted by electrical Contractor to support the cables without any extra charge. Cables shall be clamped to these supports with aluminum saddles/damps. More than one tier of cables can be provided in the same trench if the numbers of cables are more.

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

4.4.5 Laying Of Cables In Cable Trays

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

4.4.5.2 Cable shall be fixed in cable trays in single tier formation and cables shall be clamped with aluminum flat clamps and galvanized bolts/unit.

4.4.5.3 Earthing flat/wire can also be laid in cable tray along wit cables.

4.4.5.4 After laying of cables minimum 20% area shall be spare.

4.4.6 Laying of cables on Building Surface/Structure

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

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

4.4.6.3 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.

4.4.7 Termination and Jointing Of Cables

4.4.7.1 Use of Glands

All PVC cable upto 1.1 KV grade, armored or unarmored shall be terminated at the equipment/junction box isolators/push buttons/control accessories, etc. by means of suitable size compression type cable glands armor of cable shall be connected to earth point. The Contractor shall drill holes for fixing glands wherever necessary. Wherever threaded gland cable is to be screwed into threaded opening of different size, suitable galvanized threaded reducing bushing shall be used for approval type.

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 center line of holes. After installation of bottom plate and cables with glands, it shall be sealed with sold sealing compounds.

4.4.7.2 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 joining without lugs/sockets.

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

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

b) 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.

c) Correct size and type of socket/ferrule/lug should be selected depending on size of conductor and type of connection to be made.

d) Make the crimped joint by suitable crimped joint.

e) If after crimping the conductor in socket/lug, same portion of the conductor remains without insulation the same should be covered sufficiently with PVC tape.

4.4.7.3 Dressing of Cable inside the Equipment

After fixing the cable glands, the individual cores of cable shall be dressed and taken along the cable ways (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.

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

Cables inside the equipment shall be measured and paid for.

4.4.7.4 Identification of Cables/Wires/Cores

Power cables shall be identified with RED, YELLOW, and BLUE PVC tapes for trip circuit identification, additional red ferrules shall be used only in the particular cores of control cable at the termination points in the switch gear/control panels and switches.

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

4.4.8 Testing Of Cables

4.4.8.1 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 three phase circuits.

4.4.8.2 Where splices or termination 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 termination are complete.

4.4.8.3 DC high voltage test shall be made after installation on the following:

a) All 1100 volts grade cables in which straight through joints are made.

b) All cables above 1100 volts grade.

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

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

The test voltage and duration shall be as per relevant codes and practices of Indian standards Institution.

4.4.8 Proforma For Testing Cables

DATE OF TEST

a) Drum no. from which cable taken

b) Cable from to

c) Length of run of this Table meters

d) Insulation resistance test:
Voltage of megger volts

i) Between core-1 to earth_____mega ohm
ii) Between core-2 to earth_____mega ohm
iii) Between core-3 to earth_____mega ohm
iv) Between core-1 to core-2_____ mega ohm
v) Between core-2 to core-3_____ mega ohm
vi) Between core-3 to core-1_____ mega ohm

e) High voltage test Voltage duration

i) Between core and earth

ii) Between individual cores

(The Engineer-In-Charge and the Contractor shall jointly sign this Proforma)

4.5 Earthing Network

The entire network installation shall be done in accordance with the earthing drawings, specifications and instructions of the engineer-in-Charge. The entire earthing system shall fully comply with the Indian Electricity act and Rules framed there under. The Contractor shall carry out any changes desired by the Electrical Inspector or OMFED in order to make the installation confirm to the Indian Electricity Rules, at no extra cost. The exact location of the earth pits, earth electrodes and conductors and earthing points of the equipments shall be determined at site, in consultation with Engineer-in-Charge. Any change in the methods, routing, size of conductor etc. shall be subject to approval of the OMFED or Engineer-in-Charge before execution.

4.5.7 Earth Fault Relay

Earth fault relay of suitable capacity, as required under the IER is to be supplied & installed by the Contractor. This shall be wall be wall/floor mounted, in separate box suitable size, with necessary cable connection to main power supply.

4.5.8 Earth Pit with Electrode

4.5.2 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). For ready reference, sketches for pipes and plate type earth electrode earthing have been shown in Annexure-V. All earth electrodes shall preferably be driven to a sufficient depth to reach permanent moist soil.

PRIOR APPROVAL OF THE ENGINEER-IN-CHARGE SHALL BE TAKEN FOR SELECTING TYPE OF EARTH ELECTRODE (PIPE OR PLATE)

4.5.2 Earth pit center shall be at a minimum distance of 2m from nearest building, unless otherwise advised. The minimum 3m distances shall be maintained between centers of 2 earth pits.

4.5.3 Earth bus, Earthing Lead and Earth Wire/Strip

4.5.3.1 All electrical equipment is to be doubly earthed by connecting two earth strip/wire conductors from the frame of the equipment to a earthing pit/main earthing ring. The earthing ring will be connected via links to several; earth electrodes. The cable armored will be earthed through the cable glands. Conductor size for connection to various equipment shall be as specified in the drawing 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.

4.5.3.2 All hardware for earthing installation shall be hot deep galvanised. Spring washers shall be used for all earthing connections of equipments having vibrations.

4.5.3.3. Size of earthing lead/wire shall be as specified below/or as given in schedule of quantities.

Control switches	-G.I. wire 14
Motor upto 10HP	-G.I. wire 8 SWG
Motor above 10HP upto 25 HP	-G.I. strip 25 X 3mm
Motor above 25 HP	-G.I. strip 25 X 6mm
Switch Board	-G.I. strip 25 X 6mm
Power control center/ LT panel of sub-station	-G.I. strip 40 X 6mm

When earthing wire is to be drawn under floor/in underground, aluminum wire 10mm dia. With PVC insulation shall be used.

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 ohm in order to ensure satisfactory operation of protective devices.

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

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

4.5.3.6 Excavating & refilling of earth, necessary for laying underground earth bus loops shall be responsibility of the Contractor.

4.5.3.7 Wherever earth leads/strips/wires are laid in cable trenches; these shall be firmly and suitably cleated to the walls/supporting steel structures on which cable is clamped.

4.6 Statutory approvals:

The contractor shall arrange, at his own cost, for inspection of the works and approval of cable layout & schematic drawings from the concerned electrical inspector with necessary test certificates & completion certificates. Contractor without any extra cost shall carry out any modification suggested by the electrical inspector. Omfed shall reimburse statutory fees if any. The approved drawings shall be submitted by the contractor to Omfed, before final payment is released.

ANNEXURE-IV

INDIAN STANDARDS TO BE FOLLOWED FOR ELECTRICAL ERECTION

1.	PVC insulated cables (light duty) for working Voltage upto1100 volts	- 694-1977 Part I & II
2.	PVC insulated cables (heavy duty) for Voltage upto1100 volts	- 1554-1976 Part I
3.	-Do- for voltage 3.3Kv to 11KV	- 1554-1976 Part-II
4.	Specification for polyethylene insulated PVC Sheathed heavy-duty electric cables, voltage Not exceeding 11000V	- 5959-1970 Part-I
5.	-Do- for voltage 3.3 KV to 11KV	- 5959-1970 Part-II
6.	Guide for marking insulated conductors	- 5578-1970
7.	Code of practice and 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 works	- 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 650 V)	- 2274-1963
16.	Guide for testing three-phase induction motor	- 4029-1967

ANNEXURE-V

RECOMMENDED CABLES SIZES FOR INDUSTRIAL WIRING

Aluminum conductor cable size -mm.sq.

3phase,415V Motor HP	Rotor resistance starter		Star-Delta starter	
	Supply Side	Motor Side (2-cables)	Supply Side	Motor Side (2-cables)
Upto 7.5	4	4	4	4
10	6	6	6	4
15	10	10	10	4
20	16	16	16	6
25	25	25	25	10
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

Note: For D.O.L. Starter up to 7.5 HP motor 4 sq. mm. cable should be used.

SECTION – V

1.0 SPECIFICATION OF REFRIGERATION PLANT

1.01 FUNCTIONAL REQUIREMENTS

The Plant is required to supply refrigeration requirements of the dairy plant consisting of ice bank system for chilling the milk and direct cooling system for maintaining a cold store and deep Freeze for milk and milk products.

1. Duty Conditions

a. To chill 1,00,000 Ltrs. of milk per day from 35°C to 4°C. in plate chiller at a rate of 20,000 LPH.

b. To chill 60,000 LPD pasteurized milk from 15°C to 4°C at a rate of 20,000 LPH in a Pasteuriser.

c. To pre-chill 60,000 LPD of milk in a plate chiller at a rate 10,000 LPH from 10°C to 4°C before packing.

d. To maintain a cold store at 4ºC of size 168 Cu.m. for keeping milk of about 60,000 Ltrs. in plastic crate.

e. To maintain a cold store at 30ºC of size 168 Cu.m. for keeping milk products of about 30,000 Ltrs. in plastic crate/ Paper Cartoon.

f. To chill 7000 ltrs of 40% fat cream in a cream pasteuriser from 35°C to 5°C at a rate of 10000 LPH.

g. To chill 10000 ltrs of reconstitutes Milk from 40°C to 5°C at a rate of 10000 LPH.

2.02 DESIGN REQUIREMENTS AND SCOPE OF WORK

1.0 SYSTEM TYPE:

1.1 Direct Expansion System:

This system shall be used to provide refrigeration requirements for maintaining low temperature in milk cold store .

1.2 Ice Bank System:

This system shall be used to provide chilled water required for processing of liquid milk and its products.

2.0 DESIGN REQUIREMENTS:

2.1 REFRIGERATION COMPRESSORS

2.1.1 Compressors:

Ammonia heavy-duty industrial type reciprocating compressor of capacity as specified in design data at -10 Deg. Cent. suction temperature and 45 Deg. Cent. Condensing temperature. Following standard accessories should be provided with each compressor:

a. Automatic unloader, capacity controller.
b. Suction and discharge by pass manifolds with isolating valves.
c. Control panel having low pressure gauge and cutout, high pressure gauge and cutout, oil pressure gauge and differential pressure cutout and indication lamps for all cutouts / safeties, panel board to be complete with frame for floor mounting.

d. Bull's eye type oil sight glass.
e. Complete driving parts, including flywheel, motor pulley, drive belts, belt guards etc.
f. Base plate/frame vibration eliminators and Anchor bolt etc.as per requirement.
g. Standard tool kit including piston ring guide etc.

2.1.2 Motors for Compressors:

Screen protected squirrel cage, degree of protection IP23 type, induction motor, horizontal foot mounted suitable for 415 volts, 50 Hz, 3 phase, A.C. supply of rating suitable for continuous duty for compressor specified in 3.2.1.1.Necessary slide rails & foundation bolts to be provided with motor. Thermostat motor protection relay to be provided inside the motor winding. The terminal box of motor should be suitable for receiving aluminum conductors and armored cables.

2.1.4 Ammonia Oil Separator:

Oil Separators of size suitable to compressor capacity with counter flanges, float valve and strainer for automatic return of oil to the crankcase with by pass arrangement.

2.1.5 Refrigerant piping:

Suitable size M.S. "C" class (heavy duty) pipes, fittings and valves to interconnect all refrigeration equipment such as compressors, condensers, receivers, chilled water tank and air cooling units.

2.2.2 Condenser Pump:

These would be centrifugal, monobloc type, Bronze impeller of capacity as given in the design data with TEFC squirrel cage, degree of protection IP 55 induction motor suitable for three phase, 415 V, 50 Hz, A.C. supply. Common base frame of MS channel (100X50 mm) be provided for all condenser pumps. Each pump should be provided with GI sheet cover for motor for protection against rain.

2.2.3 Piping of condenser pumps:

GI ''B'' class pipes of suitable size to match inlet/Outlet sizes of pumps and capacity of system for interconnecting the condenser sumps, pumps and spray headers. Necessary suitable size flanged type gate valve/check valve with CI body and brass working parts to be used. M.S. fabricated body with brass perforated sheet pot strainer of suitable size to be provided for each condenser pump. Plate type strainer inside each compartment of sump, near outlet to be provided. One No. 100 mm dia pressure gauge with isolation cock should be provided in the common delivery header. The bidder should mention the pipe size considered in the design.

