भारत सरकार
वित्त मंत्रालय
राजस्व विभाग
कार्यालय महाप्रबन्धक,
शासकीय अफीम एवं क्षारोद कारखाना,
नीमच.458441 (म.प्र.)

सत्यमेव जयते

GOVERNMENT OF INDIA
Ministry of Finance
Department of Revenue,
Office of the General Manager,
Govt. Opium - Alkaloid Works,
Neemuch-458441 (M.P.)

टेलिफोन Telephone : 07423-220199; 220465

Fax : 07423-220647
Email- gmopiumnmh@dataone.in

F.NO. I(20)008/P/E/SD/2020

DATE:07-06-2023

NOTICE INVITING TENDER No:
F.No. I(20) 008/P/E/SD/2020

1. The Office of the General Manger, Government Opium and Alkaloid Works Neemuch invites Two-Bid online tenders (Technical bid and Financial Bid) for **THE WORK ON TURNKEY BASIS** from manufacturers or their accredited agents for the under noted Work strictly as per the specifications mentioned in Schedule 'A' to this Notice Inviting Tender.

Sl. NO.	Description of Work	Quantity	Single-Bid / Two Bid
1	Removal of old system and supply, Installation, testing and commissioning (S.I.T.C.) of new system (AHU, Evaporator, Reactor, Tray Dryers, Vessels, pipelines and etc.) at GOAW, Neemuch, M.P.	Turn-key Basis	Two-Bid

2 . CRITICAL DATES OF TENDER

Sl. No.	Particulars	Date & Time
1	Publish Date & Time	
2	Sale / Document Download Start Date & Time	07-06-2023, 12.00 A.M.
3	Sale / Document Download End Date & Time	07-07-2023, 17.00 HRS.
4	Site visit Start Date & Time	07-06-2023, 12.00 A.M.
5	Site visit End Date & Time	07-07-2023, 17.00 HRS.
6	Pre-Bidding Date & Time	17-06-2023, 12.00 A.M.
7	Bid Submission Start Date & Time	07-06-2023, 12.00 A.M.
8	Bid Submission End Date & Time	07-07-2023, 17.00 HRS.
9	Bid Opening Date & Time	10-07-2023, 12.00 HRS.

3. Tender documents may be downloaded from Central Public Procurement Portal (CPPP) site **http: //eprocure.gov.in/eprocure/app** as per the schedule given in time schedule for tender as above. Aspiring Bidders who have not enrolled/registered for e-procurement should enrol/register before participating through the website http://eprocure.gov.in/eprocure/app. The portal enrolment is free of cost. Bidders shall submit their quotation online on http://eprocure.gov.in/eprocure/app as per the tender document published. Bidders are requested to follow the instructions carefully as per the tender document and the instructions given in the above said website.

4. The tender shall be submitted **online, in two parts viz. Technical Bid and Financial Bid, along with all the tender documents**. The format of Technical Bid is given in Annexure-C. All the pages of the bid must be sequentially numbered and signed. Over writing, if any, has to be duly certified /attested by the bidder or his authorised signatory irrespective of nature of content of the documents before uploading. Bids submitted without copies of documents specified shall be summarily rejected. The offers submitted through any means other than uploading on the CPPP website https://eprocure.gov.in/eprocure/app shall not be considered. No correspondence will be entertained in this matter.

5. Interested parties are advised to visit CPPP website **https://eprocure.gov.in/eprocure/app** regularly till closing date of submission of tender for any corrigendum/ addendum/ amendment.

6. In the event of any of the above-mentioned date being subsequently declared as a holiday/closed day for this office, the tenders will be opened on the next working day at the scheduled time without any further notice.

7. Interested parties may also download the tender from the official websites - **www.goaf.gov.in &** The bids, complete in all respects should be submitted exclusively through the Government e-procurement portal **https://eprocure.gov.in/eprocure/app** on or before 07-**07-2023**.

8. For any clarification Shri M.K.Kishore, Chemical Engineer (Chairman), GOAW, Neemuch may be contacted at the office or on telephone number (07423 220199) or Mobile number 9893131371.

(M.K.KISHORE) 07.06.23
CHEMICAL ENGINEER
GOAW, Neemuch

Enclosures:

Schedule – A	**Details of work with specification and quantity**
Annexure – B	**General information for the Bidders & Terms and conditions**
Annexure – C	**Technical Bid Format**
Annexure – D	**Tender Acceptance Letter**
Annexure – E	**Special Instructions for e-submission of bids**
Annexure – F	**Amount of EMD to be deposited along with Technical bid**
Annexure – G	**Integrity Pact**
Annexure – H	**Non Blacklist Certificate**
Schedule – B	**Rate at which the material will be charged to the contractor**

ANNEXURE-B

Ministry of Finance, Dept. of Revenue, Govt.
Opium & Alkaloid Works, Neemuch (M.P)

TENDER No. : F.No. I(20) 008/P/E/SD/2020
TENDER DOCUMENTS
GENERAL INFORMATION FOR THE BIDDERS

1. With reference to this office tender notice issued vide **F.No. I(20) 008/P/E/SD/2020** dated 07-06-2023, sealed tenders are invited for Turn-key work from established/ reputed manufacturers or their accredited agents as per specification enclosed with the Tender Documents.

2. Last date for uploading of tenders is up to 17.00 Hrs. of 07-07-2023. Tenders uploaded after due date, time and not in prescribed tender document will not be considered. The tenders are to be submitted (Uploaded) in the prescribed Tender Documents, in respective covers.

3. Tenders uploaded up to prescribed time and date will be opened on 10-07-2023 at 12.00 HRS.

4. Technical Bid in the prescribed format as per Annexure C shall be duly filled in and signed by the authorized signatory and uploaded online by the bidder in Cover-I along with the self-attested and stamped scanned copies of the following documents: -

Cover-I

a) **Scanned Copy of the current and valid NSIC/MSME Certificate as applicable.**
b) **Scanned Copy of the current and valid GST Registration Certificate.**
c) **Technical Bid & Tender Acceptance Letter in format given in Annexure-C & D**
d) **Scanned Copy of EMD.**
e) **Scanned copy of Certificate of ISO 9001.**
f) **A Self declaration on stamp paper shall be submitted duly notarized to the effect that the firm is not BLACK LISTED for Government transaction by any Department / PSU of Government of India (Annexure-H)**
g) **The Bidder must have successfully carried out similar type of chemical plant work as a prime contractor during last 07 years on turnkey basis ending on 31-03-2023 costing not less than Rs.7,37,00,000/- each for three similar works or Rs.9,21,00,000/- each for two similar works or Rs. 14,74,00,000/- for one similar work.**
h) **The Average annual financial turnover of the bidder firm during last three consecutive years ending on 31.03.2023, i.e. 2020-21, 2021-22 & 2022-23 shall not be less than 28 Crores (Rupees Twenty eight crores only). Proof shall be submitted along with the technical bid. (Scanned copy).**
i) **Key personnel of the organization must possess minimum level of qualification (B.E., B.TECH, BSC or equivalent) and experience of minimum three years is required in the similar work.**
j) **Must have certificate high-pressure welders (Scanned copy of proof of certificate is required).**
k) **Scanned copy of integrity Pact. (i.e. Annexure – G)**
l) **Work/time schedule for complete shutdown work. (A Write-up to be submitted in separate sheet).**
m) **Acceptance of Terms & condition of tender must be uploaded.**

5. In case the Bidder fails to submit any of the documents as stated above, financial bids of the bidder shall not be considered for opening and shall be rejected straight away without any further reference.

6. Cover-2

The Financial Bid (as in BOQ) shall be duly filled in, digitally signed and uploaded online by the bidder.

Both Technical Bid and Financial bid should be submitted online through Central Public Procurement Portal e-tender system website http://eprocure.gov.in/eprocure/app. Off line Bids shall not be accepted.

Note:

a. Price Bid in BOQ Excel form.

b. Price bid format may be download from e-procurement site https://eprocure.gov.in/eprocure/app/

c. Bidders should not modify the price bid.

7. If it is noticed that the goods supplied do not conform to the specification of the order, GOAW, Neemuch shall have the right to reject the materials in part or full. The contractor shall be liable to replace the rejected materials within the stipulated time. Till the replacement is done, the rejected materials shall be lying at the risk, cost and responsibility of the supplier/Contractor.

8. Earnest Money of the unsuccessful Bidders shall be released after finalization of the tender, as per General Financial Rules 2017. Interest on the Earnest Money Deposit / Security Deposit will not be paid on any score, what-so-ever.

9. A Self declaration on stamp paper shall be submitted duly notarized to the effect that the firm is not BLACK LISTED for Government transaction by any Department / PSU of Government of India.

10. The General Manager, Govt. Opium & Alkaloid Works, Neemuch reserves the right to reject or accept any tender without assigning any reason.

TERMS AND CONDITIONS

1. The Bid security/EMD as mentioned in Annexure-F in the form of A/c payee demand draft, fixed deposit receipt, Bankers cheque or Bank guarantee from any of the commercial Banks drawn in favour of Assistant Chief Accounts Officer, Govt. Opium and Alkaloid Works, Neemuch (except NSIC/Micro and small enterprises (MSEs) as defined in MSE procurement policy issued by department of Micro, Small and Medium Enterprises (MSME) or registered with the Central Purchase Organization or the concerned Ministry or department) must be accompanied along with duly signed terms and conditions and self declaration.

   The Bid security is to be valid for a period of 45 days beyond the final bid validity period (180 Days). The EMD of successful bidder shall be released after furnishing of Security deposit/performance guarantee at the earliest. The EMD of unsuccessful bidders shall be released at the earliest after expiry of the final bid validity and latest on or before the 30th day after the award of the work order.

   Bid security will be forfeited if bidder withdraws or amends it's/his tender or impairs or derogated from the tender in any respect within the period of validity of the tender or if the successful bidder fails to furnish the required performance security within specified period.

2. The Basic price on F.O.R. (Free on Rail/Road) along with GST/other taxes should necessarily be quoted in the price bid. The Price quoted by the bidder should be inclusive of all the tax applicable, levies, GST, transit, insurance and freight and any other statutory levies etc..

3. The rates offered will remain valid till the completion of the entire shutdown work. Conditional tenders shall not be accepted.

4. The rates quoted should be valid for a period of six calendar months from the date of opening of the tender, as mentioned in the main tender document.

5. Rates should be quoted for Neemuch basis. Neemuch is located 135 km from Ratlam (M.P.) and 55 kms from Chittorgarh (Raj.)

6. The Income Tax and any other taxes or charges as applicable will be deducted at source from the successful bidder while making the payment.

7. In case, the Bidder withdraws his offer or in the event of Bidder failing to execute, after his tender is accepted, the Earnest Money Deposit furnished by him shall be forfeited without any prejudice to other rights of Govt. of India under any law.

8. In the event of tender being accepted, the work Order will be placed by the Competent Authority of Govt. Opium & Alkaloid Works, Neemuch.

9. **Performance Security:**

   Successful bidder shall furnish a Performance Security @10% of quoted value either in the form of Account Payee Demand Draft in favor of Assistant Chief Accounts Officer (ACAO), Govt. Opium & Alkaloid Works, Neemuch, fixed deposit receipt from a Commercial bank, /an Irrevocable Bank Guarantee of any Commercial Bank in favour of the General Manager, Govt. Opium & alkaloid Works, Neemuch- (M.P) before commencement of the work.

   a) Performance security is to be furnished within 14 (fourteen) days after notification of the award and it should remain valid for a period of sixty days beyond the date of completion of all contractual obligations of the supplier including warranty obligation (i.e. one year).
   b) Bid Security (EMD) shall be refunded to the successful bidder on receipt of Performance Security.

c) Performance security will be forfeited in the event of breach of contract by the Contractor. It will be refunded to the Contractor without interest, after he duly performs and completes the contract in all respects but not later than 60 (sixty) days of completion of all such obligations including the warranty under the contract.

10. **Defaults and Breach of Contract:** In case the contractor undergoes insolvency or receivership; neglects or defaults, or expresses inability or disinclination to honour his obligations relating to the performance of the contract or ethical standards or any other obligation that substantively affects the GOAW Neemuch rights and benefits under the contract, it shall be treated as a breach of Contract. Such defaults could include inter-alia:

    I. **Default in Performance and Obligations:** if the contractor fails to deliver any or all of the Goods or fails to perform any other contractual obligations (including Code of Integrity or obligation to maintain eligibility and Qualifications based on which contract was awarded) within the period stipulated in the contract or within any extension thereof granted by the Procuring Entity.
    II. **Insolvency:** If the contractor being an individual or if a firm, any partner thereof, shall at any time, be adjudged insolvent or shall have a receiving order or order for the administration of his estate made against him or shall take any proceeding for composition under any Insolvency Act for the time being in force or make any conveyance or assignment of his effects or enter into any assignment or composition with his creditors or suspend payment or if the firm be dissolved under the Partnership Act, or
    III. **Liquidation:** if the contractor is a company being wound up voluntarily or by order of a Court or a Receiver, Liquidator or Manager on behalf of the Debenture-holders is appointed, or circumstances shall have arisen which entitle the Court or Debenture-holders to appoint a Receiver, Liquidator or Manager.

11. In case of exigencies, unforeseen circumstances, the Competent Authority of GOAW, Neemuch reserves the right to cancel the work order for whole or the balance quantity or part of it by way of notice without assigning any reason, what-so-ever.
12. Legal proceedings, if any, emanating from this Order shall fall within the jurisdiction of the competent court of Neemuch as the case may be.
13. The stores when received at the delivery place / destination shall be inspected for its quantity and quality.
14. No advance payment on any account shall be made for the supply. After inspection of the material supplied and on the material found satisfactory, payment shall be released by way of PFMS.
15. The material can be inspected at the premises of manufacturers / suppliers by the officers of this organization to ensure the quality of the material as per specification.
16. The competent Authority also reserve the right to increase or decrease the quantity of store/material to be supplied based on assessment of the final requirement & tender agrees to supply such revised quantities at the same rates and terms of this tender.
17. **Validity of Bids**: The Bids should remain valid for 180 days from the date of financial bid opening.
18. The details of independent external monitor for the above tender is as follows:-

    Smt. Rashmi Verma, IAS (Retd.)

