

INVITATION OF QUOTATIONS

REF No: ALSS/RGM/PUR/LCB/2024-25/ spl:24

Date : 25th November' 2024

Dear Sirs,

Sub : Invitation of quotation for the supply, installation, testing and commissioning of 10,000 Litters liquid nitrogen silo under RGM at Alamadhi semen station in Chennai

1. You are invited to submit your most competitive quotation for the following works:-

| Brief Description of the works | Technical specification | Estimated value of the works | Delivery Period |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------|------------------------------|---------------------------------------------|
| Supply, installation, testing, commissioning, training and after sales services of 10,000L liquid nitrogen silo under RGM at Alamadhi semen station in Chennai, Tamil Nadu | As per Annexure | Rs.30 lakhs | Within 180 days from the date of PO. |

2. The National Steering Committee (NSC) of the Rashtriya Gokul Mission (RGM) at its 8th meeting had approved a grant for Strengthening of the Semen Station at Alamadhi semen station.
3. Alamadhi Semen Station, Chennai invites bids from eligible bidders for the “**Supply, installation, testing, commissioning, training and after sales services of 10,000L liquid nitrogen silo under RGM at Alamadhi semen station in Chennai, Tamil Nadu**” as specified in the bid document. Invitation For Bids (IFB) is uploaded in our web page. Eligible Bidders are requested to download the soft copy bidding document and may submit their bids on or before **15:00 hrs. on 16.12.2024**. For any details, visit Alamadhi Semen Station’s website www.alamadhisemenstation.com or contact at the above address.

For any details, contact us at :
NDDB DS, Alamadhi semen station,
Upparapalayam Road, Edapalayam Post,
Near Redhills, Chennai -600052.
Phone Number: +91 7092922400

4. To assist you in the preparation of your quotation, we are enclosing the following:
- Detailed Bill of Quantities with technical specification
 - Instructions to Bidders (in two sections).
 - Draft Contract Agreement format which will be used for finalizing the agreement for this Contract
5. You are requested to provide your offer latest by **15:00 hrs. on 16.12.2024**.
6. Quotations will be opened in the presence of Bidders or their representatives who choose to attend at **15:30 hrs. on 16.12.2024** in the office of Alamadhi semen station.
7. We look forward to receiving your quotations and thank you for your interest in this project.

General Manager,
NDDB DS, Alamadhi semen station

Instructions to Bidders

Section – A

1. Scope of Works

The Alamadhi semen station in Chennai invites quotations for the works as detailed in the table given below

| Brief Description of the Works | Period of Completion |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------|
| Supply, installation, testing, commissioning, training and after sales services of 10,000L liquid nitrogen silo under RGM at Alamadhi semen station in Chennai, Tamilnadu | 180 days |

The successful bidder will be expected to complete the works by the intended completion date specified above.

2. Qualification of the bidder :

To qualify for award of the contract the bidder:

**** for Package-I:**

should have satisfactorily completed as a prime contractor at least one similar nature of works of value not less than Rs.15 Lakhs (rupees fifteen lakhs) in the last three years;

**** for Package-II:**

Bidder should have experience in handling and installation of LN silos and submit copy of purchase order for one similar nature of work.

Bidders qualifying package-I are also eligible to quote for Package-II. Bidders only quoting for package -II should qualify the similar nature of works for Package-II.

Project authority have the right to place the purchase order for package I & II on a single contractor or different contractors based on the qualification & eligibility criteria of the bidders and project requirement.

3. Bid Price

- a) The contract shall be for the whole works as described in the Bill of quantities and technical specifications. Corrections, if any, shall be made by crossing out, initialing, dating and re writing.
- b) All duties, taxes and other levies payable by the contractor under the contract shall be included in the total price.
- c) The rates quoted by the bidder shall be fixed for the duration of the contract and shall not be subject to adjustment on any account.

d) The rates should be quoted in Indian Rupees only.

4. Submission of Quotations

4.1 The bidder is advised to visit the site of works at his own expense and obtain all information that may be necessary for preparing the quotation.

4.2 Each bidder shall submit only one quotation.

4.3 The quotation submitted by the bidder shall comprise the following :-

(a) Quotation in the format given in Section-B.

(b) Signed Bill of Quantities ; and

(c) Qualification information form given in Section-B duly completed.

4.4 The bidder shall seal the quotation in an envelope submit to:

“The General Manager,
NDDB DS, Alamadhi semen station,
Upparapalayam Road,
Edapalayam Post, Alamadhi,
Ponneri Taluka, Thiruvallur Dist,
Chennai -600052”

The envelope will also bear the following identification :-

- Quotation for the supply, installation, testing and commissioning of 10,000 Litres liquid nitrogen silo under RGM at Alamadhi semen station in Chennai.
- Do not open before **15:30 hrs. on 16.12.2024.**

4.5 Quotations must be received in the office of the Alamadhi semen station, Chennai not later than the time and date given in the letter of invitation . If the specified date is declared a holiday, quotations shall be received upto the appointed time on the next working day.

5.0 Any quotation received by the Alamadhi semen station, Chennai after the deadline for submission of quotations will be rejected and returned unopened to the bidder.

6. Validity of Quotation

Quotation shall remain valid for a period not less than 90 days after the deadline date specified for submission.

7. Opening of Quotations

Quotations will be opened in the presence of bidders or their representatives who choose to attend on the date and time and at the place specified in the letter of invitation.

8. Information relating to evaluation of quotations and recommendations for the award of contract shall not be disclosed to bidders or any other persons not officially concerned with the process until the award to the successful bidder is announced.

9. Evaluation of Quotations

The Employer will evaluate and compare the quotations determined to be substantially responsive i.e. which

- (a) meet the qualification criteria specified in clause 3 above;
- (b) are properly signed ; and
- (c) conform to the terms and conditions, specifications without material deviations.

10. Award of contract

- 10.1 NDDB DS, Alamadhi semen station shall award the Contract to the bidder whose bid has been determined to be substantially responsive to the bidding documents, technically acceptable and who has offered the lowest Evaluated bid price and provided further that the bidder has the capability and the resources to carry out the Contract effectively and has adequate technical and financial competence including record of satisfactory performance.
- 10.2 NDDB DS, Alamadhi semen station Right to Accept any Bid and to Reject any or all bids.
- 10.3 Notwithstanding clause 10.1 or any other clauses stated above, the NDDB DS, Alamadhi semen station reserves the right to accept or reject any bid and to annul the bidding process and reject all bids, at any time prior to the award of the Contract, without thereby incurring any liability to the affected bidder(s) or any obligation to inform the affected bidder(s) of the grounds for the NDDB DS, Alamadhi semen station's action.
- 10.4 The bidder whose bid is accepted will be notified of the award of contract by the Employer prior to expiration of the quotation validity period.