Flow switch should be provided in discharge line (main header) of condenser pumps so that compressors should not be started in case there is no water flow.

2.2.4 Compressor Jacket Cooling:

Suitable size 'B' class GI pipe with necessary gate valves (GM body and GM working parts) to be provided from compressors to atmospheric condenser and return for compressor jacket cooling. Bidder should mention the pipeline size considered in the design.

EVAPORATIVE TYPE AMMONIA CONDENSOR SYSTEM:

Ammonia evaporative type condensers to be designed for suitable 150 TR Refrigeration Unit. The condensers should be complete with all required components like pipes fitting valves etc.

Qnty.	**One sets. Independent Unit**
Type	Induced type
Wet Bulb	28 deg C.
Refrigerant	Ammonia
Condensing Temp	45 deg C
Refrigeration capacity/Unit	**150** TR
Fans /Unit	Minium-3Nos, (Two operative and one stand by)
Air Volume	20CUM/Sec
Water Flow	22 LPS
Water Pump/Unit	2Nos.(Monoblock)
Coil Dia	5/8" OD 1.2 mmThick
MOC	SS 304 L tube
Body construction -	GI 22 gauge for casing & 18 gauges for tray.
Coil Dimension	3.0mL x39 Row depth x10Pipes (H)
Dimension	3600mm(L) x 900mm (W) x 3600mm (H)
Weight	2700Kg(Dry)
Operating weight	5200Kg.
Water source	available from deep bore well/Hardness-35ppm.

3.2 Type: Condenser shall be of evaporative type, and induced draft design with vertical discharge conforming in all aspects to the specifications.

3.2 Duty:

The total capacity of the condenser shall be adequate to reject the hot gas heat of compressors operating at design duty along with economizer, plus minimum 10% allowance, shall not be less than the rate scheduled.

This heat rejection shall be achieved with a condensing temperature less than that scheduled and ambient wet bulb temperature based on monsoon condition.

3.3 Design:

The detailed design of the condenser is the responsibility of the Supplier and shall meet the requirements specified in the schedule, as well as meet relevant manufacturing codes /standard.

The evaporative condenser supplied by a specialist manufacturer as fully assembled units. The capacity and performance of the evaporative condensers shall be warranted by the manufacturer.

Factory Testing: The manufacturer shall be capable of testing the operation of the condenser in the manufacturer's own test facility. Test facilities shall be capable of simulating design conditions, including but not limited to design wet-bulb, airflow, refrigerant mass flow rate, refrigerant condensing temperature, and total heat rejection.

Quality Assurance: The manufacturer shall have a Management System certified by an accredited registrar as complying with the requirements of ISO-9001:2000 to ensure consistent quality of products and services.

3.4 Construction:

General: All steel panels and structural elements shall be constructed from heavy-gauge, hot-dip galvanized steel (minimum Z600 grade), with cut edges given a protective coating of zinc-rich compound.

3.5 Coil Casing Assembly:

The evaporative condenser shall include a coil casing section consisting of refrigerant condensing coil, spray water distribution system, drift eliminators, and air plenum with fan assemblies.

The refrigerant condensing coil shall be fabricated of continuous lengths of all prime surface steel and hot-dip galvanized after fabrication. The refrigerant condensing coil shall be tested at 375 psig.

The refrigerant condensing coil shall be designed for low-pressure drop with sloping tubes for free drainage of liquid refrigerant. The refrigerant condensing coil shall be ASME B31.5 compliant.

Water shall be distributed evenly over the coil to ensure complete wetting of the coil at all times. Large-diameter, non-clog, distribution nozzles shall be spaced across the coil face area. Nozzles and spray branches shall be observable and accessible for cleaning from the outside of the evaporative condenser during condenser operation without the removal of other components. It shall be possible to allow quick removal of individual nozzles or complete branches for cleaning or flushing.

PVC drift eliminators shall be provided to prevent moisture from entering the air plenum. The drift eliminator shall be removable.

3.6 Wet deck Surface:

The heat transfer section shall consist of wet deck surface with integral drift eliminators for cooling the spray water leaving the coil to optimize the thermal performance of the evaporative condenser. The wet deck surface and integral drift eliminators shall be resistant to rot, decay, fungus, and biological attack.

Fan: Fan(s) shall be heavy-duty, axial type with aluminum alloy blades driven by a one-piece, multi-groove neoprene/polyester belt designed for a minimum of 150% of the motor nameplate horsepower. Fan(s) and shafts shall be supported by heavy-duty, self-aligning, grease-packed ball bearings with moisture-proof seals and integral sealer rings, designed for very long life. Fan and motor sheaves shall be fabricated from corrosion resistant materials.

Fan motor(s) shall be energy efficient, inverter duty, totally enclosed type with a 1.15 service factor, and shall be mounted on an easily adjusted, heavy-duty motor base. The motor shall be furnished with double-sealed, permanently lubricated bearings and special moisture protection on windings, shafts and bearings. Air plenum shall provide adequate clearance under the motor base to provide comfortable working space for service personnel.

3.7 Pan Assembly:

The evaporative condenser shall include a pan assembly consisting of cold water basin with pump assembly, heat transfer section for spray water cooling with integral drift eliminators, and air inlet louvers. **The cold water basin shall be constructed of heavy-gauge stainless steel panels and structural members.** Basin shall include a depressed section with drain/cleanout connection. The basin area under the wet deck surface shall be sloped toward the depressed section to facilitate cleaning.

The cold water basin shall include: a drain/clean-out connection; a steel strainer; a brass make-up valve; over flow connection; and a water re circulation pump assembly. Cold water basin shall be designed so that the strainer, makeup valve and float, and pump assembly are easily accessible without removing any of the unit panels or other components. The strainer shall be designed with integral anti-vortexing hood to prevent air entrainment.

3.8 PUMP :

Water re-circulation pump shall be a close-coupled, bronze-fitted centrifugal pump equipped with a mechanical seal, mounted on the basin and piped from the suction strainer to the water distribution system. The pump shall be installed with adequate drains so that it may drain freely when the basin is drained. The pump assembly shall include an integral metering valve and bleed line to control the bleed rate from the pump discharge to the overflow connection. The pump motor shall be totally enclosed fan cooled (TEFC), energy efficient type.

3.9 **Accessories**

- Hinged access door to be provided to provide easy access to the unit interior for servicing.

- Evaporative condenser shall be provided with extended lubrication lines with standard grease fittings for lubricating the fan shaft bearings from the outside base of the condenser.

- Evaporative condenser shall be provided with a factory assembled, field-installed external platform with an access ladder and handrails to provide access to the top of the evaporative

- Evaporative condenser shall be provided with an internal walkway to facilitate servicing the unit and also provided with a moveable ladder with fixed ladder supports to provide access to the fan drive system and coil assembly.

- Electronic Water Level Control system mounted in the basin with a solenoid activated valve in the make-up water line. The valve is slow closing to minimize water hammer. The ON/OFF status of the solenoid valve shall be made available in the central PLC.

- Air Inlet Screens (factory installed) over the inlet louvers and the spray distribution system to prevent debris from entering the unit.

3.10 **Fittings and mountings**:

Provided on each condenser

1. Hot gas connection flanged and valved.
2. Liquid outlet flanged and valved.
1. Dual Safety valve branch with 2-position changeover valve and 2 Nos. safety valves. Simultaneous closing of both branches shall not be possible.

2. Necessary arrangement with isolating valves for pumping out/evacuating the condenser for maintenance shall be provided.
3. Air Purge connections
4. Pressure gauge tapping with valved pressure gauge.
5. Makeup water connection with all fittings.

3.11 **Installation**

Condenser shall be installed on an elevated RCC structure adjacent to existing atmospheric condenser, at suitable height (to ensure proper functioning cooling system of compressor) with sufficient working space has to be provided to ensure the gravity flow of condensed refrigerant into the receiver. The refrigeration plant supplier shall install the condensers with supply of necessary galvanized structural base frame complete all necessary accessories as required. All essential fittings and mountings required are in the scope of the supplier.

Refrigeration system contractor provide necessary layout drawings with static/dynamic load of the condensers to design the roof slab **suitably alongwith standard structural drawings required for installing the proposed condenser within fifteen days of issuing of letter of indent/purchase order**. **The access ladder to the top of condenser and protective hand railing, (all in galvanized steel construction) & foundation are included in the scope of Refrigeration Contractor**

All condenser coils, liquid and gas headers, supporting structure should be spray galvanized.

4.0 AMMONIA RECEIVER

Liquid ammonia receiver of pressure vessel design of suitable capacity to receive the refrigerant of whole system. While working out capacity of receiver, it should be assumed that 25% of receiver would be empty after receiving complete ammonia of system. Receiver should be complete with following accessories: -

a. Liquid inlet and outlet valves.
b. Air purging valve.
c. Charging hose pipe with connections, and charging valve.
d. Liquid level gauge glass enclosed in a metal casing along with necessary valves.
e. Pressure gauge with isolating valve.
f. Safety valve.
g. Liquid equalizer connection.
h. Oil drains connection with valve.

5.0 Testing And Commissioning:

5.1 Testing of piping:

5.1 All piping shall be internally cleaned and flushed by the Contractor after erecting in a manner suited to the service and as directed by the OMFED/consultant.

5.2 For hydrostatic testing and water flushing, the Contractor shall furnish necessary pump, equipment, instruments, piping etc.

5.3 Testing pressure for various for pipelines are mentioned below:

Sl. No.	Name	Test pressure	Test med.
1.	Water pipelines (soft, raw, chilled & glycol)	8 kg/cm sq.	Water
2.	Ammonia pipeline a) Suction b) Discharge	 16 kg/cm sq. 24 kg/cm sq.	 Nitrogen Nitrogen

Duration of test shall be 30 Min. for (1) with no allowable pressure drop. For ammonia time duration of test is 24 hours with allowable pressure drop of 0.2 kg/cm.sq.

7.0 ICE BANK SYSTEM

7.1 Ice accumulation coil to be fabricated from 32 mm NB MS 'C' class (heavy duty) Pipes in suitable sections and each section to be complete with inlet and outlet headers, oil drainage arrangement etc. The design of ice bank coils should be such as to accumulate a maximum of 50 mm thickness of ice. A suitable ice thickness cut out with solenoid valve should be provided for this purpose. Digital electronic thermometer to be provided for each compartment of ice bank. The main duties of the accumulating coil are as follows:

a) To accumulate ice equivalent to approx.20, 00,000 Kcal.
b) To meet the required heat transfer capacity and formation of ice when three compressors (each of capacity 1,25,000 Kcal/hr. are running simultaneously.
c) The design should be such as to accumulate a maximum of 50 mm thickness of ice. However, the length of the ice bank coil should not be less than 2500 meters.

The center-to-center distance between two pipes should be minimum 145 mm.

All header and ice accumulation coils should be spray galvanized after fabrication.

7.2 Two nos. MS Liquid separator complete with float valve, with electronic float switch, strainer, and by-pass arrangement for regulating the flow of liquid refrigerant in the ice bank coils to be provided.

8.0 CHILLED WATER TANK

Tank size and no. of compartment as specified in Design Data should be strictly maintained .It should be fabricated from MS plate of commercial grade as follows:

Sides and partition walls ---6.0mm
Bottom ---8.0mm

MS structural members as stiffeners, fasteners and supports etc. should be provided for accommodating the coil and to prevent bulging. Tank to be provided with suitable inlet with float valve. Overflow and drain with valve, raceway for agitators, MS angles are to be provided on top of chilled water tank to support removable covers. The partition plate should be provided with sufficient stiffeners so that in case one compartment is empty and adjacent compartment is full of water, there is no bulging. The tank shall be spray galvanized after fabrication. One electronic temp. indicator shall be supplied and fitted on IBT.