D-87, Ground Floor, Panchseel Enclave,
New Delhi – 110 017
Email : verma.rashmi@rediffmail.com

19. **Rejection of Bids:** Canvassing by the Bidder in any form, unsolicited letter and post-tender correction may invoke summary rejection. Conditional tenders will be rejected. Non-compliance of applicable General Information and Instruction will disqualify the Bid.

20. If any Bidder submit more than one technical and /or financial bid, the bid would be liable to be rejected out rightly.

21. **Site Visit:** The GOAW, Neemuch recommends that bidders visit the site during the tender period to become familiar with and take into account the existing system and all relevant surrounding site conditions. The successful contractor to have included in tender price all costs associated with performing all aspects of the work which are affected by existing conditions or related existing conditions which arise as a result of performing any aspect of the work. The Contractor shall investigate the possible presence of underground utilities/services which may be encountered while performing the work, and take into account all associated precautions and/or altered work methods. No additional compensation will be provided for any work items affected by existing site conditions.

22. **Force Majeure:**
On the occurrence of any unforeseen event, beyond the control of either Party, directly interfering with the delivery of Services arising during the currency of the contract, such as war, hostilities, acts of the public enemy, civil commotion, sabotage, fires, floods, explosions, epidemics, quarantine restrictions, strikes, lockouts, or acts of God, the affected Party shall, within a week from the commencement thereof, notify the same in writing to the other Party with reasonable evidence thereof. Unless otherwise directed by the General Manager, GOAW, Neemuch in writing, the contractor shall continue to perform its obligations under the contract as far as reasonably practicable and shall seek all reasonable alternative means for performance not prevented by the Force Majeure event. If the force majeure condition(s) mentioned above be in force for 90 days or more at any time, either party shall have the option to terminate the contract on expiry of 90 days of commencement of such force majeure by giving 14 days' notice to the other party in writing. In case of such termination, no damages shall be claimed by either party against the other, save and except those which had occurred under any other clause of this contract before such termination.

23. **Payment Terms:** The payment will be made on submission of Invoice in triplicate addressed to General Manager against the work indicated in SCH-A in the following manner.

A. 70% payment shall be made against the supply of entire material to this works on submission of following documents.

I. Supplier's Invoice
II. Packing list;
III. Insurance certificate;
IV. Railway receipt/consignment note;
V. Manufacturer's guarantee certificate and in-house inspection certificate;
VI. Inspection certificate issued by purchaser's inspector;

B. Balance 30% payment shall be made on successful completion of fabrication,

installation, testing and commissioning of the entire system at this works.

No advance/mobilization advance payment on any account shall be made.

24. **Delivery/Work Completion Period:**

After placing work order or LOI, the contractor must be able to supply/deliver entire material/ items like Storage tanks, Dryers, Vessel etc and connected pipelines, valves and other fittings as a part of the above work at the site of Govt. Opium & Alkaloid Works, Neemuch (M.P) within 60 days period from the date of receipt of the LOI.

Also the contractor must be able to remove the existing old System and install, fabricate, test and commission the entire new system after supply within a period of 90 days as detailed in work order.

Please note that shutdown of the plant shall be given only for 90 days including Sundays & holidays. Prior to this, 15 days are required for cleaning of the plant to make solvent free, which shall be carried out by this works. **Then after the permission will be given to the contractor to enter the plant for the work of fabrication, installation, testing and commissioning of the entire process system for 90 days only.** Accordingly the contractor shall plan well in advance and should supply entire material as per clause & carry out the pre-fabrication activities at workshop within the one month time prior to the actual shutdown period and should keep the pre-fabricated pipelines and equipments ready, so that they can install at respective sections during the actual shutdown period of 90 days as mentioned above, and no more shutdown period shall be allowed, and if the shutdown period happens to be continued, the risk purchase clause shall apply.

25. **Extension of Delivery Period:** If at any time during the currency of the contract, the contractor encounters conditions hindering timely delivery of the Goods and performance of incidental Works/ Services, he shall promptly inform the General Manager, GOAW, Neemuch in writing about the same and its likely duration. He must make a request to the General Manager, GOAW, Neemuch for an extension of the delivery schedule. On receiving the contractor's communication, the General Manager, GOAW, Neemuch shall examine the situation and, at its discretion, may agree to extend the delivery schedule, with or without liquidated damages by issuing an amendment to the contract.
26. All tools and plants (T&P) and manpower deployed by contractor during execution of work shall be sufficiently insured and proof against the same should be submitted to engineer in charge.
27. **Test Certificates & Technical Literature:**

Test Certificates in support of material specification mentioned in **SCH-A** shall be made available to us for mechanical, Electrical, instrumentation items etc. The manufacturer's test certificate in original is acceptable. Wherever, the test certificates from outer agencies (i.e. IBR & IS) are being furnished the same shall be submitted without extra cost to this work.

It will be imperative on each bidder to fully acquaint himself of all local conditions and factors, which may have any effect on the execution of the work covered under these documents. The Bidder is advised to visit the site and get acquainted with the conditions of the plant (i.e. for taking physical measurement etc.) before submission of tender.

28. **Risk Purchase:** In case the Material/Equipments are not supplied and/or commissioned within stipulated period as per order or in case of supplies of substandard quality the General Manager, Govt. Opium & Alkaloid Works, Neemuch reserves the right to purchase the equipments from any other available sources and if any extra expenditure is incurred due to such work, the extra expenditure shall be borne by the contractor. In this regard the notice given by this Works will be final and binding without any dispute.

29. **Liquidates damages:** In case of delay in supply of material and/or completion of work (i.e. installation, testing and commissioning) as per work order, you will be liable for liquidated damage @ 2% of value of the work order per month subject to maximum 5% of the contract value.

30. The Quality of the work & its performance shall be verified at our Works with respect to successful working at the time of commissioning. In case, the work is not as per specifications, the General Manager, Govt. Opium & Alkaloid Works, Neemuch reserves the right to reject the equipment/material at the cost of Contractor.

31. All the deductions of taxes, levies as applicable will be made under the relevant statue and laws, and also will be charged at the rates prescribed by respective laws and procedures and instructions issued from time to time.

32. The contractor shall furnish the addresses of the firms, including phone No., Fax and the name of contact person to whom such type of material had been supplied and executed similar types of work.

33. **Award of Contract: The Contract will be awarded to the lowest Bidder on the total amount (BOQ) basis and successful qualification in the Technical as well as Financial Bid. No separation of the work shall be considered, and as such all of these works (SCH – A) are interlinked with each other work. The entire works shall be executed as a whole and shall be executed on turnkey basis.**

34. The General Manager reserves the right to reject/ accept the whole or any part of the tender/bid. The contractor shall be responsible and shall be bound to perform the job allocated to him at his quoted rates and accepted by this Works.

35. Dispute if any will be subjected to Neemuch jurisdiction

36. The qualified bidder has to sign the agreement of Integrity Pact as per Annexure G and should be submitted along with the technical Bid.

37. In case the Bidder withdraws his tender or in the event of his tender being accepted, fails to accept the order within the stipulated time, the Earnest Money furnished by him shall be liable to be forfeited without any prejudice to other rights of the Govt. under the law.

38. In the event of tender being accepted, the Bidder shall have to furnish performance Security at the rate of 10 (Ten) percent of the total value of work to this Works as mentioned at above.

39. Contractor/firm should be capable of doing all the jobs mentioned in Schedule A and scope of work and should have carried out similar type of jobs; Work is to be done as per instructions of Engineer in charge.

40. Conditional tenders will not be accepted.
41. Contractor/ Firm shall comply with the Factory Acts 1948, labour laws and safety laws in force from time to time.
42. Any other Rules and regulations, conditions etc. which are in force at present and that any be framed by this Works from time to time in connection with the contract will be binding and acceptable to the contractor.
43. All the General T&P required for executing the job is to be arranged by contractor and no extra payment will be done. T&P shall include spanners of inch size, mm sizes, hammer, screwdriver, chain pulley block, winches, other lifting equipment devices, sling, D shades, eyebolt, etc. for the above job.
44. Work is to be started at 07:00 AM in the morning and shall continue up to 10:00 PM or as directed by the engineer in charge.
45. Contractor/firm should deploy the work force capable of doing the job as mentioned in scope of work and contractor has to deploy one site in charge and supervisor, who will be responsible for all the activities carried out daily and co- ordinate the job as per direction of Engineer in charge.
46. The contractor/firm should visit this Works, and site of work with permission of General Manager on any working day between 10:00 am to 17:00 hrs before submitting the tenders.
47. In case of exigencies, Unforeseen circumstances the General Manager reserve the right to cancel the work order for whole or the balance of the quantity or part it by way of one week notice without assigning any reason.
48. Legal proceeding, if any emanating from this contract shall fall within the jurisdiction of the competent court of Neemuch, state of Madhya Pradesh.
49. **Warranty/Guarantee Clause:** Contractor should provide warranty against defects arising from design, material, workmanship or any omission on part of the vendor/ contractor during a period of 12 months from the date of commissioning of the system.
50. The stores/material when received shall be installed and demonstrated for satisfactory working. It will be the responsibility of contractor to replace or repair the defective parts during guarantee / warranty period.
51. The contractor should be capable to look after installation & commissioning and be able to supply spare parts at least for five year.
52. All supplies should be accompanied with a test certificate in support of quality of the material, as mentioned in the tender document.
53. Point no. 4 (i) of general information for the bidders: Minimum qualification of key personnel should be Graduation in BE/B.Tech/B.Sc., or equivalent.
54. Govt. Opium & Alkaloid Works, Neemuch will not be responsible for any damages, losses to the property of the contractor during the period of work, similarly, the Govt. Opium & Alkaloid Works, Neemuch will not be responsible for any loss caused to any persons engaged by the contractor due to any reason what so ever.
55. These General Terms and Conditions shall form part of the contract. The contractor will also be responsible for peaceful work covering dismantling, erection and clearance of the materials and storage during the performance of contract and there after winding up of the work on completion.

56. **Pre-bid meeting:**

a. Bidder may request a clarification of any of the Tender documents prior to the proposal submission date. Any request for clarification must be sent in writing to the General Manager, Govt. Opium & Alkaloid Works, Neemuch, M.P. 458441. These would be clarified at the pre-bid meeting.

b. The bidder or his official representative is invited to attend the pre-bid meeting, which will take place on the appropriate time and place, it will be informed accordingly.

c. The purpose of the meeting will be to clarify issues and to answer questions on any matter related to the Tender Document that may be raised at that stage including the clarifications requested above, related to work to be carried out.

d. Non-attendance at the pre-bid meeting will not be a cause for disqualification of a bidder.

Accepted
Signature of the Contractor
With name, Date, Designation
And Seal.

SCHDULE - B

Name of Work :- Removal, supply, Installation, Testing and Commissioning of new system at Govt. Opium and alkaloid works, Neemuch (M.P.) on turnkey basis.

S.No.	Particulars	Rate at which the material will be charged to the contractor for recovery from his bill	Place of delivery
1	Water	Free of charge	At one point at site.
2	Electricity	Free of charge	At one point at site
3	Welding generator & welding transformer and welding electrodes (SS&MS), Fork Lift, Hydraulic Machineries and all applicable tools & tackles etc.	In the scope of contractor	--
4	Oxygen & Acetylene, Argon Gas, Electrodes & Flux etc.	In the scope of contractor	--

Accepted

Signature of Contractor with seal,
Signature, date, time and name

ANNEXURE-C

Ministry of Finance, Dept. of Revenue, Govt.
Opium & Alkaloid Works, Neemuch (M.P)
TENDER No. :

TECHNICAL BID

a. Name & Address and Telephone number of the Firm/Bidder :

b. Name & Address of the Authorized Signatory : Tel. No. of the Authorized Signatory

c. i) Details of the firm :

ii) In case of manufacturer, submit copy of valid certificate :

d. GST Registration Number (Copy of valid G.S.T Certificate may be submitted.) :

I/We hereby declare that the above statements are true. I/We also declare that the decision of GOAW, Neemuch regarding selection of eligible firms for opening of Financial Bid (Part-II) shall be final and binding on me/us.

Date: Signature:

Address: Name of the Authorised Signatory :

Designation

Note:

1. The Financial Bids of only such Bidder whose Technical Bids are eligible will be opened on the specified date, which will be publish to the portal after Technical Bid.

ANNEXURE-D

TENDER ACCEPTANCE LETTER

To

The General Manager
Govt. Opium and
Alkaloid Works,
Neemuch (M.P)

Sir,

Subject: Acceptance of Terms & Conditions of tender for "The work on Turnkey basis".

Tender Reference No:_____

1. I/ We have downloaded / obtained the tender document(s) for the above-mentioned tender from the web site(s) namely as per your advertisement, given in the above mentioned website(s).

2. I / We hereby certify that I / we have read the entire terms and conditions of the tender documents (including all documents like annexure(s), schedule(s), etc., which form part of the tender document) and signed on all the pages of the terms & conditions. I / we shall abide by the terms / conditions / clauses contained therein.

3. The corrigendum(s), issued from time to time by your department too have also been taken into consideration, while submitting this acceptance letter.

4. I / We hereby unconditionally accept the tender conditions of above mentioned tender document(s) / corrigendum(s) in its totality / entirety.

5. I / We do hereby declare that we have not been blacklisted/ debarred by any Govt. Department/Public sector undertaking.

6. I / We certify that all information furnished by me/ us/ our firm is true & correct and, in the event, that the information is found to be incorrect/untrue or found violated, then your department shall without giving any notice or reason thereof, shall summarily reject the Bid, without prejudice to any other rights or remedy.