11. Warranty :

12 months against any manufacturing defects from the date of successful commissioning and taken over by the project authority. During the period of maintenance, the contractor will be responsible for rectifying any defects free of cost to the Employer.

12. Delivery schedule :

Total quantity should be supplied within delivery period.

SECTION - B

1. Format for Qualification Information.

2. Format for Submission of Quotation.

1.0 QUALIFICATION INFORMATION

1 For Individual Bidders

1.1 Principal place of business: _____

Power of attorney of signatory of Quotation.
[Attach copy]

1.2 Proof towards supply performed within the last three years to meet the minimum qualification requirements as per clause no: 2 of section-A should be provided.

Notes :

- a) The contract means the work done against one work order on a single location.
- b) Cost of contracts/works shall be considered for evaluation as per the clause no: 2 of section-A above.

Bidder shall submit the following details to support their claim for meeting the minimum eligibility requirement -

- 1. Names of project to be considered for meeting minimum eligibility criteria
 - 2. Nature of project completed for meeting minimum eligibility criteria.
 - 3. Value of work of project completed.
 - 4. Location of execution of project/work completed.
- a) The Bidder, in the same name and style, should be in business at least for **three years** at time of bid opening. In case of change of name of bidder by merger / acquisition / change in status, the bidder may be eligible based on the documentary evidence.
- b) The Bidder should have valid registration under various Acts that may be applicable for the contract proposed. This shall include but not limited to Income Tax, Companies Act, GST etc.

1.3 Name, address, telephone and fax numbers of the Bidder's bankers, who may provide references if contacted by the Employer.

1.4 Information on litigation history in which the Bidder is involved.

| Other party(ies) | Employer | Cause of dispute | Amount involved | Remarks showing present status |
|------------------|----------|------------------|-----------------|--------------------------------|
| | | | | |

Even though the bidder meets the specified criteria, it may be disqualified if it has:

- a) Made untrue or false declaration in the forms, statements and attachments submitted in proof of their qualification and / or
- b) Record of poor performance such as abandoning the works, not properly completing the contract, inordinate delays in completion or financial failure etc.

2. Format for Submission of Quotation.

QUOTATION

To:

The General Manager,
NDDDB DS, Alamadhi semen station,
Upparapalayam Road,
Edapalayam Post, Alamadhi,
Ponneri Taluka, Thiruvallur Dist,
Chennai -600052

Subject : Quotation for the supply, installation, testing, commissioning, training and after sales services of 10,000L liquid nitrogen silo under RGM at Alamadhi semen station in Chennai, Tamilnadu.

Reference: Letter No.....dated.....from.....

Sir,

We offer to execute the Works described in your letter referred to above in accordance with the Conditions of Contract enclosed therewith for a total Contract Price of :

Rs.** _____ [in figures]

Rs. _____ [in words].

This quotation and your written acceptance of it shall constitute a binding contract between us. We understand that you are not bound to accept the lowest or any quotation you receive.

We hereby certify that we have taken steps to ensure that no person acting for us or on our behalf will engage in bribery.

We hereby confirm that this quotation is valid for 90 days as required in Clause 6 of the Instructions to Bidders.

Yours faithfully,

Authorized Signature : _____ Date: _____

Name & Title of Signatory : _____

Name of Bidder : _____

Address : _____

** To be filled in by the Bidder, together with his particulars and date of submission at the bottom of this Form.

Draft Agreement form

ARTICLES OF AGREEMENT

* This deed of agreement is made in the form of agreement on _____ day _____ month _____ 2024, between the Alamadhi semen station or his authorized representative (hereinafter referred to as the first party) and _____ (Name of the Contractor), S/O _____ resident of _____ (hereinafter referred to as the second party), to execute the work of Supply, installation, testing, commissioning, training and after sales services of 10,000L liquid nitrogen silo under RGM at Alamadhi semen station in Chennai, Tamilnadu (hereinafter referred to as works) on the following terms and conditions.

2. Cost of the Contract

The total cost of the works (hereinafter referred to as the “total cost”) is **Rs.** _____ as reflected in Annexure - 1.

3.1 Payments under its contract:

For package-I

Payments to the second party for the construction work will be released by the first party in the following manner:-

80% on receipt of the LN Silo and acceptance of the material at site.

Remaining 15% on completion of installation, satisfactory commissioning, testing and training of the LN Silo and allied pipe lines.

Balance 5% of over all order value after one month satisfactory performance and continuous running of over all system.

For package-I

95% on satisfactory commissioning of the works.

Balance 5% of over all order value after one month satisfactory performance and continuous running of over all system

3.2 Payments at each stage will be made by the first party :

- (a) on the second party submitting an invoice for an equivalent amount.
- (b) on certification of the invoice (except for the first installment) by the engineer nominated by the first party with respect to quality of works in the format in Annexure – 2

4. Notice by Contractor to Engineer

The second party, on the works reaching each stage of construction, issue a notice to the first party or the Engineer nominated by the first party (who is responsible for supervising the contractor, administering the contract, certifying the payments due to the contractor, issuing and valuing variations to the contract, awarding extensions of time etc.), to visit the site for certification of stage completion. Within 30 days of the receipt of such notice, the first party or the engineer nominated by it, will ensure issue of stage completion certificate after due verification.

5. Completion time

For package -I

The works should be completed in **180 days** from the date of this Agreement. In exceptional circumstances, the time period stated in this clause may be extended in writing by mutual consent of both the parties.

For package -II

The works should be completed in **60 days** from the date of site clearance given in writing. In exceptional circumstances, the time period stated in this clause may be extended in writing by mutual consent of both the parties.

6. If any of the compensation events mentioned below would prevent the work being completed by the intended completion date, the first party will decide on the intended completion date being extended by a suitable period :
- a) The first party does not give access to the site or a part thereof by the agreed period.
 - b) The first party orders a delay or does not issue completed drawings, specifications or instructions for execution of the work on time.
 - c) Ground conditions are substantially more adverse than could reasonably have been assumed before issue of letter of acceptance and from information provided to second party or from visual inspection of the site.
 - d) Payments due to the second party are delayed without reason.
 - e) Certification for stage completion of the work is delayed unreasonably.
7. Any willful delay on the part of the second party in completing the construction within the stipulated period will render him liable to pay liquidated damages @ **0.5%** (zero point five) present per week of total contract value will be deducted from payments due to him. The first party may cancel the contract and take recourse to such other action as deemed appropriate once the total amount of liquidated damages exceeds **10%** of the contract amount.