8.1.1 Covers

The removable teak wood covers fabricated in two equal layers each of 25 mm thickness of suitable equal size with 2 nos. lifting handles to be provided for complete ice bank tank except near the ends where non standard sizes can be used. The two layers of teak wood covers should be separated by waterproof paper.

8.1.2 Chilled water tank agitator:

These shall be mechanical type with 3 phase, 415 V, 50 Hz. Squirrel case TEFC degree of protection IP 55 induction motor of suitable size, along with necessary driving parts. Agitator should be designed to ensure uniform melting of ice on the coils. Each compartment of ice bank tank should be provided with suitable agitator and total number of agitators required for the ice bank tank is specified in design data, which should be strictly maintained.

8.1.3 Chilled water pumps:

These shall be centrifugal, monoblock type with capacity 60000 LPH at 25 MWC total head. Impeller of pumps shall be of bronze and motor shall be 3 phases, 415 V, 50 Hz.TEFC squirrel cage type degree of protection IP 55.

8.1.4 Chilled water piping:

Necessary GI 'B' class pipes and fittings for interconnecting ice bank tank, chilled water pumps, prechiller, Powder plant room chiller, milk pasteuriser, cream pasteuriser and return lines to the IBT including MS fabricated pot type strainers with brass perforated sheet, non- return valves and isolating valves (gate valves with CI body and brass working parts). One no. 100mm dia pressure gauge with isolation cock should be provided. Bidders should mention the pipe size considered for design. The distance between Chilled water pumps and chiller/ pasteuriser is 50 Meter. One suitable size header from the chilled water pump discharge shall be provided up to the process room from where chilled waterconnection shall be provided to the chillers and pasteuriser with necessary NRVs and stop valves. Similar chilled water return connections shall also be provided.

10.0 FORCED DRAFT COOLERS:

10.1 Function:

10.1.1 Cold room (Milk Cold Store) and Deep Freeze are maintained at required operating conditions by direct expansion forced draft coolers.

10.1.2 Duty and Design:

The duties of respective units are scheduled in Design data. The detailed design and the material of construction of the forced draft cooler shall be the responsibility of the contractor. The drawings shall be approved, required test pressure are scheduled in the special conditions of the contract.

Construction:

A specialist manufacturer shall supply forced draft coolers as fully assembled units. The manufacturer shall warrant performance. The make and type of units are subject to approval and shall be detailed in the contract.

The coolers required are of ceiling suspended forced-draft type specifically intended to operate with flooded liquid supply.

Cooling coils shall be of finned steel tube hot dip galvanized (or, else cooling shall be of finned stainless tube and pressure tested) after fabrication and pressure testing. For minimum zinc coating, 80 microns. Fin spacing shall be:

Rooms above 0 Deg. C. – Not less than 6 mm.

Coils shall be arranged for down-fed liquid supply and shall be graded continuously down to the outlet. Parallel coils shall be supplied

with refrigerant liquid through fixed metering orifices from the liquid supply header to ensure even distribution.

Water defrosts Spurger pipes and header shall be provided, arranged to be self-draining.

The casing shall be of 18 galvanised sheet steel, cross-broken to prevent drumming. Refrigeration coils and defrost piping shall be fixed to substantial bearers. The manufacturer is responsible, through the contractor, to ensure that no rattles occur when the unit is operating.

Induced draft fans shall be axial, direct coupled to motors. Belt drives are not acceptable. Fans and motors shall be dynamically balanced. Fans of cast aluminum or heavy gauge sheet steel, hot dip galvanized, are acceptable. Fans and motor assemblies shall be resiliently mounted and effectively guarded. Motors and bearings shall be suitable for operation at an ambient temperature of 4ºC and motors shall have degree of protection IP55 or better.

The drain tray shall be of 18 gauge-galvanized sheets, cross-broken to provide falls and arranged to intercept condensation from the casing. The drain tray shall be suitably insulated. The height of the tray shall not be less than 100mm.The outlet shall be vertical. Fabrication and installation drawings shall be approved.

Fixing of the unit shall be suitable numbers (at least four) suspensions rods attached to substantial lugs on the casing.

11.0 PIPING:

11.1 Requirement:

Supply and installation of all piping necessary for the operation of the plant.

11.2 Materials:

Piping for the respective services shall be: -

Service	Material	Specification
Refrigerant, Including oil purge	Steel	IS: 1239,3601 Heavy duty
Cooling water mains	Galvanized steel	IS: 1239, 3601, 4736Mediun
Water supply, Compressor cooling, Bleeds and drains	Galvanized steel	- Do –
Chilled water lines	Galvanized steel	- Do –
Defrost supply Return and drain	Galvanized	- Do –

4.3 Valves:

Manually operated isolating valves and check valves shall be of types:

Service	Material	Specification
Refrigeration	Ferrous, globe, Lift check.	IS: 1239, 11132
Cooling water: Over 75 mm - For 75 & 50 mm -	 CI butterfly Bronze gate	 IS: 778
Watersupply, Compressor, Cooling bleeds And drains	Bronze globe	IS: 778
Chilled water	Bronze gate, Swing check.	IS: 778
Defrost supply	CI lubricated Plug cocks.	

All valves shall be of flanged construction.
All water valves of size 38mm and below should be with CI ball valves.

11.0 Installation:

Special conditions of contract (Mechanical installation) clause 3.0 shall apply.

The drawings show the connections of piping and the general layout of pipe routes. These may be varied subject to approval provided the required function is maintained.

Pipe supports supplied and installed within the plant room should be adequate to accommodate other service piping, if any, entering the room. Installation drawings are to be approved by the OMFED.

In lines subject to thermal expansion, anchors shall be provided at approved locations and hangars and supports adjusted to be fair when the line is working condition.

12.0 Particular requirements:

Refrigerant suction:

Branches entering the suction main shall do so at the top.

Refrigerant hot gas:

Shall grade from a high point in the compressor branch down to the condensers. All branches should have top entry to the main.

Liquid drain:

The refrigerant liquid drain system from the condensers to the liquid receiver shall grade down to the liquid receiver.

Refrigerant valves

Unless otherwise directed or approved, valve shall be installed with spindles horizontal.

Water supply

Main water will be supplied at a point in the refrigeration plant room. All reticulation from this point is the responsibility of the contractor.

Cooling water and chilled water drains

Drain lines will be installed from suitable locations shown, within the refrigeration plant room. Connections shall be made to this to receive overflow, drains, including pump wells.

Bleed:

As appropriate, from the cooling and chilled water systems.

Compressor water-cooling:

Cooling as required for compressor cylinder heads, shaft glands shall be by water from the condenser supply system returned to the condenser sump. The water supply and return to the compressor should be done by providing supply and return water headers with suitable valves and fittings. Each branch connections shall incorporate a stop valve.

Outdoor piping.

Piping comprising:

-Refrigerant lines to condensers and receiver.

-Cooling water pipe work,

Shall be supported on structural steel members, hot dip galvanized after fabrication. Drawings are to be approved by OMFED

Insulation

Pipelines operating below ambient temperature shall be suitably insulated.

Vents

All refrigerant safety valve vents shall be piped outdoors to a place of safe discharge outdoors or to the condenser sump, as required by statutory authorities, and the vent outlet protected from obstruction.

Water valves

All water valves of size 38mm and below should be of CI ball valve type.

12.0 INSULATION OF MILK COLD STORAGE & DEEP FREEZE

13.1 CODES AND STANDARDS:

The design, supply, testing and application of insulation system shall confirm to the requirements of the following specifications: -

a) IS: 661 Code of practice for thermal insulation of cold storage.
b) IS: 4671 specifications for thermal insulation materials.

13.2 MATERIALS SPECIFICATIONS

Insulating material shall be expanded polystyrene confirming to the requirements of the latest edition of IS: 4671 insulation material supplied.

a. Should have a density not less than 16.0kg/cum plus/minus 10% in case of expanded polystyrene, 32kg/cum plus/minus 10% in case of polyurethane and 24kg/cum plus/minus 10% in case of phenotherm if it is to be used for insulating walls, roofs and ceiling.

b. Should have a density not less than 21.0kg/cum plus/minus 10% in case of expanded polystyrene, 32kg/cum plus/minus 10% in case of polyurethane and 24kg/cum plus/minus 10% in case of phenotherm, if it is to be used for insulating floor.

c. Should have a compressive strength of not less than 1.35 kg/ sq.cm.

d. Should have a thermal conductivity at 10 deg.C. not greater than 0.028 Kcal/sqm/hr.C for polystyrene, 0.021 Kcal/sqm.hr.C for polyurethane and phenotherm.

e. Should have water vapour transmission rate (permeance) of not greater than 0.4% by volume in 24 hours.

13.2 Water vapour barrier for walls, roofs and ceiling of cold store room should be 0.05 mm thick, having a density of 60 grams/sqm. Garware's metal coated polyester film or equivalent.

13.3 Bitumen used as vapour barrier for cold store and adhesive shall be industrial bitumen 85/40 or 85/25 conforming to the requirement of IS-702.

13.4 Supporting wooden framework shall be of teak wood of good quality.

13.5 Chicken wire mesh used shall be 20 mm x 24 gauge GI chicken wire mesh

13.6 Cement plaster used shall be of 1:4 ratios for all walls and 1:3 for ceiling.

13.7 Thickness and quantities of insulation material (for expanded polystyrene only) are specified above. However if the bidder intends to use polyurethane/phenotherm as insulating material he may specify the equivalent thickness of insulation whole quoting.

13.8 METHOD OF APPLICATION OF INSULATION

For walls and ceilings of cold store & Deep freeze.

a. Clean the surface and apply a coat of hot bitumen at the rate of 1.5kg/sqm with the help of lime brush over the walls and ceiling.

b. Fix a layer of 0.05mm metal-coated polyester film using bitumen as adhesive with 75.0 mm over laps at the joints.

c. Fix teak wood battens vertically at 550mm centers, horizontally 1050 mm with the help of suitable rawl plugs and wood screws for walls.

For ceiling mild steel flat are to be provided & fixed in the slab by the Contractor at the center distance of 550mm in one direction and 1050mm in the other direction. The teak wood battens would be held in position with the help of studs (already welded to mild steel flat provided in slab) and nut.

The size of teak wood battens should be as follows:

i) 50mmX15mm for 30mm insulation
ii) 50mmX25mm for 30mm insulation
iii) 50mmX30mm for 60mm insulation
iv) 50mmX50mm for 75mm or 100mm insulation
v) 50mmX75mm for 125mm or 150mm insulation
vi) 50mmX100mm for 175mm or 200mm insulation

d. Fixed first layer of insulation material as specified below firstly between the battens, applying a coat of bitumen at the rate of 1.5 kg/sqm on the faces and the edges of insulation slab:

i) 15mm thick for 30mm insulation
ii) 25 mm thick for 50 mm insulation
iii) 30 mm thick for 60mm insulation
iv) 50 mm thick for 75mm, 90mm, 100mm insulation
v) 60 mm thick for 110mm insulation
vi) 75 mm thick for 125mm and 150mm insulation

vii) 100mm thick for 175mm and 200mm insulation

e. Seal the joints carefully with bitumen.

f. After the first layer of insulation is secured bitumen must be applied on the insulation surface of the first layer and the contact surface of the second layer. The rate of application shall be such as to ensure a total rate of 1.5 kg / Sqm between the contacting surfaces.

g. Fix a second layer of insulation material as specified below crosswire staggering the joints using bitumen as adhesive:

i) 15mm thick for 30mm insulation
ii) 25 mm thick for 50 mm or 75mm insulation
iii) 30 mm thick for 60mm insulation
iv) 40 mm thick for 90mm insulation
v) 50 mm thick for 100mm, (110mm) or 125mm insulation
vi) 40 mm thick for 150mm insulation
vii) 100mm thick for 200mm insulation

h. Seal the joints carefully with bitumen.

i. Fixed layer of 0.05mm metal-coated polyester film using bitumen as adhesive with 75mm overlaps at joints as vapour sealing on the outer surface of insulation material in case of partition walls.

j. Cover the insulation with layer of 20mm X 24mm gauge GI chicken wire mesh fixed of insulation material with the help of suitable 'U' nails made of 18 gauge GI wire.

k. Support both wire mesh and insulation material to the wooden battens with the help of suitable washers and wood expansion screws.

l. Finally finish with approximately, 15mm thick cement plaster.