Yours sincerely

Date:
Address:

Signature:
Name of the Authorised Signatory:
Designation:
Seal/Stamp:

ANNEXURE-E

Ministry of Finance, Govt. Opium and Alkaloid Works, Neemuch (M.P)
TENDER No. :F.No. I(20)008/P/E/SD/2020
Special Instructions for e-submission of bids

1. The bidders are required to submit soft copies of their bids electronically on the CPP Portal, using valid Digital Signature Certificates. The instructions given below are meant to assist the bidders in registering on the CPP Portal, prepare their bids in accordance with the requirements and submitting their bids online on the CPP Portal.
2. More information useful for submitting online bids on the CPP Portal may be obtained at https://eprocure.gov.in/eprocure/app

REGISTRATION

a. Bidders are required to enrol on the e-Procurement module of the Central Public Procurement Portal (URL: https://eprocure.gov.in/eprocure/app) by clicking on the link "**Online bidder Enrolment**" on the CPP Portal which is free of charge.
b. As part of the enrolment process, the bidders will be required to choose a unique username and assign a password for their accounts.
c. Bidders are advised to register their valid email address and mobile numbers as part of the registration process. These would be used for any communication from the CPP Portal.
d. Upon enrolment, the bidders will be required to register their valid Digital Signature Certificate (Class II or Class III Certificates with signing key usage) issued by any Certifying Authority recognized by CCA India (e.g. Sify / nCode / eMudhra etc.), with their profile.
e. Only one valid DSC should be registered by a bidder. Please note that the bidders are responsible to
ensure that they do not lend their DSC's to others which may lead to misuse.
f. Bidder then logs in to the site through the secured log-in by entering their user ID / password and the password of the DSC / e-Token.

SEARCHING FOR TENDER DOCUMENTS

i. There are various search options built in the CPP Portal, to facilitate bidders to search active tenders by several parameters. These parameters could include Tender ID, Organization Name, Location, Date, Value, etc. There is also an option of advanced search for tenders, wherein the bidders may combine a number of search parameters such as Organization Name, Form of Contract, Location, Date, Other keywords etc. to search for a tender published on the CPP Portal.

ii. Once the bidders have selected the tenders they are interested in, they may download the required documents / tender schedules. These tenders can be moved to the respective 'My Tenders' folder. This would enable the CPP Portal to intimate the bidders through SMS / e-mail in case there is any corrigendum issued to the tender document.

iii. The bidder should make a note of the unique Tender ID assigned to each tender, in case they want to obtain any clarification / help from the Helpdesk.

PREPARATION OF BIDS

a. Bidder should take into account any corrigendum published on the tender document before submitting their bids.

b. Please go through the tender advertisement and the tender document carefully to understand the documents required to be submitted as part of the bid. Please note the number of covers in which the bid documents have to be submitted, the number of documents including the names and content of each of the document that need to be submitted. Any deviations from these may lead to rejection of the bid.

c. Bidder, in advance, should get ready the bid documents to be submitted as indicated in the tender document / schedule and generally, they can be in PDF / XLS / RAR / DWF/JPG formats. Bid documents may be scanned with 100 dpi with black and white option which helps in reducing size of the scanned document.

d. To avoid the time and effort required in uploading the same set of standard documents which are required to be submitted as a part of every bid, a provision of uploading such standard documents (e.g. PAN card copy, annual reports, auditor certificates etc.) has been provided to the bidders. Bidders can use "My Space" or ''Other Important Documents'' area available to them to upload such documents. These documents may be directly submitted from the "My Space" area while submitting a bid, and need not be uploaded again and again. This will lead to a reduction in the time required for bid submission process.

SUBMISSION OF BIDS

i. Bidder should log into the site well in advance for bid submission so that they can upload the bid in time
i.e. on or before the bid submission time. Bidder will be responsible for any delay due to other issues.

ii. The bidder has to digitally sign and upload the required bid documents one by one as indicated in the tender document.

iii. The server time (which is displayed on the bidders' dashboard) will be considered as the standard time for referencing the deadlines for submission of the bids by the bidders, opening of bids etc. The bidders should follow this time during bid submission.

iv. The uploaded tender documents become readable only after the tender opening by the authorized bid openers.

v. Upon the successful and timely submission of bids (i.e. after Clicking "Freeze Bid

Submission" in the portal), the portal will give a successful bid submission message & a bid summary will be displayed with the bid no. and the date & time of submission of the bid with all other relevant details.

vi. The bid summary has to be printed and kept as an acknowledgement of the submission of the bid. This acknowledgement may be used as an entry pass for any bid opening meetings.

ASSISTANCE TO BIDDERS

1. Any enquiries relating to the tender document and the terms and conditions contained therein should be addressed to the Tender Inviting Authority for a tender or the relevant contact person indicated in the tender.

2. Any queries relating to the process of online bid submission or queries relating to CPP Portal in general may be directed to the 24x7 CPP Portal helpdesk. The contact number for the helpdesk is 1800 233 7315.

Annexure "F"

Amount of EMD to be deposited and to be submitted Physically along with Technical bid

Sr no.	***Name of Work***	***Amount of EMD to be deposited in INR***
1	• Removal and S.I.T.C. of new system on turnkey basis at Government Opium & Alkaloid works, Neemuch (M.P.)	**Rs. 70,00,000/- (Rs. Seventy lacs only/-)**

Annexure-G

Integrity Pact

(**To be executed on stamp paper and submitted along with technical bid/tender documents. To be signed by the bidder and Govt. Opium and Alkaloid Works, Neemuch.)**

Govt. Opium & Alkaloid Works, (GOAW) Neemuch hereinafter referred to as "The Principal".

AND

_____hereinafter referred to as "The Bidder/Contractor".

PREAMBLE

The Principal intends to award, under laid down organizational procedures, contract/s removal and supply, installation, and commissioning S.I.T.C of new system in SRM, NCT, SC and VAP section. The Principal values full compliance with all relevant laws of the land, rules, regulations, economic use of and of fairness/transparency in its relations with its Bidder(s) and/or Contractor(s).

In order to achieve these goals, the Principal will appoint an Independent External Monitor (IEM), who will monitor the tender process and the execution of the contract for compliance with the principles mentioned above.

Section 1: Commitments of the Principal.

1. The Principal commits itself to take all measures necessary to preventcorruption and to observe the following principles:-

   a) No employee of the Principal, personally or through family members, will in connection with the tender for, or the execution of a contract, demand, take a promise for or accept, for self or third person, any material or immaterial benefit which the personal is not legally entitled.

   b) The Principal will during the tender process treat all Bidder(s) with equity and reason. The Principal will in particular, before and during the tender process, provide to all Bidder(s) the same information and will not provide to any Bidder(s) confidential/additional information through which the Bidder(s) could obtain an advantage in relation to the process or the contract execution.

   c) The Principal will exclude from the process all known prejudiced persons.

2. If the Principal obtains information on the conduct of any of its employees which is a criminal offence under the IPC/PC Act, or if there be a substantive suspicion in this regard, the Principal will inform the Chief Vigilance Officer and in addition can initiate disciplinary actions.

Section 2: Commitments of the Bidder(s)/Contractor(s)

1. The Bidder(s)/Contractor(s) commit himself to take all measures necessary to prevent corruption. He commits himself to observe the following principles during his participation in the tender process and during the contract execution.

   a. The Bidder(s)/contractor(s) will not, directly or through any other persons or firm, offer promise or give to any of the Principal's employees involved in the tender process or the execution of the contract or to any third person any material or other benefit which he/she is not legally entitled to, in order to obtain in exchange any advantage or during the execution of the contract.

   b. The Bidder(s)/Contractor(s) will not enter with other Bidders into any undisclosed agreement or understanding, whether formal or informal. This applies in particular to prices, specifications, certifications, subsidiary contracts, submission or non submission of bids or any other actions to restrict competitiveness or to introduce cartelization inthe bidding process.

   c. The Bidder(s)/Contractor(s) will not commit any offence under the relevant IPC/PC Act; further the Bidder(s)/Contractors will not use improperly, for purposes of competition or personal gain, or pass on toothers, any information or documents provided by the Principal as partof the business relationship, regarding plans, technical proposals and business details, including information contained or transmitted electronically.

   d. The Bidder(s)/Contractor(s) of foreign origin shall disclose the name and address of the Agents/representatives in India, if any. Similarly, the bidder(s)/contractor(s) of Indian Nationality shall furnish the name and address of the foreign principals, if any. All the payments made to the India agent/representative have to be in Indian Rupees only.

e. The Bidder(s)/Contractor(s) will, when presenting his bid, disclose any and all payments he has made, is committed to or intends to make to agents, brokers or any other intermediaries in connection with the award of the contract.

f. The Bidder(s)/Contractor (s) who have signed the Integrity Pact shall not approach the courts while representing the matter to IEMs and shall wait for their decision on the matter.

2. The Bidder(s)/Contractor(s) will not instigate third persons to commit offences outlined above or be an accessory to such offences.

Section 3: Disqualification from tender process and exclusion from futurecontract

If the Bidder(s)/Contractor(s), before award or during execution has committed a transgression through a violation of Section 2 above or in any other form such as to put his reliability or credibility in question, the Principal is entitled to disqualify the Bidder(s)/Contractor(s) from the tender process or to terminate the contract, if already signed, for such reasons.

Section 4: Compensation for Damages

1. If the Principal has disqualified the Bidder(s) from the tender process prior to the award according to Section 3, the Principal is entitled to demand and recover the damages equivalent to Earnest Money Deposit/Bid Security.

2. If the Principal has terminated the contract according to Section3, or if the Principal is entitled to terminate the contract according to Section3, The Principal shall be entitled to demand and recover from the Contractor liquidated damages of the Contract value or the amount equivalent to Performance Bank Guarantee.

Section 5: Previous Transgression

1. The Bidder declares that no previous transgressions occurred in the last three years with any other company in any country conforming to the TII's anti corruption approach or with any other public sector enterprisein India that could justify his exclusion from the tender process.

2. If the bidder makes incorrect statement on this subject, he can be disqualified from the tender process and appropriate action can be taken including termination of the contract, if already awarded, for suchreason

Section 6: Equal treatment of all Bidders / Contractors / Sub -contractors.

1. In case of sub –contracting, the Principal Contractor shall take the responsibilityof adoption of Integrity Pact by the Sub – Contractor.

2. The Principal will enter into agreements with the identical conditions as thisone with all bidders and Contractors.

3. The Principal will disqualify from the tender process all bidders who do not sign this Pact or violate its provisions.

Section 7: Criminal charges against violation Bidder(s) / Contractor(s) / Sub-contractors(s).

If the Principal obtains knowledge of conduct of a Bidder(s)/ Contractor(s) which constitutes corruption, or if the Principal has substantive suspicion in this regard, the Principal will inform the same to the Chief Vigilance Officer.

Section 8: Independent External Monitor/Monitors

1. The Principal appoints competent and credible Independent External Monitor for this Pact after approval of Central Vigilance Commission. The task of the Monitor is to review independently and objectively, whether and to what extent the parties comply with the obligations under this agreement.

2. The Monitor is not subject to instructions by the representatives of the parties and performs his functions neutrally and independently. The Monitor will have access to all contract documents, whenever required. It will be obligatory for him to treat the information and documents of bidders/contractors as confidential. He reports to the Chief Controller of Factories, New Delhi.

3. The Bidder(s)/Contractor(s) accepts that the Monitor has the right to access without restriction to all project documentation of the Principal including that provided by the Contractor. The Contractor will also grant the Monitor, upon his request and demonstration of a valid interest, unrestricted and unconditional access to his project documentation. The same is applicable to Subcontractors.

4. The Monitor is under contractual obligation to treat the information and documents of the Bidder(s)/Contractor(s)/Subcontractor(s) with confidentiality. The Monitor has also signed declarations on “Non – Disclosure of Confidential Information” and of “Absence of Conflict of Interest” In case of any conflict of interest arising at a later date, the IEM shall inform Chief Controller of Factories, New Delhi and recuse himself/herself from the case.

5. The Principal will provide to the Monitor sufficient information about all meetings among the parties related to the Project provided such meetings could have an impact on the contractual relations between the Principal and the Contractor. The parties offer to the Monitor the option to participate in such meetings.
6. As soon as the Monitor notices, or believes to notice, a violation of this agreement, he will so inform the Management of the Principal and request the Management to discontinue or take corrective action, or to take other relevant action. The monitor can in this regard submit non-binding recommendations. Beyond this, the Monitor has no right to demand from the parties that they act in a specific manner, refrain from action or tolerate action.

7. The Monitor will submit a written report to the Chief Controller of Factories, New Delhi within 8 to 10 weeks from the date of reference or intimation to him by the Principal and, should the occasion arise, submit proposals for correcting problematic situations.

8. Monitor shall be entitled to compensation on the same terms as being extended to/provided to Independent Directors on BFL Board.

9. If the Monitor has reported to the Chief Controller of Factories, New Delhi, a substantiated suspicion of an offence under relevant IPC/PC Act, and the Chief Controller of Factories, New Delhi has not, within the reasonable time taken visible action to proceed against such offence or reported it to the Chief Vigilance Officer, the Monitor may also transmit this information directly to the Central Vigilance Commissioner.

10. The word "Monitor" word include both singular and plural.

Section 10: Pact Duration

This pact begins when both parties have legally signed it. It expires for the Contractor 12 months after the last payment under the contract, and for all other Bidder 6 months after the contract has been awarded.

If any claim is made/lodged during this time, the same shall be binding and continue to be valid despite the lapse of this pact as specified above, unless it is discharged/determined by Chief Controller of Factories, New Delhi.

Section 11: Other Provisions

1. This agreement is subject to Indian Law. Place of performance and jurisdiction is the registered office of the Principal i.e. GOAW Neemuch.
2. Changes and supplements as well as termination notices need to be made in writing. Side agreements have not been made.
3. If the contractor is a partnership or a consortium, this agreement must be signed by all partners or consortium members.
4. Should one or several provisions of this agreement turn out to be invalid, the remainder of this agreement remains valid. In this case, the parties will strive to come to an agreement to their original intentions.
5. Issues like Warranty/Guarantee etc. shall be outside the purview of the IEMs.
6. In the event of any contradiction between the Integrity Pact and its Annexure, the clause in the Integrity Pact will prevail.