8.0 Duties and responsibilities of the first party

- 8.1 The first party shall be responsible for providing regular and frequent supervision and guidance to the second party for carrying out the works as per specifications. This will include written guidelines and regular site visit of the authorized personnel of the first party, for checking quality of material and construction to ensure that it is as per the norms.
- 8.2 The Engineer or such other person as may be authorized by the first party shall hold meeting once in a month where the second party or his representative at site will submit the latest information including progress report and difficulties if any, in the execution of the work. The whole team may jointly inspect the site on a particular day to take stock of activities.

9. Duties and responsibilities of the second party

- 9.1 The second party shall :
- a) take up the works and arrange for its completion within the time period stipulated in clause 5;
 - b) employ suitable skilled persons to carry out the works ;

- c) regularly supervise and monitor the progress of work ;
 - d) abide by the technical suggestions / direction of supervisory personnel including engineers etc. regarding building construction ;
 - e) be responsible for bringing any discrepancy to the notice of the representative of the first party and seek necessary clarification;
 - f) ensure that the work is carried out in accordance with specifications, drawings and within the total of the contract amount without any cost escalation ;
 - g) keep the first party informed about the progress of work ;
 - h) be responsible for all security and watch and ward arrangements at site till handing over of the building to the first party ; and
 - i) maintain necessary insurance against loss of materials/cash, etc. or workman disability compensation claims of the personnel deployed on the works as well as third party claims.
- f) Pay all duties, taxes and other levies payable as per law under the contract (First party will effect deduction from invoices in respect of such taxes as may be imposed under the law).
 - g) The supplier or the second party shall supply 2 sets of drawings, specifications and guidelines to the project authority or the first party for the proposed works.

10. Variations / Extra Items

The works shall be carried out by the second party in accordance with the approved drawings and specifications. However, if, on account of site conditions or any other factors, variations are considered necessary, the following procedure shall be followed:-

- a) The second party shall provide the Engineer with a quotation for carrying out the Variation when requested to do so by the Engineer. The Engineer shall assess the quotation, which shall be given within seven days of the request before the Variation is ordered.
- b) If the quotation given by the second party is unreasonable, the Engineer may order the Variation and make a change to the Contract Price which shall be based on Engineer's own forecast of the effects of the Variation on the Contractor's costs.
- c) The second party shall not be entitled to additional payment for costs which could have been avoided by giving early warning.

12. Termination

- 12.1 The Employer may terminate the Contract if the supplier causes a fundamental breach of the Contract and delayed the completion period for more than 90 days. No compensation will be paid for the termination of contract for the delay by the supplier.

14. Dispute settlement

In the event of any dispute in the interpretation of the terms and conditions of this order/ agreement or difference of opinion between the parties or any point in the order / contract arising out of or in connection with the agreement/ accepted order/ contract or with regard to performance of any obligation hereunder by either party, the parties hereto shall use their best efforts to settle such disputes or difference of opinion amicably by mutual negotiations. In case no agreement is reached,

either party may forthwith give to the order, a notice in writing of the existence of such question, dispute or difference of opinion and the same shall be referred to the adjudication of **sole arbitrator** to be appointed by “**NDDB DS, Alamadhi semen station**” whose decision in the matter shall be final and binding on the parties. The arbitration proceedings shall be governed under the provisions of the **Indian Arbitration and Conciliation Act of 1996** and the rules thereunder or any statutory notification thereof for the time being in force. In the order/ contract, the venue of such arbitration shall be **Chennai (Tamil Nadu)** and courts at Chennai alone shall have jurisdiction regarding any matter arising out of order/ contract.

15. Inspections and Auditing

The Contractor shall permit, and shall cause its Sub-Contractors to permit, the project authority and/or persons or auditors appointed by the project authority to inspect and/or audit its accounts and records and other documents relating to the submission of the Quotation and performance of the Contract. Any failure to comply with this obligation may constitute a prohibited practice subject to contract termination and/or the imposition of sanctions by the Bank (including without limitations determination of ineligibility) in accordance with prevailing Bank’s sanctions procedures.

Item A: Liquid Nitrogen Storage Tank (Silo) with accessories

Capacity: 10,000 Liters

1.0 FUNCTIONAL REQUIREMENT :

The liquid nitrogen storage system shall be used for bulk storage of liquid nitrogen (LN) at the selected place for the onwards distribution of LN through small LN containers to the end users.

2.0 DESIGN REQUIREMENT

2.1 CAPACITY :

The nominal capacity of the 10 KL storage tank shall be more than 10,000 Liters and the net capacity of the inner vessel shall be 10,000 Liters.

2.2 CONSTRUCTIONAL FEATURES :

The liquid nitrogen storage tank shall be of double walled, vertical pedestal mounted having inner shell made out of SA – 240, TP-304 (SS 304) and outer shell with carbon steel Sa-516 Grade 70 boiler quality plate. The complete pipe line shall be of SA-312, (SS 304) material. The annular space between the two vessels shall be insulated with Multi Layer Super Insulation (MLSI) material and evacuated to high degree of vacuum. For warm vacuum retention 5 X 10 to the power minus 3 torr and for the cold vacuum retention 5 X 10 to the power minus 3 torr or better. The storage tank shall be provided with a set of cryogenic valves & fittings, safety device, instruments for level measuring, pressure building coil etc. The tank shall also be provided with a distribution header net work suitable for filling of three liquid nitrogen containers at a time complete with cryogenic valves and fittings and duly insulated with multi layer super insulation up to the termination. For dispensing into the three LN containers at a time flexible hose suitable for cryo application shall be provided on each point of one meter length.

2.3 WELDING AND FINISHING :

The inner/outer vessel circumferential & longitudinal weld seams shall preferably be welded on automatic SAW/GTAW welding machine. All the weld joints shall be cleaned / finished as per the requirement. The surface of the inner vessel shall be retained with original mill finish. The outer surface of the vessel shall be thoroughly cleaned applied with primer followed by two coat of polyurethane paint of approved shade.

2.4 APPLICABLE CODES, REGULATIONS AND INDUSTRY STANDARDS :

Inner as well as outer vessel shall be fabricated in accordance to:
American Society of Mechanical Engineers (ASME) Section VIII Division I, 1995 Boiler and pressure vessel code amended till 1996 or more recently.
Static and Mobile Pressure vessel (unfired) rules 1981 from Chief Controller of Explosive, Nagpur.
As per the requirement of the ALM SS, stipulated in the technical specifications.