For Floors of Cold Store & Deep freeze:

a. Clean the surface and apply a coat of hot bitumen at the rate of 1.5 kg/sqm with the help of lime brush.

b. Fix a layer of 1 to 1.2 thick waterproof tar felt sheet-using bitumen as adhesive with 75mm overlap at all joints and 250mm overlap at the walls.

c. Seal the joints with bitumen and apply a coat of bitumen on the outer surface of tar-felt.

d. Fix a layer of insulation using bitumen as adhesive as under:

i) 15mm thick for 30mm insulation
ii) 25 mm thick for 50 mm insulation
iii) 30 mm thick for 60mm insulation
iv) 50 mm thick for 75mm, 90mm, 100mm insulation
v) 60 mm thick for 110mm insulation

vi) 75 mm thick for 125mm and 150mm insulation

e. Seal the joints with bitumen m

f. Apply a cost of bitumen on the outer surface of insulating materials as well as on the contact surface of the second layer. The rate of application should be such as to ensure a total rate of 1.5 kg/sqm between the contacting surfaces.

g. Fixed a second layer of insulation material crosswise staggering joints using bitumen as adhesive as under:

i) 15mm thick for 30mm insulation
ii) 25 mm thick for 50 mm or 75mm insulation
iii) 30 mm thick for 60mm insulation
iv) 40 mm thick for 90mm insulation
v) 50 mm thick for 100mm, 110mm and 125mm insulation
vi) 75 mm thick for 150mm insulation

h. Seal the joints carefully with bitumen.

i. Fix layer of approx. 3mm thick waterproof tarfelt sheet using bitumen as adhesive with 75mm overlap at all joints and 250mm overlap at the walls.

j. Seal the joints with bitumen.

13.10 TESTING

Test provided from authorised laboratories shall be provided in support of all physical proportion of insulating material.

All insulating material supplied shall be inspected and tested for density. Sampling of specimen shall be as per IS: 4671 and sampling shall be carried out at site by the contractor when materials being delivered. Samples shall be chosen at random by OMFED's Engineer.

13.11 SPECIAL NOTES:

The supply of necessary size of studs with washer and nuts and its welding to mild steel flats is included in the scope of supply.

'J' bolts, rawl plugs, wood screws, washing, 'u' nails, GI screws, wire mesh etc., whatsoever required to complete the job is included in the scope of supply and erection.

If required, necessary bolts for ceiling in case the mild steel plates are not provided in the ceiling are to be supplied and fixed by the Contractor/contractor.

Cost of cement for plaster, if supplied by OMFED, shall be recovered at the rate of Rs150/- per bag of 50kg. However the cement consumption has to be within 5% limit of theoretical consumption. Any excess consumption above 5% will be recovered at 1.5 times of the issue rate.

14.0 AUTOMATIC CONTROLS AND AUXILIARY EQUIPMENTS

14.1 AIR CURTAINS

Air curtains for doors of size 1.2m. Opening to stop entry of fresh air into cold store/deep freeze. These should have arrangement for starting on opening of doors. Unit should have high speed (10M/Sec) air blower with single phase, squirrel cage induction motor and air distributor.

14.2 Air Purger

It should be of suitable capacity to purge non-condensable gases. The purge should include cylindrical steel shell, cooling coil, expansion valve, liquid level sight glass, pressure gauge, suction valve, purge valve, gas inlet and liquid valve, overflow line and valve mounting supports, water seal etc. The purge shall be tested and finished as per standard practice.

14.3 Cold Store & Deep Freeze Doors

These doors should be made out of properly seasoned teak wood and insulated with expanded polystyrene resin with 14 SWG aluminum cladding on both sides and frame. The doors should be complete with hinges, handles, hold fast, locking arrangements, double front pushing knobs made of brass and chromium plated.

14.4 Electric Buzzers:

Heavy duty type, single phase 230V, A.C. supply operated for giving distress signal from cold stores to plant room/outside cold store.

14.5 Electrical Inter locking for Control.

a) Interlocking between all the pumps with all the compressors with control cables should be done in such a way that none of the compressor should be started unless one of the condenser pumps is running.
b) Low suction pressure, high discharge pressure and low oil pressure cutouts should be interconnected with compressor motor starter.
c) Interlocking of ice bank tank agitator with solenoid coils (operated by ice thickness thermostat) with control cables is to be done in such a way so that solenoid coils should not be energized without starting the agitator.

Note:

Necessary control contacts in required electrical feeder for starter are to be provided by the Contractor.

14.6 INSTALLATION OF SYSTEM

14.7.1 Electrical Installation

14.7.1.1 General:

The power switchboard would be available at the plant room. All electrical works (including supply of basic materials and consumables) connected with refrigeration system shall be carried out by tenderer as per latest Indian Electricity Rules & Standards.

14.7.1.2 Cables

All power cables shall be PVC insulated, PVC sheath, aluminum conductor, armored as per IS: 1554 (Part-1) and control cables shall be of copper conductor, armored, Cables should be laid in suitable size `A' class GI pipes when in floor, clamped on supports when in trenches, on GI perforated cable trays when in air and at 750 mm below ground with sand and bricks when underground as per standard practices. Upto working height above floor level armored cables would be protected by

GI `A' class pipes. At but ends of cables suitable heavy-duty brass glands shall be used and if required tee would be terminated with sockets/lugs.

No power cable shall be less than 4 sq. Mm conductors and control cable less than 2.5 sq mm conductor.

17.7.2 **Earthing:**

Suitable GI strips bus/wires shall be laid in trenches/cables trays etc. to provide 2 Earthing to each power equipment and control instrument/panel/meter.

17.2.3 Isolating switches/Push Button/Junction Boxes:

Suitable size isolating switches/push buttons in weather proof, AI.coast housing shall be provided near each motor if the motor is not in the plant room (where power switch board is located) and also if aerial distances of motor from power switch board is more than 25 meter. Weather proof, AI, cast junction boxes shall be provided near each water pump if it is 7.5 HP or lower HP. From this junction box, connection should be made to pump motor through flexible multicore copper conductor unarmored cable in stainless steel flexible conduct.

17.2.4 Statutory Requirements:

As per statutory requirements, the tenderer shall provide necessary danger plates and shock charts etc. in the areas where electrical installation is being done by them. On completion of works necessary electrical testing as per IER should be carried out and test report should be submitted to site engineer for forwarding to Chief Electrical Inspector.

17.3.2 Mechanical:

17.4.1 Painting:

All factories fabricated and site fabricated MS surfaces should be provided two coats of anti-corrosive primer followed by at lest 2 coats synthetic enamel paint. However the inside surfaces of chilled water tank shall be given one coat of zinc rich paint. All supports fabricated at site should also be painted with 2 coats of anti-corrosive primer & 2 coats of synthetic enamel paint. Pipelines should be painted as per colour code of ISI 2379-1963 amended till date.

17.5 Insulation:

17.6.1 Insulation of Chilled Water Tank:

Supply and application of sufficient quantity of insulation material such as expanded polystyrene, bitumen, tarfelt, studs, chicken wire mesh for chilled water tank as specified below. The contractor will do plastering work over the insulation:

a. For bottom 100 mm thick heavy-duty expanded polystyrene having an average density of 20 kg/cum in two layers of 50mm each.
b. For sides 100 mm thick normal duty expanded polystyrene having average density of 16 kg/cum. in two layers of 50mm each. Vapour barrier also to be used for sides. Other insulation material can be used, only after approval of the same by OMFED.

17.6.2 Insulation of Pipe Lines:

Sufficient quantity of insulation material such as expanded polystyrene/phenotherm, sticking material bitumen, vapour seal, `U' nails, chicken wire mesh, 22 gauge aluminum cladding material, battens, paints etc. for insulation of liquid separator, ammonia suction line and connections to air cooling units, chilled water pipe lines and for whatever pipe line insulation is required. Glass wool insulation with 22-gauge aluminum cladding is to be provided over bodies of all valves & filters in chilled water line.

Wherever possible standard pipe section insulating material should be used. All insulated pipeline and separators should be cladded with 22 Gauge Aluminum sheet.

17.6.3 Piping:

All piping should be welded type and flanged joints shall be provided wherever necessary for dismantling the pipelines for maintenance.

17.6.4 Consumable:

The plant should be provided with sufficient quantity of first charge of refrigerant to meet the required load at specified suction and discharge pressure, sufficient quantity of first charge of oil for compressors (including consumed during trials) shall be provided.

8.0 Testing & Commissioning of System

The contractor shall operate, maintain and give satisfactory trial run of the plant for a period of continuous 30 days at the rated output. All rectifications of damages, defects and routine trouble shooting should be carried out by the Contractor, during this period. The Contractor shall incorporate/execute necessary minor modifications for maximizing operational efficiency. The Contractor shall demonstrate proper working of all mechanical and electrical controls, safeties and protective devices in a presence of OMFED's engineer and the same should be duly recorded. The work shall be deemed to be completed only after satisfactory performance of the entire plant for 30 continuous days at the rated output, & after handing over the same subsequently.

9.0 BATTERY LIMITS:

The battery limits for this job are as follows:

a. Chilled water from outlet of IBT to chilled water pump including outlet header of chilled water pumps with necessary valves & strainers & insulation of all the pipelines and accessories connecting chillers, and pasteuriser are included in the scope of work.

b. Chilled Water and including pipe line with insulation / Valves/ Fitting should be inter connected with the existing header

c. Raw/soft water-from a centralized tapping point near plant room.

d. Electrical: For New MCCs in new refrigeration room. Contractor has to provide & install outgoing cables for all the motors and automatic control systems within the scope of worked from these MCCs, including testing/commissioning of the same.

e. The scope of work includes unloading storing, moving of the plant and equipment including their parts and fittings to & from the contractor's godown to the place of erection, decrating, aligning, assembling, fixing on foundations etc.

f. Cutting of holes in walls/RCC and grouting of supports for piping, cable trays etc, are to be done by contractor.

10.0 INCLUSIONS

10.1 Civil works such as foundations for equipments and finishing by plastering after installation of equipment on foundation.

10.2 RCC/masonry sump for atmospheric condensers including RCC column for supporting steel structure of condenser coils. Necessary MS insert plates would be grouted at top face of the beam required for supporting the condenser coil. Contractor has to provide the supporting steel structure for the coils.

11. MOTOR CONTROL CENTER FOR REFRIGERATION

A. INCOMING FEEDER:

(01) One no 600Amp, TPN SFU having a symmetrical breaking capacity of suitable Amp at 415V AC equipped with –

a. One set of CT's ratio of (600/5) Amp. & Accuracy class '1' for metering.

b. One no Ammeter of size (96x96) mm and scale range of (0-500) Amp.

c. One no. Three way & off Ammeter selector switch.

d. One no. Neutral link.

e. One no. 'ON & OFF' indicator.

f. One no. Voltmeter of size (96x96) mm with a range of (0-500) V.

g. One no. Voltmeter selector switch three way &off.

h. One no. Single phasing preventor 3ph, 415V

B. OUTGOING FEEDER FOR REFRIGERATION: -

SL NO.	FEEDER DESCRIPTION	H.P. RATING	SWITCH IN AMPS	FUSE IN AMPERE	STARTER
01	Ammonia Compressor-I	100	200 TPN	63	Switch Fuse Unit
02	Ammonia Compressor-II	100	200 TPN	63	Switch Fuse Unit
03	Ammonia Compressor-III	100	200 TPN	63	Switch Fuse Unit
04	Chilled Water Pump-I	10	32	16	Star/Delta
05	Chilled Water Pump-II	10	32	16	Star/Delta
06	Chilled Water Pump-III	10	32	16	Star/Delta
07	I.B.T.Agitator-I	5	32	16	DOL
08	I.B.T.Agitator-II	5	32	16	DOL
09	Condenser Pump -I	10	32	16	Star/Delta
10	Condenser Pump -I	10	32	16	Star/Delta
11	Blower for condenser-I	To be provided as per design of manufacturer			
12	Blower for condenser-II	To be provided as per design of manufacturer			
13	Blower for condenser-III	To be provided as per design of manufacturer			
14	Compressor cooling water pump	To be provided as per design of manufacturer			
15	Compressor cooling water pump	To be provided as per design of manufacturer			
16	Sump pump	10	32	16	Star/Delta
17	Spare-I	10	32	16	Star/Delta
18	Spare-II	7.5	32	16	DOL
19	Spare-III	7.5	32	16	DOL

NOTE: -1. All feeders should be provided with O/L relay of appropriate range and Provision for remote control Start/Stop.