(For & on behalf of the Principal)

(Office Seal)

Place Date

Witness 1:
(Name & Address)

_____
_____
_____
_____

Witness 2:
(Name & Address)

_____
_____
_____
_____
_____

(For & on behalf of Bidder/Contractor)

(Office Seal)

Place Date

Witness 1:
(Name &Address)

Witness 2:
(Name &Address)

Annexure-H

Non- Blacklisting (On company's letterhead)

Date:

To,

General Manager
Govt Opium and Alkaloid Works
Neemuch, M.P.

Respected Sir/Madam,

I have carefully gone through the Terms & Conditions contained in the Document for tender for Turnkey work at ***GOAW, Neemuch on contract basis*** . I / We hereby declare that presently our Company/ firm ……is having unblemished record and is not declared ineligible for corrupt and fraudulent practices either indefinitely or for a particular period of time by any State/Central Government/PSU.
We further declare that presently our company/firm……..is not blacklisted and not declared ineligible for reasons other than corrupt and fraudulent practices by any State/Central Government/PSU on the date of Bid Submission. If this declaration is found to be incorrect then without prejudice to any other action that may be taken, my/our security may be forfeited in full and the tender if any to the extent accepted may be cancelled.

Yours faithfully,
(Signature, name and designation of the authorized signatory)
(Name and seal of the Bidder)

BOQ OF ITEMS.

S. No. Of SCH-A	Name of the Work	QUANTITY	COST IN RS.
1	Hydraulic & Ultrasonic test of steam jackets and Replacement of steam jackets	35	
2	Replacement of vacuum Lines, header 6 inch (As per Appendix-I)	One system	
3	Replacement of chilled Waterlines (As per Appendix-II)	One system	
4	Replacement of cold waterlines (As per Appendix-III)	One system	
5	Tubular Level Gauges	08	
6	Condenser tube replacement	09	
7	Temperature controller & indicating system	02	
8	S.S. Dosing Tank & it's system	01	
9	NUTCH & it's connected piping & umping System (Ex – 16, 380 liters, edicated unit for Gums & Resins of pium)	01	
10	Centrifuge & it's piping System	01	
11	S.S. Tray dryers and it's ducting system	02	
12	S.S. Ribbon Blender	02	
13	S.S. Tubular Sight Glass	08	
14	Installation of FLP Temperature Indicators	16 available in this Works	
15	S.S. 316 welding for Extractors	35	
16	Cooling tower (New)	01	
17	Chilling unit (New) for water	01	
18	Unit for manufacturing of Synthetic Codiene	01	
19	EX-2A, Chilling System	01	
20	S.S. 316 Storage Tank	01	
21	Acetic Acid Line	01	
22	Un-used vessels	11	
23	Unit of Evaporator; EV-3	01	
24	Modification of tray dryer	01	
25	Jacket for settler	01	
26	Crystallizer for C.P.	01	
27	Nutch and connecting piping system	01	
28	Nutch for additional C.P.	01	
29	500 lts. Alcohol distillation unit	01	
30	(AHU), 04 areas, Complete system as per GMP	01	
Total			
GST @18% Extra			
Grand Total			

Schedule 'A'

Sub-Removal of old system and Supply , Installation ,Testing and Commissioning (S.I.T.C.) of new system on turnkey basis at Government Opium and alkaloid Works, Neemuch (M.P.)

1) Replacement of steam Jacket:-

Removal of the existing corroded C.S. Steam Jacket, along with Bottom Dish End, Collar, Steam & condensate Connections and Bottom Discharge Valve etc.

S.I.T.C. of New steam Jacket – 6 mm THK carbon steel of boiler grade IS -2002 & Dish End, Collar bottom ring along with all connections of the steam & condensate nozzles/ other nozzles, bottom discharge valve (process) of SS 304, 65 mm DIA 3 piece design FLG end, BS – 10, Table – E. The steam & condensate nozzles and other nozzle connections to be re-connected to the existing system. Also extra spare nozzles of steam and condensate (25 mm. DIA) to be provided for each steam jacket of the vessels with PN-40 valve (C.S.) 04 nos. leg supports are also to be replaced with new supports.

Number & Location of Vessel –

SRM Section -

Ex – 1 ; Ex- 2 ; Ex-3 ; Ex - 1A ; Ex – 2A, Ex- 3A ; Ex – 4 ; Ex – 5 ; Ex – 6 ; Ex – 7 ; Ex – 8 ; Ex – 9 ; Ex – 10 ; Ex – 11 ; Ex – 16 ; Ex -17 ; WA – 1; WA-2 ; WA – 3 ; DC – 1 ; **Total 20 Nos.**

NCT Section –

EV- 2; EV- 3 ; EV – 5 ; Ex- 20; Ex- 21; Ex- 22 ; DC- 2; RCT- 1TH; Ex- 18 **Total – 10 Nos.**

SC section-

Ex- 1S; Ex – 2S; RCT – 3S; RCT – 1D; Ex- 4S **Total – 05 Nos.**

After complete fabrication of Steam Jacket and connecting nozzles, bottom dish etc. the contractor has to get it tested all the steam jackets of the vessel with a competent person from M.P. and to provide a certificate in required pro-forma for submission to Asst. Director of Industrial Health and Safety, Indore as per M.P. Factories rule- 1962

Testing means Hydraulic Testing at 04 kg/cm^2 as well as ultrasonic test (N.D.) for measuring the thickness of jacket and after the above, Insulation work of jackets with 50 mm thick glass wool (density 100 kg/m^3) with G.I. wire netting, and applying 12 mm thick plaster of paris coat, and wrapping hessian cloth/ long cloth (TAAT) covering and over that painting with black colour/ Shali Cot and re-fixing the vessels at respective section and gearbox with motor and agitator to be re – assembled along with other utility connections like steam, cold water, chilled water etc.

Specification of bottom Discharge Valve : Size; and Numbers –

3 Piece Design; SS 304; Flange End Ball Valve; BS – 10 Table – E

Make – M/s Leader/ Hawa(Marck) /Zoloto/ G.M./Akay/virgo or equivalent

SRM Section – 65 mm DIA Ball Valve - 19 Nos. + 06 Nos. (Spare)
Total = 25 Nos.

NCT Section – 65 mm DIA Ball Valve – 07 nos. + 03 Nos. (Spare)
Total = 10 Nos.

40 mm DIA Ball Valve – 01 Nos. + 02 Nos.(Spare)
Total = 03 Nos.

S.C. Section – 65 mm DIA Ball Valve – 03 Nos. + 02 Nos. (Spare)
Total = 05 Nos.

40 mm DIA Ball Valve – 01 Nos. + 02 Nos. (Spare)
Total= 03 Nos.

VAP Section – 65 mm DIA Ball Valve – 02 Nos. + 02 Nos.(Spare)
Total = 04 Nos.

50 mm DIA Ball Valve – 03 Nos. + 02 Nos.(Spare)
Total = 05 Nos.
PN – 40 Flange ; Size – 25 mm NB = 25 Nos.
Any other fittings of S.S. 304/C.S. as per site Conditions in the scope of contractor .

2) Vacuum Piping System :-

Removal of the existing corroded M.S. Vacuum Pipes from S.R.M. ; N.C.T. ; S.C. and V.A.P. sections of the plant S.I.T.C. of new vacuum piping system in the above sections.The M.O.C. , Quantity of Material, fittings etc. has been given in ***Appendix I***. Apart from the material shown in ***Appendix I*** , the contractor should also supply the following material along with the piping material and corrugated hose pipe installed in the piping system , for NUTCHES/Receivers etc.

S.S. Corrugated Hose Pipe with Floating Flange; Size- 40 mm DIA; Flg. End – BS- 10, Table – E ; Length Between FLG to FLG – 06 feet. :-

Two nos vacuum pumps complete with motor, frame and other accessories are required to be installed at SRM section of the plant (outside of the section) and necessary civil foundation is also in the scope of contractor. These vacuum pumps to be connected to existing vacuum header (SS 304) of 6" dia with 3" dia pipe of SS 304.

Specification of Pump:
Max suction capacity : 5.5 to 6.0 m^3/min
(non flame proof) recommended motor H.P. : 15 H.P. ; 3 PH ; RPM 1450
Note:- the main header of size 6" shall be Separated by placing appropriate valve preferably PTFE lined SS 304 butterfly valve or 3PC Ball valve

SRM :- 16 nos. + 06 nos. (Spare)
Total = 22 Nos.

NCT :- 09 nos.+ 03 nos. (Spare)
Total = 12 Nos.

SC :- 06 nos. + 02 nos. (Spare)
Total = 08 Nos.

VAP :- 07 Nos. + 03 Nos. (Spare)
Total = 10 Nos.

S.s. 304 Ball valve ; 3 Piece Design; FLG End; B.S. – 10, Table – E; Size – 40 mm:-

Quantity :-

SRM :- 16 nos. + 08 nos. (Spare)
Total = 24 Nos.

NCT :- 09 nos.+ 04 nos. (Spare)
Total = 13 Nos.

SC :- 06 nos. + 04 nos. (Spare)
Total = 10 Nos.

VAP :- 07 Nos. + 03 Nos. (Spare)
Total = 10 Nos.

Make – M/s Leader /Hawa (marc)/ zoloto/ G.M./Akay/ Virgo or equivalent
Any other Fittings of S.S. 304/ C.S. – as per site conditions and in the scope of contractor.

Removal and S.I.T.C. of new Vacuum receivers to be connected to vacuum system:-

Quantity :- 03 Nos.
M**.**O.C.:- IS 2026
Thickness: - 08 mm
Size – Square with reinforced fins of outside 44" X 44" ; with suitable size of supporting legs (04 Nos.) and nozzle connections as per existing receiver and Ball Valves (S.S. 304)
Section : - 03 Nos. (S.R.M.; N.C.T.; V.A.P.)

3) Chilled Water System :-

Removal of the existing chilled water pipe lines (system) from S.R.M. ; N.C.T. ; S.C. and V.A.P. Sections of the plant. S.I.T.C. of new piping system in the above sections. The M.O.C. , quantity of material, fittings etc. has been given in ***Appendix II***. Also insulation of the piping system with a coating of coal-tar epoxy, over that thermocole sections. Binding with chickenmesh, and cement plastering of smooth finish as well as enamel painting as per code of I.S. as well S.I.T.C. of chilled & Hot water well (tank) with partition size 18 feet length X 5 feet height X 5 feet width X thickness of the plate 6 mm as per IS -2062 and insulation as mentioned above to be connected to the existing chilled water pumping system (Pumps are available).

Any other fittings of SS 304 /C.S. – as per site condition & in the scope of contractor.

4) Cold Water System :-

Removal of the existing cold water pipe lines (System) From cooling tower, S.R.M. ; N.C.T. ; S.C. & V.A.P. sections of the plant. S.I.T.C. of new piping system in the above sections. The M.O.C. ; quantity of material, fittings etc has been given in ***Appendix –III***.
Any other fittings of S.S. 304/C.S. – as per site condition in the scope of contractor.

5) Tubular level Gauges :-

Providing of Flanged SS 316 Nozzles in the existing bottom dish storage (SK), Process liquid storage (TK) and receiver tank. Supply, Installation, Testing & Commissioning (S.I.T.C.) of tubular level indicator with SS 304 rectangular box(Guard) and valves (SS 316) at GOAW, Neemuch (M.P.).

Providing SS 316, 25mm NB Flange end, Nozzle Sch – 40, CL -150, R.F. with SS 316 Ball valve class – 150 in the existing tank and to be connected to tubular level indicator with rectangular box, SS 304 (Guard) with SS 316 safety ball check valve & relieve valve, screwed end; with engraved calibrated scale of SS 304, with 25mm OD toughened borosilicate glass tube. All the above mentioned tanks should be totally calibrated and the calibration chart for each tank should be submitted to this works on S.I.T.C. basis (details of the tanks).

Storage vessel no. & Section	I.D. of the vessel	cylindrical height of the vessel
SK – 7	1700 mm	1700 mm

SRM		
TK – 10; 16; 17; 18; 19	800 mm	1180 mm
SRM		
TK – 9; 11	1000 mm	1450 mm
SRM		

a) The tentative sketch for level indicator is enclosed as ***APPENDIX-VIII***
b) All sizes of SS 316 ball valves as mentioned in this tender document should be three piece design (3PC) class – 150, RF, and screwed end (3PC) with BSP threads, class – 150, make – M/s Akay/ Virgo/GM/Hawa/Leader/Zoloto or equivalent.
c) All existing storage, process liquid storage, and receiver tank are with bottom dish end, hence the Tenderer/Bidder should take care of regarding calculation of volumes for calibration purpose i.e. Dish level volume is also required to be taken into calibration.

6) Replacement of condenser tube system-

Removal and S.I.T.C. of condenser tubes and baffle plates and installation of the condensers at respective sections of the plant.

Condensers details, location & section :-

No. of tubes – 42 Nos.
O.D. of the tube – 25.4 mm DIA
Length of the tube – 2000 mm
MOC of tube – SS 304, gauge pipe
Gauge – 14 G (B.W.G.) or 2.10 mm

N.C.T- 02 Nos. [EV-5; Ex- 20]
Workshop – 04 Nos.
Total – 06 Nos.

No. of tubes – 19 Nos.
O.D. of the tube – 25.4 mm DIA
Length of the tube – 2000 mm (approx)
MOC of tube – SS 304, gauge pipe
Gauge – 14 G (B.W.G.) or 2.10 mm

S.C. – 01 Nos. [Ex -1s] secondary
Total – 01 Nos.

No. of tubes – 38 Nos. and 14 Nos.
O.D. of the tube – 25.4 mm DIA
Length of the tube – 1464 mm
MOC of tube – SS 304, gauge pipe
Gauge – 14 G (B.W.G.) or 2.10 mm

V.A.P.–01Nos.[VAP-EV] Primary
V.A.P – 01 Nos. [VAP- Ev] Secondary
Total – 02 Nos.