2.5 DESIGN PARAMETERS

| PARAMETER | 10 KL Silo |
|-------------------|-----------------------------------------|
| Configuration | Vertical / Cylindrical Double walled |
| Nominal Capacity. | More than 10,000 Litres |
| Net Cap. | 10,000 Litres |
| Product | Liquid Nitrogen |
| Max. WP | 2.0 Kg/sq. cm. |

(tank should be fabricated to meet the statutory requirements of CCOE and required PISO certification should be submitted. These are in the scope of supplier.)

| | |
|--------------------|--------------------------------|
| Service temp. | (-) 196 deg. C. |
| Design temp. | (+) 37 to (-) 196 deg.C. |
| Inner vessel | |
| Design temp. | (+) 90 to (-) 10 deg.C. |
| Outer vessel | |
| Insulation | MLSI |
| Thermal | 1.35×10^{-4} |
| Conductivity | kcal/m.hr.deg.C. |
| (MLSI) | typical |
| Static Evaporation | 0.55% or less |
| Rate% or less | |
| Design pressure | 5.69 Kg/sq. cm. (g) |
| (Inner vessel) | |
| Test Pressure | 8.53 Kg./sq. cm. (g) |
| (Inner vessel) | |
| Design pressure | 1.05 Kg./sq. cm. (Ext) |
| (Outer vessel) | |
| Thickness inner | 4.0 mm/ 5.0 mm |
| Shell/dish ends | |
| Thickness outer | 6.0 mm/ 8.0 mm |
| Shell/dish ends | |
| Major dimensions | Height - 5600 mm \pm 325MM |
| (Over all) | Diameter - 2150 mm \pm 150MM |

Above parameter have been derived considering the following major design aspect and as per the requirement of the ASME & SMPV(U) rules :

Maximum Allowable Working Pressure
Static Head of the liquid
External Vacuum
Small safety margin
Corrosion allowance of 1 mm

3.0 PREPARATION OF THE DRAWING AND APPROVAL.

Preparation of all the fabrication drawings, scrutiny by the third party inspection agency Lloyds Register industrial Services and final approval by Chief Controller of Explosive (CCOE)/PESO, Nagpur, shall be the responsibility of the supplier, if required. Party shall submit one set of drawings comprising of general arrangement drawing, schematic drawing & painting details, for perusal and record.

The supplier shall prepare and submit the foundation drawings well in advance for construction of the civil foundation. **Civil works not in the scope of the supplier.**

The supplier shall prepare and obtain approval from the CCOE, PESO and other statutory authorities if required for the fabrication, installation and commissioning of the storage tanks. **All the expenditures including statutory fees etc. are included in the scope of work of the supplier.**

4.0 SCOPE OF SUPPLY

4.1 INNER VERTICAL CYLINDERICAL VESSEL :

The inner vessel shall be made out of SA-240, TP-304 (SS-304) material. The thickness of the inner shell and the dish ends for the 10 KL model shall be 5 mm. Sufficient stiffeners shall be provided to the inner vessel.

4.2 OUTER VERTICAL CYLINDRICAL VESSEL :

The outer casing shall be made out of Carbon Steel SA-516 Grade 70 boiler quality plate. The thickness of the shell and the dish ends for the 10 KL model shall be 8 mm (inclusive of corrosion allowance).

4.3 INSULATION

The annular space between inner and the outer vessel shall be applied with Multi Layer Super Insulation (MLSI) material which consists of alternative layers of highly polished thin pure aluminum foil and special binder free insulating paper.

The typical thermal conductivity of the MLSI shall be 1.35×10^{-4} kcal/M/hr.deg. C.

The annular space after insulation shall be evacuated to the level of 5×10^{-3} torr for warm vacuum retention and 1×10^{-3} torr or better in case of cold vacuum retention in order to minimize convective heat loss.

To ensure complete elimination of moisture content from the insulation material as well as from the annular space, the inner vessel shall be heated to approximately (+) 80 degree C. for many days during evacuation of the annular space. In addition to that special getter material shall be kept inside the annular space to take care of the OUT GASING and hence prevention of deterioration of loss of vacuum with passage of time.

The insulation thickness shall be arrived in such way that for working temperature of minus 196 deg. C. and for the design temperature of +37 to -196 deg. C., the static evaporation loss rate shall be 0.70% or less in case of 10 KL model at STP.

4.4 The Liquid nitrogen storage tank shall be provided with following major valves & fittings:

| S.NO. | DESCRIPTION | QTY. | MAKE | REMARK |
|-------|----------------------------------|-------|----------------------|----------|
| 1. | Liquid Inlet Valve 1" | 1 No. | Bestobell /Herose,UK | Imported |
| 2. | Liquid Outlet | 2 No. | -- do -- | -- do-- |
| 3. | Bottom fill | 1 No. | -- do -- | -- do -- |
| 4. | Pressure building Valve 1/2" | 1 No. | -- do -- | -- do -- |
| 5. | Pressure building Regulator 1 /" | 1 No. | Cash acme | Imported |

| | | | |
|--------------------------------------------------------|--------|------------------------|----------------------|
| 6. Safety relief Valve 1/2" X1 | 2 Nos. | Sebim, Halol India | LRIS Approved |
| 7. Differential Level indicator | 1 No. | Switzer, Chennai India | Approval from ALM SS |
| 8. Vent valve 1" | 1 No. | Bestobell, UK | Imported |
| 9. Pressure Gauge | 1 No. | Fiebig / Gluck India | Approval from ALM SS |
| 10. Try cock/over | 1 No. | Bestobell, UK | Imported |
| 11. Three way valve For 3/8" pipe | 1 No. | Indigenous | Approval from ALM SS |
| 12. Check Valve 1" | 1 No. | Bestobell, UK | Imported |
| 13. Safety valve (line) Size 1/2" | 1 No. | Sebim, Halol India | LRIS approved |
| 14. Pop-up safety valve Size 3/4 " min. On outer shell | 3 nos. | Indigenous | Approval from ALM SS |

In addition to above whatever valves or fittings are required to complete the job shall be provided by the manufacturer as per the approved make within the P.O. value. All the valves which are under cryogenic condition shall be provided with extended spindle of suitable length. Critical instruments shall weather proof suitable to install outside in open.

4.5 DISTRIBUTION MANIFOLD, SI LINE, VALVES & FLEXIBLE HOSE:

Each liquid nitrogen storage tank shall have about 3.5 Metre long discharge line of diameter 1" duly insulated with MULTI-LAYER SUPER INSULATION and evacuated to 1 X 10 to power minus 3 torr or better. At the end of the line a manifold (distribution header) of diameter not less than 1" shall be provided duly insulated with MLSI and fitted with 3 nos. 1/2 " Bestobell valve with extended spindle suitable for cryo application. To ease the dispensing in three cryocans at a time each valve shall be provided with 1/2" jacketed hose of approved make and of about 2 M length. Complete manifold assembly shall have its own supporting arrangement.