2. Ammeter shall be provided for each compressors separately as per standard requirement.

12. APPROVED MAKE:

Bidder should specify make (Maximum 2 Nos.) of following items in order of preference:

Sl.No.	Item	1st preference	2nd preference
i)	Compressor	Frick /Kirlosker/ Accel Equivalent	
ii)	Compressor Motor	Seimens/Crompton greaves/Kilosker	
iii)	Pumps	Kirloskar	
iv)	Condenser Coil	TATA/Jindal	
v)	Air Cooling Units	Reputed Make	
vi)	Refrigerant Piping	Jindal	
vii)	Ammonia system Valves	Super maini	
viii)	Water valves	Audeo	Sunders
ix)	Power cable (LT)	Polycab/KEI	Gloster
x)	Control cable (LT)	Gloster	
xi)	Motor Isolator	Seimens	
xii)	Junction Box For Motors	Havells	
xiii)	Push Buttons	L & T	
xiv)	Cable Glands	Comet	
xv)	Cable lugs/sockets	Comet	Dowell's
xvi)	Instruments/controls	Indfoss	
xvii)	Insulation materials for pipelines	Beardsell	Lloyd
xviii)	Insulation materials for cold store /IBT	Lloyd	
xix)	Pressure/Temp. Gauges	H.Guru	Filbig
xx)	Refrigeration controls	Radix IDMC/Accel Equivalent	
xxi)	Cooling Tower	Humugiri/Unitech	

2nd preference make would be allowed for use only if OMFED is satisfied that 1st preference make is not available or is preferred over the 1st preference, by OMFED.

Note: Samples of G.I. strip, G.I. wire, PVC ferrule, cable trays, Motor isolator, and Junction box for motors are to be submitted for approval before use.

12.0 DESIGN DATA

1.	No. of Compressors	03Nos.
2.	Capacity of each compressor	1,80,000 kcal/ hr.
3.	Ammonia oil separator for main Compressor	3 Nos
4.	Capacity of ammonia receiver	2000 litresX1nos
5.	No. of ice bank tank	2 Nos
6.	Overall size of ice bank tank, (of both tanks)	To be designed by Bidder
7.	No. of compartments of each ice bank tank	Two Nos.
8.	Total No. of agitators for ice bank tank	2 Nos.
09.	Total length of ice bank coil, 32 NB (in two tanks)	2500RMT
10.	Chilled water pumps-60KLPH at 25 MWC each	3 Nos
16.	Approx. Size of refrigeration plant room	12M x5M
17.	Evaporative Condenser	01 set Specification attached in Page No-77

Note: The proposed machinery layout drawing is to be enclosed in the bidding documents.

13.0 TECHNICAL INFORMATION TO BE PROVIDED BY TENDERER

1.1 Main compressor: Size _____ , Speed _____

Model _____ , Capacity _____ KCal/hr

1.2 Motor for main compressor: _____ HP , _____ RPM

1.3 Booster compressor: Size _____ , Speed _____

Model_____ , Capacity _____

Motor for booster compressor: _____ HP , _____ RPM

1.4 Condenser pump: _____ HP , _____ RPM , Model _____

1.5 Chilled water pumps: _____ HP, _____ RPM , Model _____

1.6 Agitator of chilled water tank: size _____Ø , _____ HP

1.7 Blower motor for forced draft cooler unit: _____ HP , _____ RPM

1.8 Total qty. of first charge of ammonia considered: _____kg

1.9 Total qty. of compressors oil considered: _____ L.

NOTE:

1. **Contractor has to ensure that the data provided above shall be sufficient for the scope of work covered by the Contract. Acceptance of the above data by the OMFED does not release the bidder of his responsibility to provide satisfactory performance of the entire plant, on a turnkey basis.**
2. **Contractor may provide alternate design of refrigeration system and quote separate price for the same.**

SPECIFICATION FOR CIVIL WORK OF REFRIGERATION PLANT –

The Scope of civil work (Design is under scope of Bidder suitable for 150TR.)

1. Shed of Ammonia receiver tank with IPS Flooring.
2. Foundation bolt Grouting of MS angle and channel.
3. Brick masonry wall up to Plinth level (+) 600mm from Ground level.
4. Plinth beam over Brick masonry wall of Ammonia receiver Shed.
5. Truss with MS steel /MS channel/ MS Pipe of Ammonia receiver shed.
6. Exiting refrigeration room to be used as compressor. Dismantling of exiting foundation of air compressor inside the refrigeration room is under scope of bidder.
7. Shed over ammonia receiver tank with galvanized sheet.
8. Wall cutting and M.S channel and angle wall guard for supporting of pipe lines.

It is not the intent of these technical specifications to specify completely all details of design and fabrication of any plant/equipment, nevertheless, the equipment shall confirm in all respects to high standards of engineering design & workmanship and be capable of performing in continuous commercial operation up to agreed performance standards in a manner acceptable to the OMFED.

The purchaser/client will interpret the meaning of various equipment specification and drawings and shall have the power to reject any material/ equipment which in their opinion is not in full accordance to tender specifications.

The successful Bidder shall be responsible to undertake all work involved in implementing the project within their battery limits. This shall include but not limited to design, manufacture, supply, installation and commissioning of the entire project component including process equipment, process pipe-work, utilities equipment, services pipe-work, electrical equipment, power cabling, instruments and controls, control cabling, pneumatics, and automation. Also all necessary supports, support structures, cable ducts, trenching, conduits etc. required to complete the installation and to meet the OMFED's high standards are included. No exclusions of any nature are acceptable, other than those detailed in this Tender document to be in the supply of OMFED, or in the scope of one of the other Tender Packages.

In particular the Supplier shall be responsible for:

Execution of the project in accordance with the prevailing Indian Standards, Indian Electricity Rules, Indian Explosives Act, Indian Factories Act, Indian Pollution Act and any other Act which may be relevant to the project and obtaining approvals thereof. Wherever Indian Standards are not available the bidder shall follow International Standards.

Design Requirements and Scope of Work:

The scope of work includes Design, supply and installation of required which comprises of ;

- The ceiling and wall should be with pre-fabricated panels of required thickness as per IS specification.
- Vapour proof light fittings (2 X 36 W fluorescent tube lights) for adequate illumination inside the cold store and airlock, safety alarm system, digital temperature indicator & sensor, control switch gears, electrical wiring, conduiting, power/control cabling, earthing, etc.
- Manual sliding type doors with padlocking facility and airstrip curtains with all accessories.
- Providing suitable supporting /suspension system for ceiling panel and wall panels.

- Providing suitable provisions/cutouts for installation of refrigeration units, refrigerant piping, defrost piping, light fittings, power/control wiring, air curtains, etc., to be supplied and installed without any extra cost, after installation of the units/piping/fittings.

- The Supplier shall provide the details of his requirements to the purchaser to enable keeping necessary provisions in the civil construction. The Supplier shall provide weather protection shed.

- Civil building with leveled PCC plinth for erecting the prefabricated room, RCC flooring over the floor and RCC curbing for protection wall panel.

- Wall panels should be self-supporting type and bear the load of ceiling panels, fittings, etc. Wall panels should not buckle under the operating weight.
- For the sheds with span upto 6 mts., the ceiling panel should be self supported type with weight uniformly distributed upon wall panels. For larger rooms having span more than 6 mts, the ceiling panels may be designed with suitable exterior type suspension arrangement. No interior vertical supports should be used to ensure interior of the cold store room free and clear.
- In either case, ceiling panels should not sag due to self-weight, as well as the weight of refrigeration units, light fittings, etc, which are to be suspended from the ceiling panels.
- Wall panels should be designed with suitable impact protection arrangement.
- Should withstand earthquake intensity, as well as high velocity wind applicable to the zone, where the cold store room to be constructed.
- Design should facilitate convenient installation and future expansion of the room by assembly of standard size sectional insulated panels.
- The shed, accessories and finish should be designed for suitable for considering a minimum life span 20 years.

Supplier shall submit a drawing for approval as per clause for installation of the vessels on the foundations. The installation shall be coordinated with the installation of liquid pumps, All the field equipment in refrigeration plant shall be adequately earthed as per relevant Indian standard and for different loads.

All earthing mains shall be galvanized. The earthing to the equipment will be with the help of PVC coated/insulated aluminium wire/cable for motor of up to 60 HP. For motor 60 HP and above the earthing shall be done with tinned copper flexible connections of adequate rating.

An earth pits and earthing system of instrumentation, computers and PLC controls should not share the elec. Load earthing system of electrical power equipment and a separate copper plate earthings as per statutory rules with copper interconnection strips/wire shall be supplied and erected. All related works are in the scope of Supplier including the earth pit civil works and painting, etc.

Detailed engineering/ execution drawings shall be approved prior to commencement of the work.

The schedule of quantity & thickness of ceiling/wall/floor to be carried out has been furnished in Schedule of Requirement. The quantities of wall/ceiling and floor indicated in the schedule are only tentative. The payment however should be made for the actual area of work executed based on the unit rate applicable.

Necessary foundations for equipment based on the details provided by the equipment supplier.

Supply of necessary foundation bolts along with the template, sub base and all other associated erection materials. Civil work pertaining to the cable laying, earthing pits, grouting of various foundation bolts, cut-openings in the wall, ceiling etc.

Patch up/finishing works, specifically for the cut& filling - openings in the wall,trenches, ceiling etc.

Masonry cable trench with nosing angle in plant room.Providing details of civil design, building layout and drainage and sewage details.

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

Temporary water and power supply at one point within the dairy premises.

Fire fighting system except that for the automation Systems. The **fire detection system for the automation systems shall be provided by the Supplier**.

Lightning protection system

GENERAL GUIDELINES

1.0 General Specification:

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

All MS 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 shall be easily removable and shall allow free air circulation as well as entry of electrical cables. All motors installed outside the building shall have GI shrouds.

Suitable safety guards shall be provided wherever required.

Makes of various equipment/components shall be clearly indicated by the Bidder

All weld joints shall be ground smooth. All corners shall 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.

All SS joints shall be argon-arc welded only.

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.

Wherever a "Lot" has been indicated a detailed list shall be provided by the Bidder.

All instruments, controls, and Automation system shall be manufactured by an internationally recognized Indian manufacturer or foreign manufacturer with suitable agency representation in India.

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 sets of above in soft copy in CDs.

23.3 BATTERY LIMITS

23.3.1 CIVIL WORKS

All civil works and RCC foundation shall be provided by Bidder . including all necessary foundation bolts, foundation plates and templates shall be provided by the bidder.

Following special civil works shall be in the bidder's scope:

- Civil works related to laying of underground cables such as digging of trenches, providing sand and bricks etc.
- Civil works related to earth pits such as digging of earth, making watering chambers etc.
- Supply and erection of additional MS angles / channels, cable trays, chequered plates etc., for laying cables, equipment shall remain in bidder's scope.

RCC cable trenches in sub-station building along with MS angle nosing, RCC Hume pipes for crossing roads, RCC cable trenches in transformer room for laying 11 KV cables shall be provided by the by the bidder.