Note –

The work comprises, removal of old corroded M.S. tubes from the M.S. shell by cutting the flanges of the shell, and re fixing the new SS 304, tube bundle in the old flanged shell along with the new baffle plates of SS 304, 6 mm thick, quantity – 06 Nos. And fabrication of old M.S. shell flanges, and hydraulic testing at 05 kg/ cm^2. And the tubes should be leak proof. Argon /saw welding technique may be adopted for welding of tubes to the flange. And after successful completion, the contractor should re- fit all condensers at respective sections and all utility connections like cold/ chilled water etc shall be re – assembled to the existing piping system.

All secondary condensers should be insulated by applying coal-tar epoxy on the outer surface of condenser, and after that the thermocole sections (Half round sections suitable to outside DIA

of the condensers) to be placed and bonded with chicken wiremesh and plain cement paste to be applied to smooth surface, and after drying proper code of colour (enamel paint) as per I.S. to be painted.

Any other fittings of SS 304 /CS – as per site condition and in the scope of contractor.

7) Temperature controller & indicating system :-

Quantity – two nos. of loops + one spare loop duly calibrated

Removal of the existing temperature controller (Make – Honeywell) and steam control valve with flame proof actuator of size 25 mm DIA from the system S.I.T.C. of new controller with flame proof enclosure, make – Honeywell only. Along with new steam control valve along with flame proof actuator of size 25 mm DIA, flange end should match with the existing steam loop of size 25 mm DIA. Also replacement of steam valves (06 Nos. + 06 Nos. spare) in the two nos. steam loop. The contractor should commission the system after installation to the satisfactory of this works. Also the contractor should maintain the system i.e. controller, make – Honeywell and steam control valve, 25, DIA with flame proof actuator for a period of three years after initial installation and successful completion of the work i.e. four visits per calendar year or as and when required by this works, the contractor should depute his technical service experts within 03 days from the date of intimation either phone call or written message.

Quantity – Two Nos. of Loops + one no. spare loop duly calibrated.(Controller of Honeywell in flame proof enclosure with steam control valve having flame Proof actuator)
Location – VAP-2 (VAP Section); Ex – 1S (SC section)
Total No. of loops – Three nos. of loops

Basic function of this steam loop consists controller and steam control valve-To maintain temperature of process liquids contains mix of organic substance, water, as well as solvents. Set temperature should not very beyond $\pm$ 2^0C.

Any other fittings of SS 304 /CS – as per site condition in the scope of contractor.

8) S.S. Dosing Tank and it's System :-

Removal of the existing S.S. dosing tank, CAP – 100 liters from extractor –

10 at SRM section, installation of spare S.S. dosing tank, cap – 200 liters (available with this works) along with any modification to be made in S.S. 316 process piping etc. (25mm DIA) also level switch /device of latest version to be installed in the dosing tank to avoid the over flow of the liquid liquid chemical compound /40% NaOH solution.

Any other fittings of SS 304/ SS 316 /CS – as per site condition & in the scope of contractor.

9) NUTCH, and its connected S.S. piping & pumping system :-

Removal of old corroded vessel of MS/CS and S.I.T.C. of new S.S. 316 vessel nucth of capacity 1000 liters, 6mm thick along with necessary SS 316 piping system, SS 316 ball valve, 3 PC design, flanged end 25 mm DIA for process, 40 mm DIA for vacuum along with SS 316 flange bend tee etc. and to be connected to the existing process system of Ex – 16 (existing of CAP – 380 liters) with SS 316 centrifugal pump with MECH seal of make H1 FAB, type –HSUT, size 0285 mat –CAR/SIC/PTFE/SS DRG- STC/2 55 39 RO; CAP- 25 m^3/Hr , 25X25 mm, Head – 35 meter, complete set with flame proof motor with base frame, Quantity – 03 nos. ; make – M/s Akay/ KSB/ Jhonson /Investa/ Flowserve or equivalent. Repair/ Replace/ Rectification of chequrered plate of 06 mm thick of the

platform also in the scope of contractor
25 mm DIA Ball valve flanged , CL – 150/Bs-10, table – E, 3 PC Design – 05 Nos.
40 mm DIA Ball valve – 04 Nos.
Location – SRM section.
SS 316 Pipe, SCH – 40, 25 mm DIA, 6 MTR length - 05 lengths: 65 mm DIA – 03 lengths
Other SS 316 Fittings i.e. flange, reducer, bends, tee, etc. – As per condition.
Any other fittings, pipes of SS 304/ 316/ CS – As per site condition & in the scope of contractor.

10) Centrifuge and it's piping system (GMP model) :-

Quantity: - 01 Nos.

Removal of the old certifuge, S.I.T.C. of new centrifuge of G.M.P. model, as per the specifications given below:

Designation of vertical top discharge centrifuge :-

Basket shell inside diameter	– 705 mm
Basket nominal height	– 350 mm
Basket rim diameter	– 500 mm
Basket shell thickness	– 5/6 mm

Material of constructions:-

Basket shell & rim ring	– SS 316
Process house	– SS 316
Seals in contact with product	– Viton /PTFE
Top Cover – SS 316	
Basket Bottom	– Cast steel, lined with SS 316 all over.

Major Components:-

i) Cover ASSLY and BASE plate
ii) VISCO damper spring unit /any latest design. The machine shall support on 04 nos. of VISCO damper spring units/ any largest design. The housing shall have 100 N.B. diameter mother liquor outlet connection. The housing should also have connections for greasing of bearings on the base plate face for conveniently greasing the bearings during operation.
iii) Bearing house assembly
iv) Basket
v) Slurry pipe feed
vi) Wash cum rinse pipe
vii) Seals
viii) C.I.P. cleaning facilities
ix) Control Panel with flame proof push button (on/off) along with other accessories like Armoured Cable, Copper Lugs, Earth Material etc.
x) Flame proof electric motor of 5 H.P. along with drive & driven pulley etc.

Critical Assemblies :-

Utmost care should be taken for the following assembly :-

I) Bearing house to shaft assembly
II) Basket with shaft assembly

Note – All bearings/ pulley/ other fitting material should be genuine and to be used from OEM only.

Any other fittings of SS 316/304/CS – as per conditions & in the scope of contractor.

11) SS tray dryers and it's ducting system (GMP Model):-

Removal of the existing 02 Nos. of 25 Tray drier machines from NCT Section of the plant, and shifting and installation of 02 Nos. at SC section along with control panel, exhaust DUCT etc. and successful commissioning of the same. Also, S.I.T.C. of two nos. of 50 Tray dryer machine, G.M.P. type model, along with inside built steam radiator, 20 micron inlet connection for air, and exhaust DUCT of SS 304 of suitable size with top bend (i.e. the height of the DUCT should be 6-7 feet excluding bend) Digital control panel fitted in flame proof enclosures, flame proof motors air circulation/heating fans etc. the dryer should be connected to steam inlet an out pipes of SS 316 with steam cum temperature control ball valve having flame proof actuator, and necessary armoured electric cable work with flame proof gland fittings etc. at NCT section.

Capacity – 50 Tray, G.M.P. type model
S.S. 316 Tray size – 16 inch X 30 inch X1 and 1/4 inch
Contact Parts – SS 316
Non Contact Parts – SS 316
Gasket – Silicon food grade
PT – 100 sensor – EPCE/any standard
Steam Radiator – SS 316, Seamless tube
Electric Supply – 415 V AC 3 PH/ 50 Hz
Connected Load – 0.75 Kw/ As per design
Steam Dry & saturated – 04 kg/cm^2
Digital Control Panel – Flame proof
Quantity – 02 Nos.

Any other fittings of SS 316/304/CS – as per site condition & in the scope of contractor.

Note :- 04 (four) Nos. of spare steam control valves with flame proof actuators (to tray dryer) and 04 (four) nos. of digital controller without FLP enclosure shall be supplied to this works as a spare use.

12) SS Ribbon Blender and it's system (GMP model):-

S.I.T.C. of new ribbon blender having U- Formed horizontal trough together with double helical ribbon agitator that rotates within, with strong flat cover to entirely opened lid that gives room for easy cleaning & loading of the material.

Ribbon blender should design to meet efficient blending and mingling capabilities. To appropriately mix and blend dry chemical powdered components to produce fine and homogenous mixture. As well the drive mechanism of discharge valve may be manual, preferably knife gate valve usually dusted tight and ideal for powders and other dry material.

Securely controlled clearance between surfaces and agitator tips suitable to mix powder – powder a suitable/strong sealing methods are to be in corporate. Suitable to use in a limited over head and surrounding space.

Parts of the ribbon blender:-

i) Flame proof motor & gear box and driving mechanism for the Helical Agitator.
ii) Structure /Body (Includes platform, stair etc and can be detachable)
iii) Outlet/ Valve
iv) Inlet
v) Inspection/ Hand additives hatch

vi) Stuffling box/seal

vii) Agitator/ Helix

viii) Control System of pre – loaded and wired control panel fitted in flame proof enclosure, comprises of main power switch, safety limit switches, emergency stop button, fuses etc. and suitable armoured cable as per site condition & requirement.
Quantity – 02 Nos. ; Capacity – 150 Kg. each
Section – SC or NCT/VAP

13) SS Tubular sight glass :-

Design & Feature :- Attachment of self locking nuts, full bore design, 360^0 viewing angle vertical assly, inter-changeable side parts, connections, BS 10 Table E, SS 316 Flange.

Material :- Side SS 316, stud – SS 316, Glass – Toughned borosilicate according to ISO, Gasket – PTFE, Surface finish – Sanitary Polish.

Size :- 40 mm NB, to be fitted into the existing piping system of 32 mm NB with SS 316 Reducer 32 X 40 mm Flange – SS 316 BS 10 to Table E and with SS 304 Ball Valve, 32 mm DIA, 3 PC design , F/E, BS 10, Table E, Quantity – 20 Nos.

Other fittings:- of SS 316 As per site condition.

Quantity: - 04 Nos. ; Ex – 12; Ex – 13; Ex – 14; Ex – 6

04 Nos. ; Spare with gasket, flange, Reducer etc.

14) Installation of FLP Temperature Indicators :-

Installation of FLP Temperature indicators at SRM, SC & VAP sections of the plant. And lying of power supply cable (if needed) and sensing cable as well Pt – 100 sensor with necessary S.S. fittings to connect to the temperature indicators which are available with this works also all FLP temperature indicators are required to be calibrated
Quantity: - 16 Nos. (Available with this works). As per details given in **Appendix - IV**

15) S.S. 316 welding for extractors :-

Grinding of the existing weld joints of the S.S. vessel thickness of the sheet 6 mm, making of V – Groove and full S.S. 316 welding.

Number & location of extractors/vessels:-

SRM Section : - Ex – 1 ; Ex – 2; Ex – 3 ; Ex – 1A; Ex – 2A; Ex – 3A; Ex – 4; Ex – 5; Ex – 6; Ex – 7; Ex – 8;
Ex – 9; Ex – 10; Ex – 11; Ex – 16; Ex – 17; WA -1; WA – 2; WA – 3; DC – 1; total Nos. –
20, Approx length of S.S. 316 weld joint for 20 Nos. = 400 mtrs.

NCT Section : - EV – 2; EV – 3; EV – 5; Ex -22; DC – 2; RCT – 1TH; Ex – 18; Total nos. – 10 Nos.,
Approx length of S.S. 316 weld joints for 10 nos. = 400 mtrs.

SC Section : - Ex – 1S; Ex – 2S; RCT – 3S; RCT – 10; Ex – 4S; total nos. – 05 Nos.; Approx length of S.S.
316 weld joint for 05 Nos. = 100 mtrs.

16) Cooling Tower :- Removal / dismantling of the old cooling tower structure and shifting the

debris to scrap yard. Supply, installation testing & commissioning of pultruded FRP double cross flow cooling tower, circulation of water 225 m^3 /hr, with pump, concrete work, electrical work etc. The complete technical specification, details, Bill of Material MOC etc are as per the **Appendix-VI**

17) Chilling Water Plant:- Removal of the existing old chiller water compressor and it's system i.e. condenser, chiller, electrical panel etc from the plant building and shifting to work shop. Supply, installation, testing & commissioning of new chilled water package unit in the same place, and inter connection of piping system for chilled water and condenser complete system with electrical panel, consists safety gadgets.

The complete technical specification, details are enclosed as **Appendix-VII**

18) Unit for manufacture of Synthetic Codiene with temperature controller and indicating system

Design, Engineering, Preparation of detailed engineering drawing as per site conditions, control valves, necessary instruments, electrical installation viz flame proof motors, flame proof push buttons, non flame proof DOL starters, cable laying, earthing and their complete specifications & make G.A. drawing of process vessels. supply, project management on F.O.R. site basis (i.e. GOAW, Neemuch M.P.), un-loading, handling, storage, erection, testing, commissioning and handing over the following manufacturing unit on turnkey basis.

Location:- The above unit shall be erected in the existing S.C. section of the plant.

Equipment Data & Specifications

(A) Reactor :- Scope of Contractor

Unit No. :- RCT-3S-2
Total Vol :- 1200 Ltr
Working vol :- 800 Ltr
Quantity :- One No.
Design & Mfg. code :- ASME Sec. VIII Div-I or IS/2825
Construction :- Cylindrical shell, top dished and flanged bottom dished. With baffles inside of the vessel
Dimensions :- As per DIN/IS (If any)
Steam Jacket:- S.A. 516 Grade 60 or equivalent or IS-2002, 6mm thick
Moc of the shell & nozzles at bottom & on top
And Top & bottom Dish end :- S.S. 316, shell Thk- 6 mm ; top & bottom dish-8 mm
Connected to(vapour line):- Primary Condenser, CD1-3S-2

Operating Conditions:-

Temp. :- 80 °- 120°
Utilities :- Steam- 1 to 3 kg/cm2 (Gauge)
Pressure at which the :- Atm/Vacuum
Reaction is to be conducted.