A 20 running metre- one inch SI line with Inner rigid/flexible pipe diameter NB 25. Required "L" & "T" bends are to considered with 7 LN2 outlets with 10 valves and 10 flexible hose pipe of 2 metres length in the line with hanging arrangement as per the diagram provided.

4.6 PRESSURE BUILDING COIL:

Each liquid nitrogen storage tank shall be fitted with a pressure building coil with fins of SA-312 (SS 304) material. The length and the diameter of the coil shall be suitable to sustain the pressure building up in the inner vessel.

4.7 INSTRUMENTS FOR LEVEL AND PRESSURE CHECK:

Each tank shall be provided with pressure gauge, differential pressure gauge and any other instrument required to check the level/quantity of the liquid nitrogen inside the tank. A suitable conversion table shall also be provided to calculate the volume w.r.t. differential pressure. All these instruments should be weather proof suitable to install outside in open.

4.8 MANUALS, DRAWINGS, LIST OF SPARE PARTS/TOOLS:

Along with the each liquid nitrogen storage tank, a set of operation and maintenance manual, set of approved drawings comprising of general arrangement, schematic drawing & painting details, spare parts list, essential tools etc. should be sent for the day-to-day operation.

5. INSPECTION AND TESTING:

In order to execute the job in accordance to the requirement of the SAME section VIII Divn. 1 boiler and pressure vessel code 1996 and SMPV Rule 1981 unfired vessel of Chief Controller of Explosive Nagpur, Alamadhi Semen Station would entrust the inspection and drawing appraisal works to a third party inspection agency. It is the responsibility of the supplier to have contact with the third party inspection agency appointed by Alamadhi SS to carry out the job as per the requirement of the ASME and SMPV regulations.

The supplier shall submit approved copy of QAP and inspection procedure to NDDDB DS, Alamadhi SS. Inspection of raw material to the finished product shall be the responsibility of the inspection agency. All documents shall be stamped by inspection agency. On completion of the job inspection agency shall issue a certificate confirming acceptance of the job in accordance to the ASME section VIII Divn.1 amended till 1996 and Static & Mobile Pressure Vessel Rule 1981 of Chief Controller of explosive. **Party shall arrange approval from CCOE & PESO certification as required.**

All the welders who will be going to work on the job against this order shall be qualified by inspection agency in line with the requirement of ASME for fabrication of pressure vessel having service temperature (-) 196 deg. Centigrade.

Following major test shall be conducted on the job by supplier in-house inspection/Inspection Agency (IA) appointed by NDDDB DS, Alamadhi SS.

| <u>INSPECTION STAGE</u> | <u>INSPECTION AGENCY</u> |
|---------------------------------------------------------------------|--------------------------|
| Raw material physical properties And chemical composition check. | IA/ALM SS |
| Dimension check | IA/ALM SS |
| Welding quality check (including X-Ray) | IA/ALM SS |
| Penetration Test | IA/ALM SS |
| Helium leak detector test | IA/ALM SS |
| Hydraulic pressure test | IA/ALM SS |
| Warm vacuum retention test | IA/ALM SS |
| Cold vacuum retention test | IA/ALM SS |
| Liquid nitrogen evaporation loss rate test | IA/ALM SS |
| MLSI material quality check | IA/ALM SS |
| Insulation check | IA/ALM SS |
| Surface finish and painting quality check | IA/ALM SS |
| Final assembly check | IA/ALM SS |

It is the responsibility of the supplier to arrange the instruments, tools & tackles required for inspection and also to organize the visit of IA representative/s as and when required for completion of the job.

As regard the inspection of the insulation is concerned, it is the sole responsibility of the supplier to give defect free MLSI. In case of any failure or defective application or non performance, the manufacturer shall be solely responsible for free rectification/replacement of the insulation.

NDDDB DS, ALM SS has right to inspect the equipment at any stage including the stages of fabrication which are under inspection agency's scope of work. The supplier shall inform the date of each stage of inspection well in advance for organizing the visit.

6.0 CLEANING AND PAINTING:

After completion of fabrication and testing, the inner vessel contact surface shall be thoroughly cleaned as per the requirement of the liquid nitrogen application. The outer shell to be thoroughly cleaned and applied with one coat of primer followed with two coats of approved shade of polyurethane paint. The outer surface shall also have painted LOGO and other information as per the statutory authority's requirement.

7.0 PACKING AND FORWARDING:

The supplier shall pack the storage tank and its accessories suitably to avoid any damage during loading, transportation and unloading at site.

8.0 INSTALLATION, TESTING AND COMMISSIONING OF THE TANK:

Since this contract is on turnkey basis, the scope covers unloading of the storage tank, obtaining approval from CCOE/PESO and other statutory authorities if required for installation, testing & commissioning of the complete system and handing over of the system in satisfactory working condition to the client.

To arrange required tools & tackles for unloading at site, installation, testing and commissioning of the complete system shall be the responsibility of the supplier.

For the evaporation loss rate test to be carried out at site after installation of the storage tank and distribution header network, the supplier shall arrange required quantity of liquid nitrogen. After successful completion of the testing, remaining quantity (approx. 2500-3000 L) of the liquid nitrogen inside the tank shall be handed over to the project authority along with the tank. The cost of the LN has been included in the installation charges.

9.0 BATTERY LIMIT:

Finished civil foundation and allied civil works for installation of the storage tank not in the scope of the contractor.

Electricity and water supply at one point near to the place of installation will be provided by NDDB DS, Alamadhi SS.

10.0 TRAINING TO THE CLIENT'S PERSONNEL:

The supplier shall arrange necessary operation and maintenance training to the working staff of the client at site, hands on training and trouble shooting steps in order to run the system trouble free.

11.0 HANDING OVER TO CLIENT:

After the successful evaporation test and commissioning of the system including distribution net work to the satisfaction of the client, party shall arrange to hand over the entire system to the project authority and obtain a certification confirming the acceptance of the liquid nitrogen storage and distribution system.

Important:

The latest ASME norms/ CCOE circulars/ PESO rules/ any other rules applicable need to be followed. All the legal/ statutory requirements need to be ascertained and adhered to by the supplier.