VI)PRICE SCHEDULE FOR EFRIGERATION PLANT ,CAPACITY-60KLPD AT BHUBANESWAR DARY,BHUBANESWAR

Part – A- Refrigeration

SL NO	DESCRIPTION OF ITEMS	QNTY.	UNIT. SUPPLY RATE (IN RS)	UNIT ERECT. RATE (IN RS)	T.SUPP. COST (IN RS)	T.ERECT. COST (IN RS)
1	Inter connection between the new ammonia pipe line and existing pipe line connected to the existing cold store complete with globe Valves NRV, etc.	1 Lot				
2	Main compressor with all accessories.-50TR	3NOS				
3	Main compressor motor -50HPwith solid rail foundation bolt pulley V. Belt with necessary fittings.	3NOS				
4	Ammonia oil separator	3NOS				
5	Evaporator condenser 100TR, PUMP etc (as per manufactures specification)	01NOS				
6	Evaporator condenser pump-10HP to be designed	02 nos				
7	M.S "C" class pipes complete with globe valve NRV for refrigeration piping inter connecting compressor condenser, receiver & evaporator.	01Lot				
8	Condenser and IBT make up water with compressor jacket cooling piping,valves and all standard accessories	01LOT				
9	Ammonia receiver 2000ltrs with all accessories	**01 NOS**				
10	Chilled water tank coil (IBT Coil) - 1250 mtr x 2nos	2500Mtr.				
11	Chilled water tank, insulation & cover	02 Sets				
12	Chilled water tank agitator.-5HP	02NOS				
13	Chilled water pump.-10HP (60KLPH)	03NOS				
14	Chilled water line CI Butter fly valves, strainer & all standard accessories	01Lot.				
15	Chilled water pipe line ("B class pipe) of size - 3".	150Mtr.				
16	Chilled water pipe line ("B class pipe) of size - 2", 1.5".	60Mtr.				
17	Ammonia refrigerant1500 KG & lubricating oil 1000LTR,(as per requirement for nos 2000Ltr Ammonia receiver and For compressor)	01Lot.				
18	Insulation & cladding of Ammonia pipe line.	01Lot				
19	Cooling water pump with pipe, valves & fittings for Ammonia compressors (as per requirement) with in radius of 50mtr	02sets				
20	Cooling tower for cooling of compressors	standard				
21	GI /M.S Bend, Union, socket, Elbow as per requirement	01Lot.				
22	MS Structure & Support for pipe lines and painting as per Industrial act.	01LOT				
23	Painting of pipe lines as per industrial act.					
24	Testing ,commissioning and trial run	01Job				
25	Statutory inspection and approval from Competent Authority / Factory inspector/Explosive act of the same.	01Job				
				TOTAL(A)		

Part –B- Civil Works

SL NO	DESCRIPTION OF ITEMS	QNTY	UNIT.SUPPLY RATE (IN RS)	UNIT ERECT. RATE (IN RS)	T.SUPP.COST (IN RS)	T.ERECT.COST (IN RS)
1	Machine foundation of for Main compressor , chilled water Pimp, condense Pump	1Lot				
2	Foundation for support Pipe line including wall cutting and Finishing the surrounding as per specification	**1Lot**				
3	Foundation and construction of evaporative condenser tank / cooling tower as per required design.	01LOT				
4	RCC Foundation for IBT Tank and construction of IBT wall of Size 7.0 x 4.0 Mtr x 3.0 Mtr Height	**01Nos**				
5	Construction of shed to accumalate Ammnia receiver including all civil works,IPS florring,receiver foundation,M.S section for shed metasheet roofing,plinth protection,colouring /painting etc complete of size 10Mx6Mx3.5Height.					
				TOTAL-B		

Part –C- Electrical Works

SL NO	DESCRIPTION OF ITEMS	QNTY	UNIT.SUPPLY RATE (IN RS)	UNIT ERECT. RATE (IN RS)	T.SUPP.COST (IN RS)	T.ERECT.COST (IN RS)
1	Refrigeration panel Board as per standard requirement with in-Built Capacitor bank. Ammeter for each compressor .Input Voltage-350Volts.	**1Set**				
2	Alluminium armoured cable of size 3.5C x 400 sq.mm from LT to refrigeration panel board	**100MTR**				
3	Alluminium armoured cable of size 3.5C x 120 sq.mm from refrigeration panel board to compressor starter	**180mtr**				
4	Suply and installation of MCCB of capacitt-400Amp at old LT Panel of plant ,related cable and necessary fittings	**01Lot**				
5	Supply and installation of Alluminium armoured cable of size-3.5Cx70Sqmm	**150Mtr.**				
6	Station/isolated switch for condenser pump and chilled water pump	**08Nos**				
7	Floor mounted push button (four point) with stand and SS encloser	**02NOS**				
8	Supply and installation of Alluminium armoured cable of size-3core X 6 Sqmm	**200Mtr**				
9	Supply and installation of Alluminium armoured cable of size-3core X 4 Sqmm	**200Mtr.**				
10	Armoured control cable of size-18Core x 1.5Sqmm	**60Mtr**				
11	3core X2.5 Sqmm **copper flexible wire.**	**100Mtr.**				
12	PVC flexibale conduit pipe of size-50mm	**100Mtr.**				
13	Cable tray (150MMx**20MM**)	**100Mtr.**				
14	MS structures & supports for laying of pipelines ,cutting wall,grouting with cement concrete.	**1Lot**				
15	Earthing wire 8 SWG GI wire	**1Lot**				
16	GI strip for earthing -40x6mm & 25x6mm	**1Lot**				
17	G I plate earthing as per is specification.	**5Nos**				
18	Testing, Commissioning & Trial run	**1Lot**				
			TOTAL-C			
			TOTAL COST OF ITEMS (A+B+C)			

Approved makes:

SCHEDULE-I

MAKE OF BROUGHT OUT ITEMS

1	Pressure Reducing Station	:	Spirax (JN Marshall /Mazda)
2	MS 'C' class pipe	:	Tata
3	CI sluice valve with GM working parts	:	Kirloskar / Leader
4	Insulation materials glass or mineral wool mat	:	Mettur Beardsell /Lloyed Spinte
5	LT cables / control cables	:	Tropodour /CCI / Closter/Nicco
6	Electrical isolating switch	:	Siemens / L&T
7	MS structural items	:	TATA / SAIL / JINDAL
8	Pressure & temperature gauges	:	JN marshal / Fiebig / H. Guru

NB: The bidder should quote for above makes of items only. The difference in prices should be mentioned clearly, while quoting the items of makes other than the specified above.

Declaration

(to be filled up by the party in letter pad)

I/we declare that I/we have gone through the above mentioned condition in Technical bid and commercial bid before filling up our rate and submission of the Tender paper. I/we confirm the acceptance to all these conditions

i) Name

ii) Name of the establishment

iii)TIN/CST no.

iv) Service tax registration no.

v) Address for correspondence

vi) Telephone no.

vii) Fax no.

viii) Email id

All the information furnished by us is true to our knowledge & belief.

Signature with Seal

Section VII

FORM OF BID

Bidders are required to fill up all the blank spaces in this form of Bid:

Name and address of OMFED :ORISSA STATE CO-OP. MILK PRODUCERS' FEDERATION LTD.,
D-2, SAHEED NAGAR,
BHUBANESWAR-751007, ORISSA

Description of works : DESIGN, DRAWING, INSTALLATION, TESTING & COMMISSIONING OF EXPANSION REFREGERATION PLANT INCLUDING CIVIL, STRUCTURAL, MECHANICAL & ELECTRICAL WORKS AT SAMBALAPUR DAIRY .
CAPACITY - 60, 000 LPD.

Dear Sir,

1.0 Having examined the bidding documents including conditions of contract, Specifications, schedule of quantities and drawings included in or referred to in the bidding documents including Addenda Nos._____, Receipt of which is hereby duly acknowledged, for the execution of above mentioned works, we, the undersigned offer to supply and deliver goods and services including installation & commissioning as detailed in the price schedule, and maintain whole of the said works, in conformity with the said conditions of Contract, specifications and schedule of quantities for the sum of **Rs_____(Rupees _____ only)** or such other sum as may be ascertained in accordance with the schedule of prices attached herewith and made part of this bid and the said technical specifications, drawings and conditions.

2.0 We, undertake, if our bid is accepted to commence the works within 15 days of receipt of the notification of award, and to complete and deliver the whole of the above said works comprised in the contract within _____**days calculated from the day of the receipt of the Notification of Award.**

3.0 If our bid is accepted we will furnish a security in the form of bank guarantee (as per the format provided in this bidding document) to be jointly and severally bound us for the due performance of the Contract, in amount of 10% of the above named sum in accordance with the conditions of Contract.

4.0 We agree to abide by this bid for the period of 90 days from the date of bid opening, and it shall remain binding upon us and may be accepted at any time before the expiry of that period.

5.0 Unless and until an agreement is prepared and executed, this bid, together with your written acceptance thereof, shall constitute a bidding contract between us.

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

Dated this _____ day of _____20____

Signature_____

In the capacity of _____

Duly authorized to sign the bid for and on behalf of

_____
(In capital letters).

No. of days should be in confirmation to the period of completion given in clause 1.3 of section –I – Instructions to bidders.

APPENDIX TO THE FORM OF BID

Condition of Contract Clause No.

Amount of Performance Security a) Bank draft b) Bank guarantee	06	10%of Contract value
Minimum amount of third party insurance		
Period for commencement, from the date Of receipt of letter of intent.		30 days
Time for completion from the date of receipt of letter of intent		6 (six) / 4 (four) months
Rate of penalty for delay	24	0.5% of the contract Value /week or part thereof.
Maximum limit of penalty	24	10%
Period of maintenance (Defect liability period)		12 months from the date of completion of work, and acceptance by Engineer-in-charge.
Time within which the payment would be made after the certificates for Receipt of Goods /completion of work is made.		30 days

Dated this _____day of_____20_____.

Signature in the capacity
Of_____, duly authorized to
Sign the bid for and on behalf of

_____
(In capital letter)

SECTION - VIII

QUALIFICATION APPLICATION

All the bidders who are interested in submitting this bids against this tender for the items must submit the qualification application along with the information in the following formats together with the relevant documentation.

SCHEDULE –I

FINANCIAL BISINESS AND TECHNICAL CAPABILITY

Name and address of the bidder :
Telephone No :

1. Latest balance sheet filed with _____
   On _____ (Attach a copy).

2. Latest profit and loss statement from _____to_____ filed with _____ on _____. (Attach a copy).

3. **Financial position (in the respective currency)**

A) Cash
b) Current assets
c) Current liabilities
D) Working capital
e) Net worth

4. **Total liabilities:**

a) Current ratio: Current assets to current liabilities.
b) Acid ratio test: cash temporary investment held in lieu of cash and current receivable to current liabilities.
c) Total liability to net worth.

5. **Net sales (in the respective currency)**

a) Current period
b) During the last financial year
c) During the year before last financial year

6. **Net profit before tax**

a) Current period
b) During the last financial year
c) During the year before last financial year

The profit and loss statements have been certified through _____ By _____.

7. **Bidders Financial arrangements (check appropriate item)**

a) Own resources

b) Bank credits

c) Other specify

8. Certificate of financial soundness from bankers of bidders

9. Sales

Category	Value of current orders to Be executed in respective Currency	value of anticipated sales for next financial year in respective currency
A) Govt. Department		
B) Commercial		

10**.** Licensed capacity to manufacture:

Description of equip.	Size Cap.	Licensed Capacity	No. of units current year	Manufactured last year	Second last year

11. List, if any, of bidders rate contract with the following organizations.

Organization	Yes/No	If yes, date contract finalized
a. Directorate General of Supplies & Disposal, Government of India.		
b. Central Equipment Stores Purchase organization for State Governments.		

12. Describe quality control Organization, if any and give the organization chart.
a) Are goods offered subject to batch test random sampling or full 100% test for quality?

b) Are tests carried out by factory employees or by a separate testing agency?

c) Are independent quality control organization checks made and certificates issued?

13. Income tax clearance

Following documents with regard to income tax clearance should be submitted along with application.

a) Details of Income tax registration

b) Last Income tax clearance certificate.