Nozzle Orientation on cover

Man Hole/ Hand Hole :- 300x400
Sight Glass :- 100 NB(1 No.)
Light Glass :- 100 NB (1 No.)
Agitator :- 125 NB (1 No.)
Thermo well pocket :- 100NB x 25 mm NB(02 Nos)

Process :- 50 NB (2 No.)
Vapors :- 100 NB (2 Nos)
Out Let :- 65 NB (1 No.)
Moc of nozzle pipe& flange:- SS 316, SCH 40; FLG CL 150

Jacket Nozzles:-

In Let :- 25 NB (1no.) 40NB (1 no.)
Out Let :- 25 NB (1no. 40NB (1no.)
Condensate/ Drain :-25 NB (1 no.)
Air Vent :- 25 NB (1 no.)

Note:- (1) Care has to be taken to accommodate as many numbers of nozzles of nozzles as possible.
(2) All flanges for nozzle drilled as per ANSI B-16.5, 150 PSI, RF.
(3) Wall thickness of the nozzle pipe should be as per design code. i.e. C.S. SCH-40
(4) Light glass should be fitted with flame prrof light with switch.

Max allowable working pressure :- Vessel- FV to 6kg/cm² ; Jacket- 6kg/cm²
Design Pressure :- Vessel-9.5 kg/cm² ; Jacket-9.5kg/cm²
Max Design Temp. :- Vessel- 0 to 200°C ; Jacket 0-200°C
Shaft sealing :- Single mechanical seal of repute make like dura, sealol with proper cooling system.
Agitator, shaft Dia & Moc :- Bend leaf, (hyper stirrer), calculated to suit reaction mass having 0.98 GMS/cc Density, S.S. 316
Agitator assembly :-Agitator shaft supported on intermediate bearing on latern.
Drive System :- Mechanical variable speed system from 30 RPM to 250 RPM(Horizontal mounted type only)
Reduction gear box :- Elecon/Radicon/Uday/ ELMRAD or equivalent
Flame proof motors :- 440V, 1440 RPM
Power(H.P.) :- To be calculated by contractor
Make :- Crompton/ Siemens

Other features included as standard scope of supply:-

1. Hand hole assembly where man hole is not possible.
2. Sufficient Nos. of stiffeners are welded on jacket for holding insulation with suitable means.
3. All jacketed vessels should be insulated with 50mm glass wool with chicken wire Mesh, has ion cloth covering and painted with black bituminous.
4. Temperature sensing facility (i.e. Thermo well pocket of suitable size S.S. 316) through outside of the jacket to inside of the vessel for mounting necessary sensors to connect temperature indicator cum controller.
5. The design of agitator, shaft dia and steam coil system to be installed in the vessel as well the complete system should be same as present system in RCT-3S (At present working in S.C. section)
6. All bolts, nuts & washers used shall confirm to IS and hot dip galvanized or cadmium coated.
7. All Gasket shall confirm to IS-2721-1998 or its latest amendment.

Quality Assurance:-1)Stage wise inspection are desired by this works

Note :- Inspite of minimum thickness for shell &jacket arrived from design code, it is preferred that the minimum thickness of plate used shall be 6mm for shell & jacket.

Process piping(i.e. size &length &Nos.) including fitting like Bends, Tees, Reducers, Elbows &Flanges *Valves* etc. :- As per site requirement.

Specifications

Pipe recommended material of & size	:- SS 316, SCH 40 pipe & fitting. 25 NB, 32 NB, 40 NB, 65 NB Construction
SCH	:- 40
Make	:- Reputed
Flanges	:- As per ANIB 16.5, 150 PSI, RF.
Process Valves	:= Flange end.
Type	:- Ball valve (Three piece design)
Size & Qty	:- As per nozzle configuration of the vessel and as per site condition
MOC	:- SS316
Class	:- 150
End Connections	:- As per ANSI B 16.5

Make :- M/s. Akay /KSB/Virgo/G.M. Engg/ Marc or equivalent

Piping for utilities (i.e. size, length & Nos.):- As per site requirement
Including bends, tees, union, reducers
Flanges, steam, trap, flanges etc

SPECIFICATION

Recommended Material of construction & size	:- Carbon steel, SCH-40, 25 NB, 50 NB; 40NB
	:- Forged carbon steel screwed fitting as per ASTM A-105 for steam trap assembly of size ¾" NB
Flanges	:- As per ANSI B 16.5, class 150 RF.
Make	:- LLOYD/Jindal for pipes and reputed make for fittings.
VALVES FOR UTILITY SERVICES	:- As per the lay out of the vessel (steam, water, chilled water, vacuum)
Size & Quantity	:- As per site requirement.
Item	:- Cast carbon steel. Globe/Gate/ 3PC ball valve, class-150
Size & Quantity	:- 25mm NB, 20mm NB, 40mm NB, 50mm NB and as per site condition.
Type	:- Bolted bonnet, O/S & yoke type rising stem, flanges as per ANSI B 16.5 class 150, RF, and 3PC design for ball valve.
Make	:- M/s. leader/Zoloto/Marc or equivalent
Pressure Temperature rating	:- A per ANBI B 16.34
Body	:- Carbon steel to ASTM A 216 WCB
Body Seat	:- S.S to ASTM A 182 Fba/ASTM A 217 CA 15 or their equivalent and S.S. 316 ball, PTFE seat for 3PC ball valve.

Specifications for valves required for steam Condensate Assembly:-

Item	:- Cu-Alloy globe valve screw female BSP
Type	:- Screwed in Bonnet, Inside Screw, Rising stem, integral seat, renewable seat as per
Make	:- M/s. Leader valves Ltd/ M/s. Zoleto/ Marc or equivalent

Size	:- ¾" NB
Quantity	:- As per the layout of the vessel and as per site requirement

NOTE:- The above process piping shall design, fabricate and erect as per ASME code for chemical plant piping, B 31.3.1993 edition or its latest amendment.

PRIMARY CONDENSER:- SCOPE OF CONTRACTOR

SPECIFICATIONS

Configuration Type	:- Shell & tube horizontal
Heat Transfer area	:- 6.54 m2
Qty	:- One no.
Service	:- To condense entrained solvent vapours.
Connected	:- To reactor RCT-3S-2
Code	:- ASME Sec VIII, Div-I TEMA class "B"
Unit No.	:- CD1-3S-2

CONSTRUCTION DATA

	Shell Side	Tube Side
Design Pressure Bar	:- 6	6
Design Temp °C	:- 200 °C	200 °C
Shell Nom Dia	:- Standard	0
MOC for flange & shell	:- S.S. 316 seamless	
Tube Nom Dia& MOC	:- 25.4 mm, O.D., seamless S.S. 316 gauge pipe (14G) .	
Tube Thickness	:- 2.1 mm	
Tube Length	:- 2000 mm	
No. of Baffles (S.S. 316)	:- 06 Nos	
Baffle Thickness	:- 05 Nos	

NOZZLES

Vapour	:- 50NB (1 No)
Condensate	:-40NB (1 No)
Air Vent	:- 40 NB (2 No)
Water In	:- 65 NB (1 No)
Water Out	:- 65 NB (1 No)
Drain	:- 25 NB (1 No)

SECONDARY CONDENSER :- SCOPE OF CONTRACTOR

SPECIFICATIONS

Type	:- Shell & tube horizontal
Heat transfer area	:- 2 m2
Qty	:- One no.
Unit No.	:- CD2- 3S-2
Service	:- Solvent vent condenser
Quantity	:- One No.
Connected to	:- Primary condenser, CDI- 3S-2
Code	:- ASME Sec VIII, Div-I, TEMA class "B"
MOC of shell & flange	:- SS-316
MOC of tube	:-Seamless SS316 Gauge pipe (14 gauge)
Construction data	:- Standard practice
Connected pipe line size, length with Necessary fittings like bends, reducers, union	:- Scope of contractor & as per site requirement

Flanges etc,
MOC of process pipe lines, fittings :- S.S. 316
Valves; nozzles

NOZZLES

Vapour	:- 40NB (1 No)
Condensate	:-25NB (1 No)
Air Vent	:- 25 NB (1 No)
Water In	:- 50 NB (1 No)
Water Out	:- 50 NB (1 No)
Drain	:- 25 NB (1 No)

RECEIVER

SPECIFICATIONS

Working Volume	:- 1000 Ltr
Total Volume	:- 1400 Ltr
Identification No.	:- REC-3S-2

Design & manufacturing code :- Standard practice with flanged dish closure on top and dish end at bottom. Flange of C.S. thikness 19mm having standard no of bolt holes and dia and dished bottom to be welded with shell. The thickness of the shell be 6 mm; dish end 8 mm. The over all dimensions of the receiver to suit the existing site.

Material of Construction	:- SS 316- Shell, top & bottom dish end ; shell thk 6mm, top & bottom dish -8 mm
Nozzle	:- Standard configuration
Location	:- SC section in the plant
Quantity	:- One no.
Connected to	:- Vacuum header , condensate from primary & secondary condenser

NUTCH FILTER:- SCOPE OF CONTRACTOR

Unit No	:- NU-RCT 3S-2
Quantity	:- One No.
Total Cap	:- 1500 Ltrs
MOC	:- SS 316, 6 mm thk
Configuration of mesh	:- Standard design
Construction data	:- Standard type flanged ring on top and flanged joint for upper & lower portion.
Process Piping (i.e. size, length & nos. Including bends, tees ,reducers, valve & flanges etc.)	:- 65NB, 50NB, 25 NB, and length , Nos as per site requirement and pipe shall be SCH- 40, SS 316 and flanges as per ANSI B16.5,150,S.S. 316
Valve	:- Ball valves three piece design, flange end class ANSI B 16.5, 150 RF, SS 316
Vacuum pipe nozzle for nutch filter	:- 40mm NB nozzles, S.S. 316, SCH-40, CL-150 FLG, S.S.316.
Utility piping (i.e. size, length &nos Including bends, tees, reducers valve & flanges etc) for vacuum from header to Nutch filter	:- 40NB, 25NB, and length &nos as per site requirement

MOC of piping :- S.S. 316, SCH 40 Pipe; S.S. 316 Flange, CL-150
Valves :- S.S. 316, 3 PC design ball valve ,
Make- M/s. Akay/Leader/Marc/Virgo/G.M. or equivalent

CENTRIFUGAL PROCESS TRANSFER PUMP WITH FLAME PROOF MOTOR AS A COMPLETE SETWITH BASE PLATE OF STRUCTURAL STEEL:- SCOPE OF CONTRACTOR

SPECIFICATIONS

Unit No. :- PU-RCT3S-2
Delivery Head :- 25 Mtrs. (Approx)
Capacity :- 4 m^3/HR (Approx)

MOC :- S.S. 316
Make :- Chem flow/KSB/Investa/Johnson or equivalent
Size (suction x delivery) :- To be decided by contractor or preferably 1" x 1" NB
Shaft Sealing :- A single, pre-set cartridge type mechanical seal is recommended. The preset cartridge design speeds installation, eliminates chance of installation error, very easy to repair , too. The springe shall be mounted on stationary portion of seal to for give seal misalignment and face eccentricity.
MOC :- Gland, Sleeve, Collar & Stator body- SS 316
Roto:- Silicon Carbide 2 or equivalent
stator face:- Carbon 5
Operating parameters :- Max. Pressure :- Up to 300 PSIG
Max. Temp :- 300°F (150°C)
Max. Speed :- Up to 3600 RPM
Quantity :- 03 Nos 01 in use; 01 no standby; 01 no spare
Make of the Mech Seal :- M/s. Flow Sanmar/ Sealol/ Burgman/ Hi-Tech or equivalent
Process valves, pipelines including bend, tees :- As per site requirement
Union, Reducers & flanges etc.

Flame Proof Motor:-

CAP:- To be decided by contractor (preferably 01 H.P.; 3 Ph,
RPM:- 2900
Coupling:- Love Joy ; SW Type

Temperature controller and indicating system

Quantity – two nos. of loops + one spare loop duly calibrated

Removal of the existing temperature controller (Make – Honeywell) and steam control valve with flame proof actuator of size 25 mm DIA from the system S.I.T.C. of new controller with flame proof enclosure, make – Honeywell only. Along with new steam control valve along with flame proof actuator of size 40 mm DIA, flange end should match with the existing steam loop of size 40 mm DIA. Also replacement of steam valves (06 Nos. + 06 Nos. spare) in the two nos. steam loop. The contractor should commission the system after installation to the satisfactory of this works. Also the contractor should maintain the system i.e. controller, make – Honeywell and steam control valve, 40, DIA with flame proof actuator for a period of three years after initial installation and successful completion of the work i.e. four visits per calendar

year or as and when required by this works, the contractor should depute his technical service experts within 03 days from the date of intimation either phone call or written message.

Quantity – Two Nos. of Loops; one no. spare loop duly calibrated.(Controller of Honeywell in flame proof enclosure with steam control valve having flameproof actuator). One no. control loop to be installed along with the above system. i.e. RCT-3S-2

Location – S.C section

Total No. of loops – Two nos. of loops

Basic function of this steam loop consists controller and steam control valve- To maintain temperature of process liquids contains mix of organic substance, water, as well as solvents. Set temperature should not very beyond $\pm$ 2^0C.

Any other fittings of SS 304 /CS – as per site condition in the scope of contractor.

19) Extractor-2A to convert in to chilling unit

In let & out let pipelines of size 40mm NB (C.S. ; SCH-40) to be connected with chilled water header at chilling section and the C.S. pipe line of size 40mm NB shall be connected. To jacket of the existing extractor no- Ex-2A at SRM section of the plant. The approximate length of each pipeline (In let & Out let) will be around 150 feet for Inlet & 150 feet for outlet. Necessary flange joint system is required to be providing in pipelines as per site requirement. Proper insulation as detailed above is required to be provided for pipe lines, flange joint. Also, to monitor the temperature of the solution of the vessels, the temperature indicator with flame proof housing and PT-100 sensor and necessary power cable & sensing cable is to be install at a proper place near to extractor EX- 2A. Also temperature indicating system as mentioned above is required to be installed near to the extractor EX- 2A in the Inlet & Outlet pipe lines which were connected to jacket of extractor EX-2A.

All necessary pipe lines (C.S., SCH-40) flanges (CL- 150) bends, elbows, T-fittings, threaded fittings (C.S., SCH- 40) etc as per site requirement.