ANNEXURE- II

Item B: Equipment for Semi-automatic distribution of LN2:

TECHNICAL SPECIFICATION

| | | |
|------------------------------------|-------------------------------|-----------|
| Operating Pressure | Bar. A | 6 |
| Operating Temperature | °C | -196 |
| Test Pressure of inner pipe | Bar. G | 7 |
| Design Temperature | °C | ,-196/+65 |
| Service Fluid | Liquid Nitrogen | |
| Inner pipe diameter rigid/flexible | NB 25 | |
| Outer Pipe Diameter Rigid | NB 80 | |
| Lengh | Per meter | |
| Inner pipe | ASTM A312 TP 304/321 | |
| Outer Pipe | ASTM A312 TP 304/321 | |
| TESTING | | |
| Helium Leak Test | 1*10 ⁻⁸ mbar l/sec | |
| Pneumatic Leak Test | 1.1 Times Design Pressure | |

- Horizontal SI pipe line of about 15 running meters to be verified actual at site and quoted accordingly with Inner rigid/flexible pipe diameter NB 25.
- An additional valve in the horizontal SI pipeline to control the flow of LN2

Important:

- The technical specifications need to be vetted by engineering group before finalising.
- The latest ASME norms / CCOE circulars / any other rules applicable need to be ascertained from Engineering group.
- All the legal requirements need to be ascertained from the suppliers and adhered to by the suppliers.
- All third party vetted documents required by the statutory authorities for grant of their permission to use the tank shall be provided.
- All designs/drawings and quality documentation of the tank.
- Instruction & Maintenance manual should be provided.
- The bidder should submit the details of earlier PO's of successful commissioning and installation of LN2 Silo's and SI Pipe lines in Semen stations.
- Item A & B may be supplied during the month of September 2018. Commissioning and installation should be completed on or before 30th September 2018
- A bidder shall quote for both item A & B and the total value of both items will be considered while finalizing the lowest bidder.

Package-I (for the supply, installation and commissioning of 10kl LN Silo)**Schedule of quantities (SOQ) for Alamadhi semen station in Chennai, Tamilnadu**

| Sl. No. | Description | Qty. | UOM | Rate excluding GST | Total value |
|---------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|-----|--------------------|-------------|
| 1 | Supply, installation, testing, commissioning, training and after sales services of 10,000L liquid nitrogen silo. Rate shall inclusive of PISO certification and allied statutory approval, fabrication, loading, transportation, unloading, installation, testing and commissioning of the tank as per approved drawing details and technical specification and applicable GST, octroi, royalty, statutory fee if any etc. | 1 | No | | |
| 2 | Supply, installation, testing and commissioning, training and after sales services of equipment for Semi automatic distribution of LN2 in FSD storage building to suit the actual site requirement including: | 1 | Set | | |
| 2.1 | About 15m super insulated cryogenic, 20NB, SS LN line from 10 KL tank to internal building line with suitable interconnection with joints and valves etc | | | | |
| 2.2 | Supply and fixing 15 NB flexible SS LN line line 2 Nos of each 2m long | | | | |
| 2.3 | Supply and fixing 15 NB flexible SS LN line line 1 No of each 3m long | | | | |
| | Total excluding GST | | | | |
| | Add: Value of applicable GST (@__%) | | | | |
| | Total including GST | | | | |

We agree to execute the works in accordance with the bill of quantities and technical specifications for a total contract price of :

Rs. _____ (amount in figures)

(Rs. _____ (amount in words).

Signature of Contractor

Package-II

(for the removal, servicing, relocating, installation, testing and commissioning of existing 6KL and 10KL LN Silos)

Schedule of quantities (SOQ) for Alamadhi semen station in Chennai, Tamilnadu

| Sl. No. | Description | Qty. | UOM | Rate excluding GST | Total value |
|---------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|-----|--------------------|-------------|
| 1 | Removing existing silo from foundation, re-locating within our premises for a maximum lead of 500m, servicing for better functioning, re-installtion over foundation, inter connection, required pipes, valves, foundation bolts & nuts, grouting the foundation bolts with suitable chemical admixture, installation, testing, commissioning of 10KL liquid nitrogen silo. Rate shall inclusive of PISO certification and allied statutory approval, loading, transportation, unloading, installation, testing and commissioning of the tank as required and as directed. Contractor to visit the site, ascertain the requirement and quote the rate accordingly. | 1 | Set | | |
| 2 | -do- as above as per item no:1, for 6KL LN silo. Contractor to visit the site, ascertain the requirement and quote the rate accordingly. | 1 | Set | | |
| | | | | | |
| | Total excluding GST | | | | |
| | Add: Value of applicable GST (@__%) | | | | |
| | Total including GST | | | | |

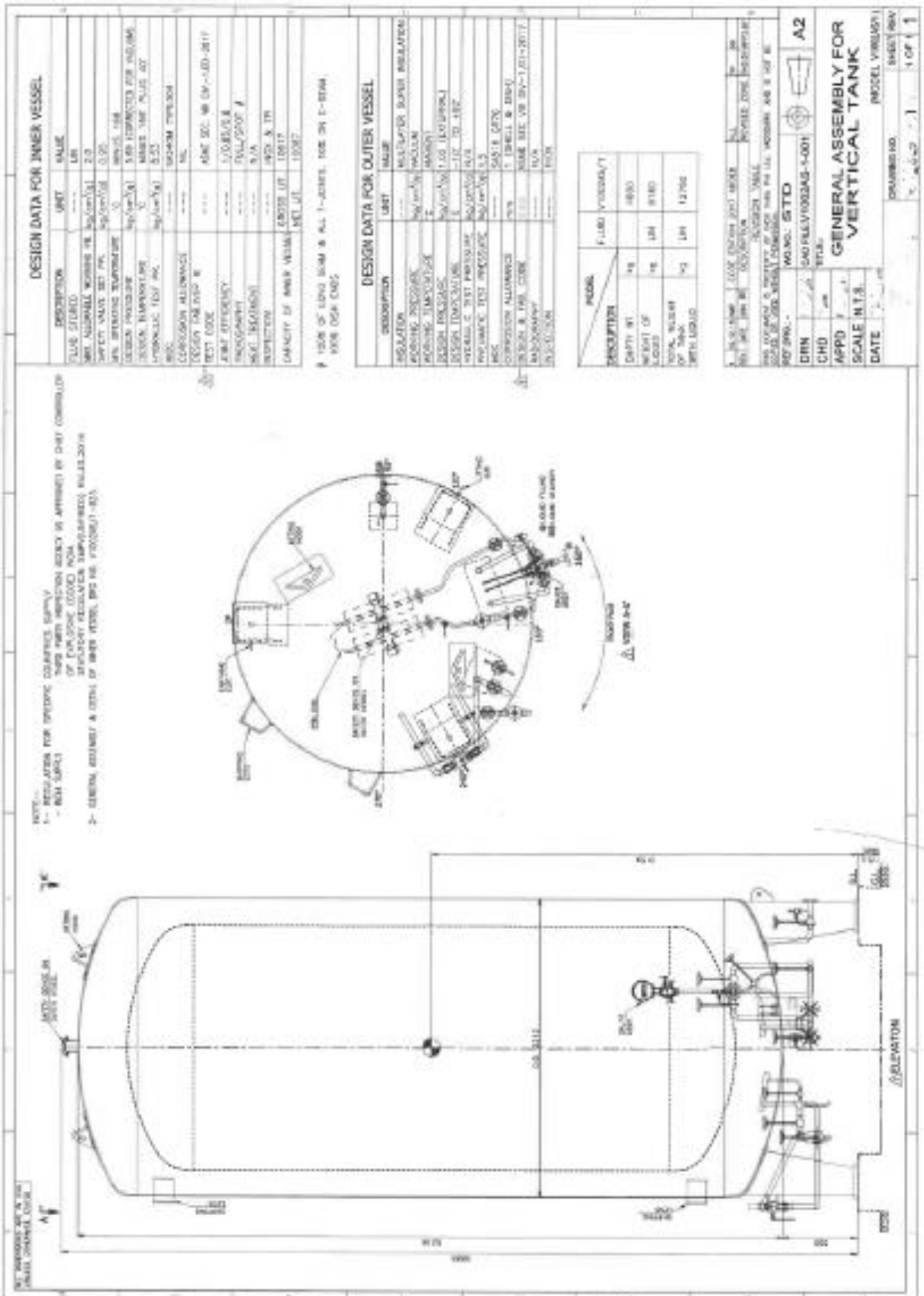
We agree to execute the works in accordance with the bill of quantities and technical specifications for a total contract price of :