Schedule –II

CAPABILTY STATEMENT OF PERSONNEL, EQUIPMENT, PLANT AND LAST PERFORMANCE

1. **Name and address of bidder:** **Phone:**

2. Classifications (1) Manufacturer

   Circle what is (2) authorised agent

   Applicable (3) Dealer

   (4) Others, please specify

3. Plant: a) Location

   b) Description, type & size of building

   c) Is property on lease or free hold? If on lease indicate date of expiry in each case.

4. Type of equipment manufactured and supplied during last 2 years.

Name of Equipt.	Capacity/ Size	Nos. manufactured	supplies are Made	Projects to which orders	No. Of on hand

5. Types of equipments supplied during last 2 years other than those covered under 4 above.

Name of. Equipt.	Capacity, Size	Name of. manufacturer & Model.	Total Nos. supplied in & Country of Origin	Projects supplied to which India are made	No.of on supplies Hand

6. Plant Facilities: sq. Meter Remark

a) Space available for manufacturer _____

b) Space available for storage _____

c) Space available for inspection _____
Items offered

d) Space available for storage items offered

_____

e) Are buildings fire resistant? Yes/No

f) Are premises approved by municipal Fire Department?

_____

g) Are buildings under municipal fire protection? _____

h) Are power and fuel supply adequate to meet
Production requirements? _____

i) Are adequate transport facilities available? _____

j) Are safety measures adequate for performance
of proposed contract? _____

k) Are adequate material handling equipment available?

_____

7. **Details of testing facilities available:**

a) List testing equipment available

b) Give details of tests, which can be carried out on items offered.

c) Details of testing organizations available

8. Personnel/Organization:

Give organization chart for following, indicating clearly the no. of employees at various levels:

1. Production
2. Marketing
3. Service
4. Spare parts
5. Administrative

9. Nearest service center to buyer:

Location _____ Phone No._____

10. Details of Organisation At Service Center

a) No. of skilled employees _____

b) No. of unskilled employees _____

c) No. of engineering employees _____

d) No. of administrative employees _____

e) List of special repair/workshop Facilities available _____

f) The storage space available for Spare parts _____Sqm

g) Value of minimum stock of shares available at all the service centers in respective currencies _____

h) List of the models/types by number of equipment serviced by the center in the last 2 years:

11. Names of two buyers to whom similar equipment are supplied in the past and to whom reference may be made by the OMFED regarding the bidder's technical and delivery ability:

1). _____
2) _____

12. List of components usually subcontracted _____

13. Schedules for furnishing technical data and certified drawings after receipt of orders. _____

14. Workload as percentage of total capacity for the current and forthcoming financial year on quarterly basis. _____

15. Number of weeks required to prepare a bid proposal _____

SECTION –IX
Form of Agreement On Non-Judicial Stamp paper of Rs.60/-

THIS AGREEMENT is made and executed on the day of _____20_____
Between the ORISSA STATE CO-OPERATIVE MILK FEDERATION LTD., a body corporate under the ORISSA STATE CO-OPERATIVE MILK PRODUCERS' FEDERATION LTD. ACT 1987(37 of 1987) and having its registered office at Anand-388001 (herein after referred to as OMFED which expression shall, unless repugnant to the context or meaning thereof, include the successors and assignees of the OMFED) of the ONE PART and
_____
_____
____
(Herein after referred to as the contractor which expression shall, unless repugnant to the context or meaning thereof, include the heirs, successors, assignees, executors and administrators of the contractor) of the OTHER PART.
WHEREAS the OMFED is desirous that certain works should be executed, viz
_____
And has by letter of acceptance Dated _____, accepted a bid by the contractor for the supply of such goods and services, including installation, testing, commissioning and performance trial run & guaranteeing such works, **NOW THIS AGREEMENT WITNESSTH AS FOLLOWS:**

1.0 In this agreement, words and expressions shall have the same meanings as are respectively assigned to them in the conditions of Contract herein after referred to.

2.0 The following documents shall be deemed to form and be read as construed as part of this agreement, viz
- i) This Form of Agreement
- ii) This Letter of Acceptance
- iii) The said bid, Appendix and the price Schedule Thereof
- iv) The Technical Specifications
- v) The Schedule of Quantities
- vi) The Drawings
- vii) The Schedule of Supplementary Information
- viii) Special Conditions of Contract
- ix) General Conditions of Contract
- x) Schedule of Materials to be issued by OMFED
- xi) Form of Bank Guarantees

3.0 The aforesaid documents shall be taken as complementary and mutually explanatory of one, another, but in the case of ambiguities and discrepancies shall take precedence in the order set out above.

4.0 In the consideration of the payment to be made by the OMFED to the Contractor as herein after mentioned, the Contractor hereby covenants with the OMFED to execute, complete and maintain the works in conformity in all respects with the provisions of the Contract.

* **The bidder shall not fill up this form.**

5.0 The OMFED shall hereby covenants to pay the Contractor in consideration of the execution, completion and guaranteeing of the works the contract price at the times and in the manner prescribed by the Contract.

IN WITNESS WHEREOF the parties hereto have caused their respective Common seals to be hereunto affix the day, month and year first above written.

Signed, sealed and delivered for
And on behalf of the within
named OMFED by the hands of its
Authorised signatory.

Authorised Signatory

ORISSA STATE CO-OPERATIVE MILK PRODUCERS' FEDERATION LTD.

In the presence of:

WITNESS:
1) Signature

Name and address

2) Signature

Name and address

Signed, sealed and delivered for
And on behalf of the within
Named Contractor, the other part.

Authorised Signatory

CONTRACTOR

In the presence of:

WITNESS:

1) Signature

Name and address

2) Signature
Name and address

SECTION-X

ACCEPTABLE FORM OF BANK GUARANTEE

Proforma of Bank Guarantee for Bid Security On Non-Judicial Stamp Paper of Rs.60/-

Bank Guarantee no. Date:

This deed of guarantee made this _____day of 20_____ (Two thousand and _____) by (Name and address of the Bank), hereinafter referred to as the Bank, which shall unless repugnant to the context or the meaning thereof includes its legal representatives, successors and assigns and the ORISSA STATE CO-OPERATIVE MILK PRODUCERS' FEDERATION LTD. (hereinafter referred to as the OMFED) which expression shall be unless repugnant to the context or meaning thereof include its legal representative, successors or assigns.

Whereas the OMFED has invited bids for the supply, installation, testing, commissioning, trial run and guaranteeing of the proposed _____ _____ by the tender notice reference no._____ .

AND WHEREAS M/S _____ _____ (Name and the address of the bidders) who having submitted their bids (hereinafter referred to as the Tender) and have agreed to deposit to the OMFED an amount indicated in the tender notice as per the terms and conditions of the bidding documents. AND WHEREAS the OMFED is also willing to accept a Bank guarantee in lieu of payment by demand draft of any amount equivalent to the amount of bid security required to be deposited by the bidder to the OMFED which guarantee shall be kept valid for 120 days after the day of the opening of the bids.

In consideration of the OMFED having agreed to consider the bid proposals having submitted by the bidder without depositing the amount of bid security and against this Bank guarantee, we (name and the address of the Bank) hereby undertake and guarantee to make payment to the OMFED the amount of bid security or any part thereof not deposited by the bidder to the OMFED at any time (time being the essence of the Contract) when the OMFED asks for the same as per the terms and conditions of the bidding documents within 120 days from the date of opening of the bids.

The Bank further undertakes not to revoke this guarantee during its currency except with the previous consent of the OMFED in writing and the guarantee shall be continuous and irrevocable guarantee up to a sum of Rs.----------(Rupees----------only) provided always that any indulgence or forbearance on the part of the OMFED to the said bidder. With or without the consent of the Bank shall not prejudice or restrict remedies against the bank nor shall the same in any event be a ground of defense by the Bank against the OMFED.

In case the OMFED puts forth a demand in writing on the Bank for the payment of the amount in full or in part against this Bank Guarantee, the Bank will consider that such demand by itself is a conclusive evidence and proof that the bidder has failed in complying with the terms and conditions stipulated by the OMFED in its bidding document and payment will be made to the OMFED without raising any disputes regarding the reasons for such failures on the part of the bidder.

The Bank shall not be discharged or released from this guarantee by any arrangement between the bidder and the OMFED with or without the consent of the Bank or any alternations in the obligations of the parties or by an indulgence, forbearance shown by the OMFED to the bidder.

This guarantee shall be in addition to and without prejudice to any other securities or remedies which the OMFED may have or hereafter possess against the bidder and the OMFED shall be under no obligations to marshal in favour of the Bank any such securities or fund or assets that the OMFED at its absolute discretion may vary, exchange, renew, modify or refuse to complete or enforce or assign any security or instrument.

The Bank agrees that the amount hereby guaranteed shall be due and payable to the OMFED on OMFED's serving with a notice requiring the payment of the amount and such notice shall be served on the Bank either by actual delivery thereof to the Bank or by dispatching thereof by to the Bank by registered post at the address of the said Bank. Any notice sent to the Bank at its address by registered post shall be deemed to have been duly served on the Bank notwithstanding that the notice may not in fact have been delivered to the Bank.

In order to give full effect to the provisions of this guarantee the Bank thereby waives all rights inconsistent with the above provisions and which the Bank might otherwise as a guarantor be entitled to claim and enforce.

The guarantee shall remain in force until----------and unless the guarantee is renewed or a claim is preferred against the bank within three months from the said date all rights of the OMFED under this guarantee shall cease and the bank shall be released and discharged from all liabilities hereunder.

Notwithstanding anything contained here before, our liability under this guarantee is restricted to Rs. ---------- (Rupees---------- only) being the amount of the Bid security and it shall remain in force until----------.

Place

Signature
Seal
Code no.

Note: Bidders should ensure that the seal and code no. of signatory is put by the Bankers, before submission of the Bank guarantees.

Proforma of bank guarantee for Performance security On Non-judicial Stamp Paper of Rs.60/-

Bank Guarantee No. Date:

This deed of guarantee made this _____ day of 20 _____ (Two thousand and_____) by (Name and address of the bank) hereinafter referred to as the bank, which shall unless repugnant to the context or the meaning thereof includes its legal representatives, successors and assigns and the ORISSA STATE CO-OPERATIVE MILK PRODUCERS' FEDERATION LTD. (hereinafter referred as to the OMFED) which expression shall unless repugnant to the context or meaning thereof includes its legal representatives, successors and assigns .

Whereas the ORISSA STATE MILK CO-OPERATIVE PRODUCERS' FEDERATION LTD. has awarded a contract bearing No._____on M/s_____(Name and the address of the party) hereinafter referred to as the Contractor, for the supply installation, commissioning, completion and the guaranteeing of _____

And whereas the Contractor has agreed to submit a performance security in the form of bank guarantee to the OMFED as per the terms and conditions of the bidding documents. And the contract which will be kept valid upto_____calendar months from the date of bank guarantees (the period should be till end of period of maintenance) and whereas the bank and its duly constituted agent and officer has already read and understood the contract between the OMFED and the Contractor.

In consideration of the OMFED having agreed to award the contract on the Contractor, we _____(the bank) do hereby guarantee, undertake, promise and agree with the OMFED , its legal representatives, successors, and assigns that the within named(the name of the Contractor) their legal representatives , assignees will faithfully perform and fulfill everything within the bidding document and the contract order on their part to be performed or fulfilled, at the time (time being the essence of the contract) and in manner therein provided , do all obligations there under and we further undertake and guarantee to make the payment to the OMFED a sum of Rs_____ (Rupees_____only). Being 10% of the contract value ,in case the Contractor , their legal representatives, assignees do not faithfully perform and fulfill everything within the bidding document and the contract order on their part to be performed or fulfilled, at the time and in manner therein provided and do not willfully and promptly do all obligations there under. In case the Contractor fails to perform or fulfill the contract as per the terms and conditions agreed upon, the OMFED is entitled to demand an amount equivalent to 10% of the contract value from the Contractor and the demand made by the OMFED itself will be conclusive evidence and proof that the Contractor has failed to perform or fulfill his obligations under the contract and neither the Contractor nor the bank shall be entitled to raise any dispute regarding the reasons for the failure of performance or fulfillment on any ground whatsoever.