20) S.S. 316 storage tank with S.S. 316 centrifugal process pump

Removal of existing corroded M.S. Tank of capacity 4300 Ltrs at SRM section (SK-4A) supply, installation, testing & commissioning (S.I.T.C.) of S.S. 316 storage tank, capacity 5000 Ltrs having flat top cover (S.S. 316, THK- 6mm) with C.S. flange, THK- 19mm having standard no of bolt holes and good quality gasket and dished bottom (S.S. 316 THK- 8mm) welded with cylindrical shell portion (S.S. 316, 6 mm)

Qty	:- 01 Nos
Nozzle with FLG on top cover	:- S.S. 316, SCH-40 for pipe nozzles, CL-150, S.S. 316 for FLG (flange) 25NB Nozzles- 02 Nos 40NB Nozzles- 02 Nos 50NB Nozzles- 02 Nos With S.S. 316, 3 PC design ball valve of repute make -i.e. Leader/Virgo/Marc/G.M. or equivalent
Bottom Nozzles	:- 50NB SS316 with S.S. 316 ball valve, 3PC design and make as above
Others	:- Two nos of S.S. 316 spare nozzles of size 50NB with S.S. 316 ball valve shall provided just top of the weld steam of dish end i.e. in cylindrical portion facing each nozzle in opposite.
Level Indicator	:- The storage tank shall be provided with tubular level indicator with rectangular box (S.S. 304) and flange end ball valve (S.S.316, 3PC) with safety ball check valve/ re lieve valve & calibrated scale (S.S. 316) engraved with 25mm OD toughened borosilicate glass tube. Tank should be totally calibrated and calibration chart also to be submitted to this works.

Spare ball valve :- S.S. 316 ball valve ; 3 PC design 25mm NB- 3 No; 40mm NB- 03 No; 50mm NB- 6 nos

Spare Level Indicator :- 01 no complete set with S.S. 316 ball valves

21) Acetic acid line with S.S. 316, centrifugal pump

Supply, installation, testing & commissioning of S.S. 316, SCH-40 piping system & S.S. 316, CL 150, flange; S.S. 316, SCH-40 pipe fittings (like Short bend, long bend, elbow, threaded pipe Socket , pipe nipple, union, tee socket weld/ threaded, reducer of different size. i.e. 25mm x 40mm; 25mm x 50mm; 40mm x 50 mm etc or as per site requirement.

Size of S.S. 316 pipe line shall be 25mm NB, SCH- 40 and this process pipe shall be connected to acetic acid tank of SRM section , and laying of pipe line with flange joints, gasket , nut bolt (S.S. 316) along with proper pipe hangers above the ground level (e.i. Approx up to 15 feet) to S.C. section with necessary S.S. 316, 3 PC design ball valve. Then above pipelines is to be connected to S.S. 316 centrifugal pump of required capacity from SRM section to SC section.

Qty of material: - As per site requirement

S.S. 316 Pump :- 03 Nos 01 no in use; 01 no stand by ; 01 no spare. Make- the same pump as mentioned for RCT-3S-2

22) Removal of un-used vessels and shifting of scrap & machinery

Removal of unused vessel, jacketed SK-16 (4300 Ltrs), EV- 7 (1200 Ltrs), centrifugal (basket size- 38"), Clarifier, plate & frame filter & PEC column, MS tank, S.S. 316 dosing tanks, cap. 300 Ltrs., Qty 3 to 5 nos from existing plat form at EX- 11, EX- 12, EX-13 (i.e. 2nd& 3rd floor of the plant form of SRM section), and re shifting of the dosing tanks to others units as desired by chemical engineer and necessary S.S. 316 sch-40 25mm NB piping work with flanges (S.S. 316,CL 150) bends, elbow, (Sch 40) nut bolt, gasket, material and necessary 3PC design S.S. 316 ball valve, CL 150 etc. as directed by chemical engineer of the plant.

23) Unit for Evaporation of solvents

Design, Engineering, Preparation of detailed engineering drawing as per site conditions, control valves, necessary instruments, electrical installation viz flame proof motors, flame proof push buttons, non flame proof DOL starters, cable laying, earthing and the and their complete specifications & make G.A. drawing of process vessels. supply, project management on F.O.R. site basis (i.e. GOAW, Neemuch M.P.), un-loading, handling, storage, erection, testing, commissioning and handing over the following manufacturing unit on turnkey basis.

Location:- The above unit shall be erected in the existing NCT. section of the plant.

Equipment Data & Specifications

(B) Evaporator :- Scope of Contractor
Unit No. :- EV-3/1
Total Vol :- 2500 Ltr
Working vol :- 2000 Ltr
Quantity :- One No.
Design & Mfg. code :- ASME Sec. VIII Div-I or IS/2825
Construction :- Cylindrical shell, top dished and flanged bottom dished. With baffles inside of the vessel
Dimensions :- As per DIN/IS (If any)

Steam Jacket:- S.A. 516 Grade 60 or equivalent or IS-2002, thk 6 mm
Moc of the shell & nozzles at bottom & on top
And Top & bottom Dish end :- S.S. 316, shell 6 mm , top & bottom dish-8 mm

Operating Conditions:-

Temp. :- 80 °- 120°

Utilities :- Steam- 1 to 3 kg/cm2 (Gauge)
Pressure at which the :- Atm/Vaccum
Reaction is to be conducted.
Connected to (Vapour Line): - CD1-EV-3/1

Nozzle Orientation on cover

Man Hole/ Hand Hole :- 300x400
Sight Glass :- 100 NB(1 No.)
Light Glass :- 100 NB (1 No.)
Thermo well pocket :- 100NB x 25 mm NB(02 Nos)
Process :- 50 NB (2 No.)
Vapors :- 100 NB (2 Nos)
Out Let :- 65 NB (1 No.)
Moc of nozzle pipe& flange:- SS 316, SCH 40; FLG CL 150

Jacket Nozzles:-

In Let :- 25 NB (1no.) 40NB (1 no.)
Out Let :- 25 NB (1no. 40NB (1no.)
Condensate/ Drain :-25 NB (1 no.)
Air Vent :- 25 NB (1 no.)

Note:- (1) Care has to be taken to accommodate as many numbers of nozzles of nozzles as possible.
(2) All flanges for nozzle drilled as per ANSI B-16.5, 150 PSI, RF.
(3) Wall thickness of the nozzle pipe should be as per design code. i.e. C.S. SCH-40
(4) Light glass should be fitted with flame proof light with switch.

Max allowable working pressure :- Vessel- FV to 6kg/cm² ; Jacket- 6kg/cm²
Design Pressure :- Vessel-9.5 kg/cm² ; Jacket-9.5kg/cm²
Max Design Temp. :- Vessel- 0 to 200°C ; Jacket 0-200°C
Flame proof motors :- 440V, 1440 RPM
Power(H.P.) :- To be calculated by contractor
Make :- Crompton/ Siemens
Other features included as standard scope of supply:-

1. Hand hole assembly where man hole is not possible.
2. sufficient Nos. of stiffeners are welded on jacket for holding insulation with suitable means.
3. All jacketed vessels should be insulated with 50mm glass wool with chicken wire Mesh, has ion cloth covering and painted with black bituminous.
4. Temperature sensing facility (i.e. Thermo well pocket of suitable size S.S. 316) through outside of the jacket to inside of the vessel for mounting necessary sensors to connect temperature indicator cum controller.

5. All bolts, nuts & washers used shall confirm to IS and hot dip galvanized or cadmium coated.
6. All Gasket shall confirm to IS-2721-1998 or its latest amendment.

Quality Assurance :- 1)Stage wise inspection are desired by this works

Note :- Inspite of minimum thickness for shell &jacket arrived from design code, it is preferred that the minimum thickness of plate used shall be 6mm for shell & jacket.

Process piping(i.e. size &length &Nos.) including fitting like Bends, Tees, Reducers, Elbows &Flanges *Valves* etc. :- As per site requirement.

Specifications

Pipe recommended material of Construction & size :- SS 316, SCH 40 pipe & fitting. 25 NB, 32 NB 40 NB, 65 NB
SCH :- 40
Make :- Reputed
Flanges :- As per ANIB 16.5, 150 PSI, RF.
Process Valves := Flange end.
Type :- Ball valve (Three piece design)
Size & Qty :- As per nozzle configuration of the vessel and as per site condition
MOC :- SS316
Class :- 150
End Connections :- As per ANSI B 16.5
Make :- M/s. Akay /KSB/Virgo/G.M. Engg/ Marc or equivalent
Piping for utilities (i.e. size, length & Nos.) Including bends, tees, union, reducers Flanges, steam, trap, flanges etc :- As per site requirement

SPECIFICATION

Recommended Material of construction & size :- Carbon steel, SCH-40, 25 NB, 50 NB; 40NB
For water/steam service :- Forged carbon steel screwed fitting as per ASTM A-105 for steam trap assembly of size ¾“ NB
Flanges :- As per ANSI B 16.5, class 150 RF.
Make :- LLOYD/Jindal for pipes and reputed make for fittings.

VALVES FOR UTILITY SERVICES :- As per the lay out of the vessel (steam, water, chilled water)

Size & Quantity :- As per site requirement.
Item :- Cast carbon steel. Globe/Gate/ 3PC ball valve, class-150
Size & Quantity :- 25mm NB, 20mm NB, 40mm NB, 50mm NB and as per site condition.
Type :- Bolted bonnet, O/S & yoke type rising stem, flanges as per ANSI B 16.5 class 150, RF, and 3PC design for ball valve.
Make :- M/s. leader/Zoloto/Marc or equivalent
Pressure Temperature rating :- A per ANBI B 16.34
Body :- Carbon steel to ASTM A 216 WCB
Body Seat :- S.S to ASTM A 182 Fba/ASTM A 217 CA 15 or their equivalent and S.S. 316 ball, PTFE seat for 3PC ball valve.

Specifications for valves required for steam Condensate Assembly:-

Item	:- Cu-Alloy globe valve screw female BSP
Type	:- Screwed in Bonnet, Inside Screw, Rising stem, integral seat, renewable seat as per
Make	:- M/s. Leader valves Ltd/ M/s. Zoleto/ Marc/GM or equivalent
Size	:- ¾" NB
Quantity	:- As per the lay out of the vessel and as per site requirement

NOTE:- The above process piping shall design, fabricate and erect as per ASME code for chemical plant piping, B 31.3.1993 edition or its latest amendment.

PRIMARY CONDENSER:- SCOPE OF CONTRACTOR

SPECIFICATIONS

Configuration Type	:- Shell & tube horizontal
Heat Transfer area	:- 6.54 m2
Qty	:- One no.
Service	:- To condense entrained solvent vapours.
Connected	:- To reactor RCT-3S-2
Code	:- ASME Sec VIII, Div-I TEMA class "B"
Unit No.	:- CD1-EV-3/1

CONSTRUCTION DATA

		Shell Side	Tube Side
Design Pressure Bar	:-	6	6
Design Temp °C	:-	200 °C	200 °C
Shell Nom Dia	:-	Standard	0
MOC for flange & shell	:-	S.S. 316 seamless	
Tube Nom Dia& MOC	:-	25.4 mm, O.D., seamless S.S. 316 gauge pipe (14G) .	
Tube Thickness	:-	2.1 mm	
Tube Length	:-	2000 mm	
No. of Baffles (S.S. 316)	:-	06 Nos	
Baffle Thickness	:-	05 Nos	

NOZZLES

Vapour	:- 50NB (1 No)
Condensate	:-40NB (1 No)
Air Vent	:- 40 NB (2 No)
Water In	:- 65 NB (1 No)
Water Out	:- 65 NB (1 No)
Drain	:- 25 NB (1 No)

SECONDARY CONDENSER :- SCOPE OF CONTRACTOR

SPECIFICATIONS

Type	:- Shell & tube horizontal
Heat transfer area	:- 2 m2
Qty	:- One no.
Unit No.	:- CD2- EV-3/1

Service	:- Solvent vent condenser
Quantity	:- One No.
Connected to	:- Primary condenser, CD1- EV-3/1
Code	:- ASME Sec VIII, Div-I, TEMA class “B”
MOC of shell & flange	:- SS-316
MOC of tube	:-Seamless SS316 Gauge pipe (14 gauge)
Construction data	:- Standard practice
Connected pipe line size, length with Necessary fittings like bends, reducers, union Flanges etc,	:- Scope of contractor & as per site requirement
MOC of process pipe lines, fittings Valves; nozzles	:- S.S. 316

NOZZLES

Vapour	:- 40NB (1 No)
Condensate	:-25NB (1 No)
Air Vent	:- 25 NB (1 No)
Water In	:- 50 NB (1 No)
Water Out	:- 50 NB (1 No)
Drain	:- 25 NB (1 No)

RECEIVER

SPECIFICATIONS

Working Volume	:- 1800 Ltr
Total Volume	:- 2500 Ltr
Identification No.	:- REC-EV-3/1

Design & manufacturing code :- Standard practice with flanged dish closure on top and dish end at bottom. Flange of C.S. thikness 19mm having standard no of bolt holes and dia and dished bottom to be welded with shell. The thickness of the shell be 6 mm; dish end 8 mm. The over all dimensions of the receiver to suit the existing site.

Material of Construction	:- SS 316- Shell, top & bottom dish end
Nozzle	:- Standard configuration
Location	:- NCT section in the plant
Quantity	:- One no.
Connections	:- Vacuum, Solvent Condensate line from CD1-EV-3/1 & CD2-EV-3/1

CENTRIFUGAL PROCESS TRANSFER PUMP WITH FLAME PROOF MOTOR AS A COMPLETE SET WITH BASE PLATE OF STRUCTURAL STEEL:- SCOPE OF CONTRACTOR

SPECIFICATIONS

Unit No.	:- PU-EV-3/1
Delivery Head	:- 25 Mtrs. (Approx)
Capacity	:- 4 m^3/HR (Approx)
MOC	:- S.S. 316
Make	:- Chem flow/KSB/Investa/Johnson or equivalent
Size (suction x delivery)	:- To be decided by contractor or preferably 1” x 1” NB
Shaft Sealing	:- A single, pre-set cartridge type mechanical seal is recommended. The preset cartridge design speeds installation, eliminates chance of installation error, very easy to repair , too. The springe shall be mounted on stationary portion of seal to for give seal misalignment and face eccentricity.