Rs. _____ (amount in figures)

(Rs. _____ (amount in words).

Contractor can submit a detailed breakup for the quote and attach it separately if required.

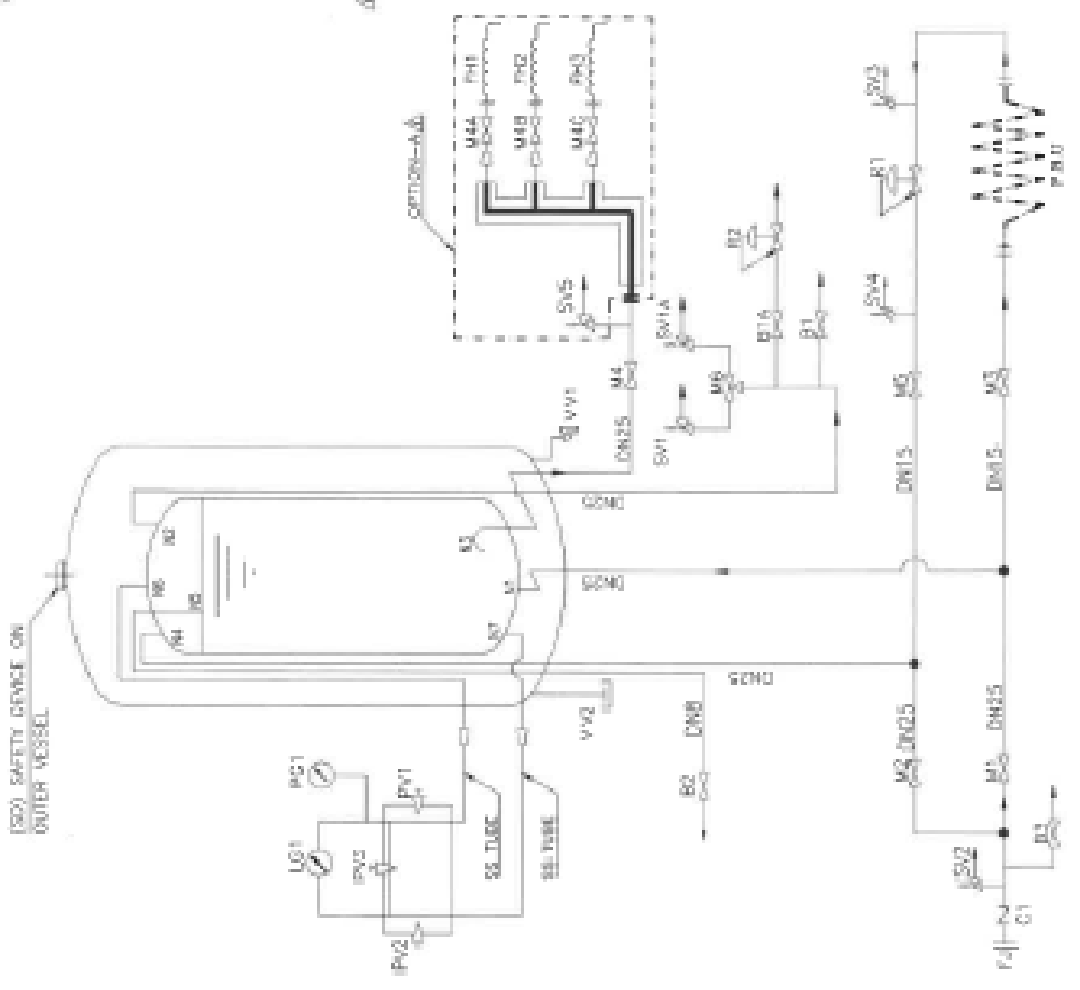
Signature of Contractor



8 7 6 5 4 3 2 1

NOTES:-

- 1] MOC OF ALL VALVES SHALL BE BRONZE/SS BODY.
- 2] MOC OF ALL PIPING SHALL BE SS304.
- 3] GENERAL ASSEMBLY & DETAIL OF INNER VESSEL DRG NO. V1002AS/1-023.