We, (the name of the bank), do hereby undertake to pay an amount equivalent to 10% of the contract value, being the amount due and payable under this guarantee. Without any demur, merely on a demand from OMFED stating that the amount claimed is due by way of Non-performance of the contractual obligations as aforesaid by the contractor or by the reason of the contractor's failure to perform the said contractual commitments, any such demand made on the banks 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 to10% of the contract value.

We, the bank further agree that the performance security herein contained shall remain in full force and effect for a period of _____ calendar months from the date of the bank guarantee. (the period shall be till the end of period of maintenance) whichever is later or till the OMFED certifies that the terms and conditions of the said contract have been fully and properly carried out by the said Contractor and accordingly discharge the guarantee , unless a demand or a claim under this guarantee is made on us in writing by the OMFED on or before _____(the date shall be 90 days after the end of the period of maintenance) we shall be discharged from all liabilities under this performance security hereafter.

We, the bank, further agree with the OMFED that the OMFED 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 bidding document and the contract or to extend the time of performance by the said Contractor from time to time and any of the power exercisable by the OMFED against the Contractor and forbear or enforce any of the terms and conditions relating to the said bidding document and the contract and we shall not be relieved from or liability by reason of any such variation ,or extension being granted to the said contractor or for any forbearance, act or omission on the part of the OMFED to the said Contractor by any such matter or thing whatsoever which under the law relating to the 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 OMFED may have or hereafter possess in respect of the works executed or intended to be executed and the OMFED shall be under no obligation to marshal in favour of the bank any such securities or funds or asset that the OMFED may be entitled to receive or have a claim upon and the OMFED at its absolute discretion may vary, exchange, renew, modify or refuse to complete or enforce or assign any security or instrument.

The bank agrees that the amount hereby guaranteed shall be due and payable to the OMFED on serving us with a notice, 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.

Any notice sent to the bank at its address by registered post shall be deemed to have been duly served on the bank notwithstanding that the notice may not infact has been delivered to the bank.

In order to give full effects to the provisions of this guarantee the bank hereby waives all rights inconsistent with the above Rs._____(Rupees_____ Only).

The guarantee shall remain in force until _____and unless the guarantee is renewed or a claim is preferred against the bank within three months from the said date (the date of expiry) all rights of the OMFED under the guarantee shall cease and the bank shall be released and discharged from all liabilities hereunder.

Place

Signature

Date

Seal

Code no.

Note:

The Contractor should ensure that seal and the code no. of the signatory is put by the bankers, before submission of the bank guarantees.

Proforma of Bank guarantee for advance payments
On Non judicial stamp paper of Rs 40/-

In consideration of the ORISSA STATE CO-OP. MILK PRODUCERS' FEDN. LTD. (hereinafter called "the OMFED") having regard to grant advance of Rs._____
(Rupees_____) to M/s _____
Having their office at _____
Hereinafter called "the said contractor") under the terms and conditions of the purchase Order No._____Dated_____ made between the OMFED and M/S.
_____
for supply, installation, commissioning, trial-running and guaranteeing of_____

(Hereinafter called the " the order") on production of bank guarantee for Rs._____
(Rupees_____only), We (the bank) do hereby undertake to pay the OMFED an amount not exceeding Rs._____(Rupees_____ _____only) against any loss/damage caused to or suffered by the OMFED by reason of any breach by the said contractor of any of the conditions contained in the order.

We, (the bank), do hereby undertake to pay the amounts due and payable under this guarantee without any demur merely on a demand from the OMFED stating that the amount claimed is due by way of loss or damage caused to or would be caused to or suffered by the OMFED by reasons of any breach by the said contractor of any of the terms and conditions contained in the order or by reasons of the contractor's failure to perform the said order. Any such demand made on the bank shall be conclusive as regards the amount due and payable by the bank under this guarantee and shall be restricted to an amount not exceeding Rs._____(Rupees _____ only).

We,_____(the bank), further agree that the guarantee herein contained shall remain in full force and effect during the period that would be taken for the performance of the said order and that it shall be continue to be enforceable till all the dues of the OMFED, under, or by virtue of the said order have been fully paid and it's claims satisfied or discharged or till OMFED certifies that the terms and conditions of the said order have been fully and properly carried by the said contractor and accordingly discharge the guarantee and unless a demand or a claim under this guarantee is made on us in writing on or before _____, we shall be discharged from all liabilities under this guarantee thereafter.

We, _____(the Bank), further agree with the OMFED that the OMFED shall have the fullest liberty without our consent and without affecting in any manner our obligation hereunder to vary in any of the terms and conditions of the said order,

to extend the time of performance by the said Contractor from time to time or to postpone for any time or from time to time any of the power exercisable by the OMFED against the said Contractor and to forbear or enforce any of the terms and conditions relating to the said order and we shall not be relieved from our liability by reason of any such variation, or extension or for any forbearance, act of omission on the part of the OMFED or any indulgence by the OMFED to the said Contractor or any such matter or thing whatsoever Which under the law relating to the sureties would but for this provision have effect of so relieving us.

We,_____ (the bank), lastly undertake not to revoke this guarantee during its currency except with the previous consent of the OMFED in writing.

Notwithstanding anything stated herein above the liability of the bank Guarantee is restricted to Rs._____ (Rupees_____Only). The guarantee shall remain in force till the _____and unless the guarantee is renewed or a claim is preferred against the bank within three months from the said date all rights of the OMFED under the guarantee shall cease and the bank shall cease and the bank shall be released and discharged from the liabilities hereunder.

Place Signature

Date Seal

Code no.

Note

Note: Contractor should ensure that seal and code no. of the signatory is put by the bankers, before the submission of the bank guarantees.

SECTION --XI (1)

MANUFACTURER'S AUTHORIZATION FORM

No._____ Dated_____

To
Orissa State Co-op. Milk Producers Federation. Ltd.
D-2, Saheed Nagar
Bhubaneswar-751001
ORISSA, INDIA

Dear Sir,

Sub: Tender Ref. No._____

We _____an established and reputable manufacturers of _____having factories at _____and _____do hereby authorize M/s _____
(Name and address of agents) to bid, negotiate and conclude the contract with you against Tender notice Ref. No. _____ for the above goods manufactured by us.

No company or firm or individual other than M/s _____,
located at _____are authorized to bid, negotiate and conclude the contract in regard to this business against this specific Tender Notice.

We hereby extend our full guarantee and warranty as per the General conditions of contract for the goods offered for supply against this Tender notice by the above firm.

Yours faithfully,

(NAME)
For and on behalf of M/s.
(Name of Manufacturers)

Note: This letter of authority should bee on the letterhead of the manufacturing concern and should be signed by a person competent and having the power of attorney to bind the manufacturer.

SECTION-XI (2)

MANUFACTURER'S AUTHORIZATION FORM

(Please see Clause 14.3 of instructions to bidders)

No. _____ Dated _____

To
Orissa State Co-op. Milk Producers' Federation. Ltd.
D-2, Saheed Nagar
Bhubaneswar-751007
ORISSA

Dear Sir,

Sub: Tender Ref.No. _____

We _____an established and reputable manufacturers of _____having factories at _____ and _____
do hereby authorize M/s _____
(Name and address of agents) to bid, negotiate and conclude the contract with you against bid no._____ for the above goods manufactured by us.

No company or firm or individual other than M/s _____
are authorized to bid, negotiate and conclude the contract in regard to this business against this specific IFB.

We hereby extend our full guarantee and warranty as per Clause 81 of the general conditions of contract for the goods offered for supply against this invitation for bid by the above firm.

Yours faithfully,

(NAME)
For and on behalf of M/s
(Name of manufacturers)

Note: This letter of authority should be on the letterhead of the manufacturing concern and should be signed by a person competent and having the power of attorney to bind the manufacturer.

SECTION --XII

TECHNICAL DEVIATION STATEMENT FORM

The following are the particulars of deviations from the requirements of the tender specifications.

CLAUSE	DEVIATION	REMARKS (Including justification)

Dated-

Signature and seal of the Manufacturer / Bidder

Note:

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

(2) 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 the statement.

SECTION - XIII

POINTS BIDDERS SHOULD BEAR IN MIND

I. BIDS CONTAINING DEVIATIONS FROM BIDDING DOCUMENT TERMS AND OTHER CONDITIONS MAY BE REJECTED.

II. BIDS NOT ACCOMPANIED BY BID SECURITY (EARNEST MONEY DEPOSIT) SHALL BE SUMMARILY REJECTED.

III. NON-COMPLIANCE WITH EVEN A MINOR TECHNICAL REQUIREMENT SHOULD BE SPECIFICALLY STATED BY THE BIDDERS.

IV. BIDDERS SHOULD FURNISH THEIR COMPLETE ADDRESS FOR THE PURPOSE OF FURTHER CORRESPONDENCE PERTAINING TO BIDDING DOCUMENT.

V. CORRECTIONS IN THE BID SHOULD BE NOTED OVER AND INITIALED AT THE PLACE OF CORRECTIONS.

VI. NEGLIGENCE OF THE BIDDER IN PREPARING THE BID CONFERS NO RIGHT TO WITHDRAW THE BID AFTER IT WAS OPENED.

VII. SPECIFICATIONS, CONDITIONS, SCHEDULES AND DRAWINGS OF BIDDING DOCUMENT CONSTITUTE AN INTEGRAL PART OF THE BID.

VIII. ALL THE BIDS ALONGWITH ENCLOSURES, DRAWINGS AND TECHNICAL LITERATURE SHOULD BE IN ENGLISH ONLY.

IX. BIDDING DOCUMENT SHALL BE GOVERNED AND INTERPRETED ACCORDING TO THE SYSTEM AND COMPONENTS UNDER TROPICAL CONDITIONS.

X. ALL THE BIDDERS SHOULD SUBMIT QUALIFICATION APPLICATION IN THE GIVEN FORMATS WITH REQUIRED DOCUMENTATION.

XI. BIDS SHOULD BE KEPT VALID FOR ACCEPTANCE FOR A PERIOD OF 90 DAYS FROM THE DAY BIDS ARE OPENED.

XII. THE BIDDING DOCUMENT SHALL BE GOVERNED AND INTERPRETED ACCORDING TO THE LAWS OF THE UNION OF INDIA.

XIII. ALL BIDDERS ARE URGED TO SUBMIT PROMPTLY WRITTEN REQUESTS ON MATTERS WHERE CLARIFICATIONS OR ADDITIONAL INFORMATION ARE DESIRED, NOT LATER THAN SEVEN DAYS BEFORE BIDS ARE DUE TO OPENING. NO EXTENSION IN DUE DATE OF SUBMISSION OF BIDS WILL BE ALLOWED ON THIS GROUND.

XIV. ALL THE BIDDERS SHOULD QUOTE FOR THE ITEMS AS PER THE SPECIFICATIONS AND DETAILS GIVEN IN THIS BIDDING DOCUMENT ONLY. IN CASE, ALTERNATIVE DESIGNS ETC. ARE TO BE OFFERED BY THE BIDDERS, THEY MAY DO SO BUT THIS SHOULD BE STATED

SEPARATELY IN THE OFFER.ORISSA STATE CO-OPERATIVE MILK PRODUCERS' FEDERATION LIMITED RESERVES ITS RIGHT TO ACCEPT OR REJECT SUCH ALTERNATIVE OFFERS, WITHOUT ASSIGNING ANY REASONS THEREOF TO THE BIDDERS.

XV. THE BIDDERS WHO QUOTE FOR SUPERVISION AND COMMISSIONING OF ANY EQUIPMENT SHOULD ALSO INDICATE THE PRICES IN THE BID SEPARATELY. THE SUPERVISION OF COMMISSIONING WOULD INCLUDE CHECKING THE INSTALLATION AND COMMISSIONING THE PLANT TO GIVE THE RATED OUTPUT.

XVI. MANAGING DIRECTOR, ORISSA STATE CO-OPERATIVE MILK PRODUCERS' FEDERATION LTD. RESERVES THE RIGHT TO ACCEPT OR REJECT ANY OR ALL BIDS WITHOUT ANY EXPLNATION TO BIDDERS.