| NO | SAFETY DEVICE FOR OUTER VESSEL | DNOM | INDX STD (INUSE) |
|------|--------------------------------|---------------|------------------------------------|
| SV1 | PPE LINE SAFETY VALVE (PPE-A) | 1/2" NPT | INDX BUBBLE (3) PRESS HIGH (3) |
| DV1 | LIQUID DELIVERY VALVE (PPE-A) | DN15 | LONG STEM GLOBE VALVE |
| LV1 | FLEXIBLE HOSE (PPE-A) | DN15-1/2" | FOR ORGANO FILLING |
| PV1 | BACK PR. REGULATOR | 3/8" NPT | SPT PR. 0.5 kg/cm ² (g) |
| RV1 | PR. BOLD REGULATOR | 3/4" NPT | SPT PR. 0.3 kg/cm ² (g) |
| FJ1 | FILLING JOINT | DN25 | ADAME B T.S.S. 300# 300# |
| VV1 | VACUUM PIPING VALVE | 1/8" NPT | BELLOWS SEALED NEEDLE VALVE |
| VP1 | EVACUATION PORT | DN10 | PLUS AND SPUD TYPE |
| PG1 | PRESSURE GAUGE | 10mm DN 1/4" | 0-6 kg/cm ² (g) |
| LG1 | LEVEL GAUGE | 10mm DN 1/4" | 0-1000 mmHG RANGE |
| PV2 | PRESSURE BALANCE VALVE | | |
| DV2 | LIQ. GAUGE VALVE | | |
| DV3 | DRG. GAUGE VALVE | | |
| SV2 | SAFETY VALVE FOR INNER VESSEL | 1/2" NPT | 3 WAY MANIFOLD VALVE |
| SV3 | SAFETY VALVE FOR INNER VESSEL | 3/4" x 1-1/2" | INDX BUBBLE (3) PRESS HIGH (3) |
| DV4 | DRAIN VALVE | DN15 | LONG STEM GLOBE VALVE |
| DV5 | LIQUID LEVEL DETECT VALVE | DN15 | LONG STEM GLOBE VALVE |
| DV6 | ISOLATION VALVE FOR RG | DN15 | LONG STEM GLOBE VALVE |
| CV1 | CHECK VALVE | DN15 | --- |
| DV7 | GAS GLOW VALVE | DN15 | LONG STEM GLOBE VALVE |
| DV8 | FLOW INVERTOR VALVE | DN15 | INVERTOR TYPE BALL VALVE |
| DV9 | STOP VALVE (PRESSURE) | DN15 | LONG STEM GLOBE VALVE |
| DV10 | LIQ. DELIVERY VALVE | DN15 | LONG STEM GLOBE VALVE |
| DV11 | PRESSURE INLET VALVE | DN15 | LONG STEM GLOBE VALVE |
| DV12 | UPPER FILLING VALVE | DN15 | LONG STEM GLOBE VALVE |
| DV13 | LOWER FILLING VALVE | DN15 | LONG STEM GLOBE VALVE |

| REV. NO. | DATE | BY | DESCRIPTION |
|----------|------------|-----|--------------------------------|
| 1 | 14.02.2015 | ... | NOM. SIZE NG TO DN CHANGED ALL |
| | | | REVISED ZONE FOR EFFORT |

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REF. DRG. NO. : **STD**

WOUND : **STD**

DRN : **CAD FILE V1002AS-1-002**

CHD : **---**

APPD : **---**

SCALE : **N.T.S.**

DATE : **12.4.2015**

TITLE : **---**

A3

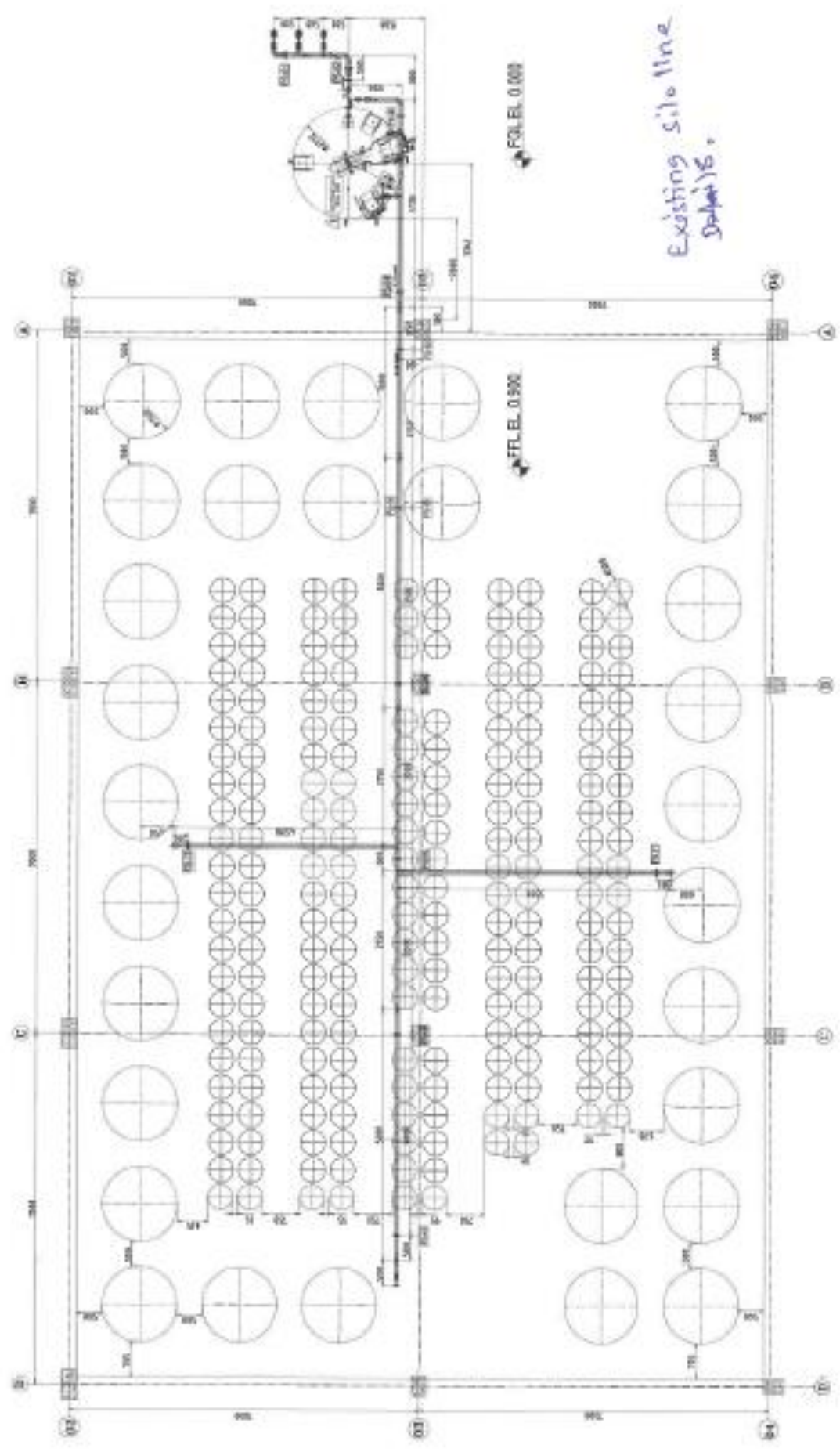
FLOW SCHEME

(MODEL V1002AS/1)

DRAWING NO. : **---**

SHEET REV. : **---**

1 OF 1



Existing silo line
Dakota 15.

FOL EL. 0.000

FTL EL. 0.300