MOC :- Gland, Sleeve, Collar & Stator body- SS 316
Roto:- Silicon Carbide 2 or equivalent
stator face :- Carbon 5
Operating parameters :- Max. Pressure :- Up to 300 PSIG
Max. Temp :- 300°F (150°C)
Max. Speed :- Up to 3600 RPM
Quantity :- 03 Nos 01 in use; 01 no standby; 01 no spare
Make of the Mech Seal :- M/s.FlowSanmar/ Sealol/ Burgman/ Hi-Tech or equivalent
Process valves, pipelines including bend, tees,- As per site requirement
Union, Reducers & flanges etc.

Flame Proof Motor:-

CAP:- To be decided by contractor (preferably 01 H.P.; 3 Ph,
RPM:- 2900
Coupling:- Love Joy ; SW Type

Temperature controller and indicating system

Quantity – two nos. of loops duly calibrated

Removal of the existing temperature controller (Make – Honeywell) and steam control valve with flame proof actuator of size 40 mm DIA from the system S.I.T.C. of new controller with flame proof enclosure, make – Honeywell only. Along with new steam control valve along with flame proof actuator of size 40 mm DIA, flange end should match with the existing steam loop of size 40 mm DIA. Also replacement of steam valves (06 Nos. + 06 Nos. spare) in the two nos. steam loop. The contractor should commission the system after installation to the satisfactory of this works. Also the contractor should maintain the system i.e. controller, make – Honeywell and steam control valve, 40, DIA with flame proof actuator for a period of three years after initial installation and successful completion of the work i.e. four visits per calendar year or as and when required by this works, the contractor should depute his technical service experts within 03 days from the date of intimation either phone call or written message.

Quantity – Two Nos. of Loops; one no. spare loop duly calibrated.(Controller of Honeywell in flame proof enclosure with steam control valve having flame proof actuator) one no. control loop to be installed along with the above system. i.e. EV-3/1
Location – N.C.T section

Total No. of loops – Two nos. of loops

Basic function of this steam loop consists controller and steam control valve- To maintain temperature of process liquids contains mix of organic substance, water, as well as solvents. Set temperature should not very beyond $\pm$ 2^0C.

Any other fittings of SS 304 /CS – as per site condition in the scope of contractor.

24) Modification work of existing tray dryer (50 tray, GMP model)

The existing tray dryer (installed in 2017) is not functioning up to the mark, due to increase in production of semi refined morphine (SRM) . And this system is required to modified to suit present conditions.

Technical specifications:-

Contact parts - SS316
Non contact parts -SS316
Gasket - Silicon food grade
PT-100 Sensor - EPCE-Mack
Trays - SS316, 16SWG(810mm x 405mm x 32mm -1.6mm thk)
Over all machine size - 1500x1250x1050

Steam Radiator (SS316)
In-let connection size - 1 ¼"

Out-let connection size -1"

Suction air filter - 10 micron

25) Jacket for settler, SE-7 at SRM section

Carbon steel jacket to be welded to the existing settler having dia of 1.2 mtr x 1.8 mtr cylindrical height. The jacket should be provided with four nos of C.S. nozzle, size 40mm N.B., SCH 40 , flange end Class 150 with S.S. 304 Ball valve 3 PC design, C.L. 150. Two nos of nozzles at the bottom of the jackets, two nos at top of the jacket.

MOC of jacket : I.S. 2062
Make of Ball valve : M/s. Akay/KSB/Virgo/GM/MARC or equivalent
Spare Ball valves : 4 Nos

The jacket is to be connected through nozzles (two no only in & out) with cold water header of size 4'' which is passing through and nearby the above settler , SE-7

26) Crystallizer confirm to GMP

Unit No : CR-CP-1
Capacity : 400-450 kg
MOC : S.S. 316
Thickness of the shell : 6 mm (S.S. 316)
Shape of the shell : U type
Length & depth : to be decided by the contractor
Thickness of the jacket : 6 mm
MOC of the jacket : IS- 2062 or equivalent
Type of the top cover : Hinged (S.S. 316 /spring loaded S.S. 316) open device for top cover with lock system
Thickness & MOC of top cover: 4 mm S.S. 316

Nozzle:
Inlet in top cover : 150NB, SS 316, Sch-40, CL 150 FLG with SS 316 PTFE lined butterfly valve
Outlet : As per the existing unit
CHW In : 25 NB ,Sch 40, class 150FLG of CS with SS316 Ball valve , 3 PC design , CL 150
CHW Out : 25 NB and other details as above
CW In : 40 NB – do—
CW Out : 40 NB—do—
Location : SC section of the plant
Two nos of drain nozzles, 25 NB with SS 316 Ball valve to be provided at thebottom of the crystallizer in jacket and shell side .
Note:- The existing chilled water lines to be modified as per site conditions and connected to the above chiller.

27) NUTCH, and connected SS piping and pumping system

Removal of old/corroded MS/CS vessel and S.I.T.C. of new SS 316 vessel

NUTCH of capacity 1600 liters and other accessories as mentioned above, and to be connected to the existing process system of WA -3 (New Ex-16; available with this works) spare vessel of capacity -800 liters, and the above spare vessel is also required to be shifted from work shop and to install at SRM section (II Platform) near Ex – 14, 25 mm DIA Ball Valve – 10 Nos. 3 PC design; Flanged end, CL- 150 or BS 10, Table – E ; SS 304. Repair/ Replacement/ Rectification of chequered plate of 6 mm thick of the platform also in the scope of contractor

SS 304, 40 mm DIA Ball Valve - 04 Nos.

Chemical process pump, as specified above – 03 Nos.

Location – SRM Section.

S.S. 316 pipe, SCH – 40, 25 mm DIA, 6 meter length – 08 lengths ; 65 mm DIA – 03 lengths

Other SS 316 Fittings i.e. flange, bends, tee, reducer – as per site condition

Note:-

The above vessel required to be installed adjacent to Ex- 14 , also the rusted, unused/ depleted vessels near Ex- 14 is to be removed to facilitate place for new Ex – 16.

Any other fittings, pipes of SS 316 /304 /C.S. – as per the site condition & in the scope of contractor.

28) Nutch for additional Codeine Phosphate .

Capacity: 450 – 500 lts.
MOC: SS – 316
SS – 316 Piping System ETC
Chemical processing pump
Location: SC Section

At the top of nutch one no. SS 316 Jacketed vessel (unit no. SK-VAP) of capacity 200-250 ltrs is required to be installed with proper steel structure. The bottom discharge valve of size 65 mm NB / 50 mm NB is to be connected to the above nutch for filtration of process material of codeine. The above SS 316 jacketed vessel, is available with this works at VAP Section (first floor) and it is to be shifted to s.c Section, and fabrication of necessary steel structure to accommodate the jacketed vessel (SK-VAP) and at the bottom the nutch filter of 450 to 500 ltrs. and at the ground level the crystallizer (Sl. N0.26) are to be installed. And necessary utility connections i.e. Steam, Cold water, Chilled water & Vacuum etc to be provided by means of CS pipelines, flanges, valves , bends etc. (Removal of existing 1D and Receiver)

29) 500 litres Absolute Alcohol Distillation Unit:

1. SPECIFICATION FOR 1000 L ALCOHOL DISTILLATION KETTLE (SS 304).		
Capacity	:	1000 L
Size	:	1000 Dia - 1300 Height
Top Dish	:	SS-304 – 6 mm Thk
Bottom Dish	:	SS-304 – 8 mm Thk
Shell	:	SS-304 – 6 mm Thk
Jacket	:	1112 Dia – 80% of shell Ht
Jacket Shell	:	MS - 5 mm Thk
Jacket top cover plate	:	MS - 5 mm Thk
Agitator type	:	PBT Type
No. of agitators	:	1 nos.
Sweep Dia Blade	:	Dia. 550 mm

Shaft dia	:	MOC - SS 304 – Dia. 60 mm
Shaft MOC	:	SS 304
Agitator MOC	:	Stainless Steel AISI SS 304
Blade thickness	:	80 mm W X 6 mm Thk
Lifting Lugs	:	4 nos. Equispaced at 90 deg apart (On Top Dish)
Thickness of the lifting lug	:	16 mm thk
Pad plate for the Lifting Lugs	:	Stainless steel AISI SS 304 X 5 mm thk
Lantern MOC	:	MS
Bearing	:	SKF make suitable for the shaft.
Shaft Sealing	:	Double Mechanical Seal with Thirmosiphon.
Oil Seal	:	Suitable for the shaft Dia 60 mm.
Contact Parts MOC	:	Stainless steel AISI SS304
Non Contact Part MOC	:	MS
MOC for the Nozzle Pipes	:	Stainless steel AISI 304
MOC for Nozzle pipes	:	All Nozzle pipes are in SS304 Seamless SCH 40
Nozzle Flanges	:	ANSI B16.5 x 150# x SORF
MOC for All nozzle flanges	:	SS 304
MOC for the Nozzle Flanges	:	Stainless steel AISI 304 up to 50NB & MS + SS304 Cladding Above 50 NB
Nozzle Sizes & Orientation	:	As per your requirement
Accessories	:	Sight Glass , View Glass of MOC – SS 304 Manhole, Pressure Gauge, Safety Valve etc.
Gear Box	:	Inline Helical with suitable gear ratio for 3 HP Premium / Bonfiglioli make
Motor	:	3 HP 4 pole, FLP of suitable mounting of CG / BB / Hindustan make.
External Surface finish (SS 304)	:	Acid cleaning.
External Surface finish (MS)	:	2 Coat of Red Oxide Paint.
Welding Joints	:	All welding joints shall be welded by L7T make rods having tensile strength 90000 PSI.
GA drawing	:	GA drawing will be send to you for approval before starting Fabrication.
Support Type	:	Leg Support.
Support	:	4 nos. Equispaced 90 deg apart
MOC of the Leg Support	:	MS
Pad plate for Bracket mounting	:	SS 304
Mounting	:	Skid Mounting with Staircase.
Automation & Control Panel	:	Excel Scope. (Low Level Switch , High Level Switch, Control Panel to motor wiring with cable tray).
Insulation	:	LBR, 100 MM.
Cladding	:	2 mm. MOC-SS304
Required Quantity of the for **1000 L DISTILLATION**	:	**1Nos.**

KETTLE (SS 304).		

2. SPECIFICATION FOR 200 NB COLUMN (SS 304)		
Type of COLUMN	:	Vertical, Cylindrical, Top & Bottom Dish End Lug Mounted
Column Size Section 1	:	200 MM ID X 2000 mm. Ht X 6mm thk **(**SS 304)
Test Pressure	:	6 Kg/cm2
Dish End	:	10% Torispherical X 6 mm Thk
Top shell	:	200 MM ID X 400 MM Ht X 6 mm Thk
Bottom Shell	:	200 MM ID X 200 MM Ht X 6 mm Thk
Body Flanges	:	As per design
Packing Support	:	Support Ring
Support Ring	:	40 mm X 6 mm Thk In Shell
MOC for Nozzle pipes	:	SS 304
MOC for All Nozzle Flanges	:	ASA 150# SORF Type, (SS 304)
MOC for Pad	:	**(**SS 304)
Lifting Lugs	:	4 Nos. 4 Equispaced at 90 deg apart (IS2062)
Pad plate for the Lifting Lugs	:	**(**SS 304)
Nozzle Orientations & Nozzles	:	As per design
Support Type	:	Lug Support ,
Support MOC	:	MS
All Contact Parts MOC	:	SS 304
All Non Contact Parts MOC	:	MS
Finishing For External & Internal **(**SS 304)	:	Pickling & Passivation.
Finishing For External (MS)	:	Paint with Two coat of Red Oxide.
Required Quantity of the **200 mm COLUMN (SS 304)**	:	**1 Set**

3) SPECIFICATIONS FOR 7.5 m^2 CONDENSER (SS 304)			
SR.NO.	**DESCRIPTION**		**SPECIFICATIONS**
1.	HTA	:	7.5 m^2
2.	Type	:	Horizontal, Cylindrical ,shell & Tube,
3.	Tube Side Passes	:	Single pass
4.	Hydro test pressure shell side	:	6 Kg/Cm2
5.	Hydro test pressure tube side	:	6 Kg/ Cm2
6.	Shell ID	:	Dia 300 mm x 6.0 mm thk X 2000 mm Lg. (SS 304)
7.	Shell Thk	:	6 mm (SS 304)

8.	Bonnet Shell Size	:	Dia 300 mm X 6 mm Thk X 150 mm Long
9.	Bonnet Dish Size	:	Dia 300 mm x 6 mm Thk.
10.	Baffle	:	5 mm Thk x 25% Cut SS 304
11.	Tie Rod	:	M10. SS 304
12.	Spacer Pipe	:	15 NB SS 304
13.	Tube diameter (O.D.)	:	19.06 mm x 1.6 mm Thk (Seamless) SS 304
14.	Tube Length	:	2000 mm
15.	Tubes Pitch	:	27 mm Triangular Pitch
16.	No. of Tubes	:	63 nos.
17.	Tube Sheet	:	Dia 410 x 24 mm Thk SS 304
18.	Type	:	Shell and Tube Heat Exchanger
19.	Nozzle Orientation	:	As per your Drawing.
20.	Nozzle Pipes Std.	:	Seamless X 40 Sch.
21.	Nozzle Flanges Std.	:	ASA B16.5x 150# x SORF
22.	Shell Side MOC	:	SS304
23.	Bonnet Side MOC	:	SS304
24.	Shell Side Flanges MOC	:	MS+ SS 304
25.	Bonnet Side Flanges MOC	:	MS+ SS 304
26.	Condensor Mtg. Support	:	Saddle support
27.	Support MOC	:	MS
28.	Finishing	:	Acid Cleaning
29.	GA drawing	:	GA drawing will be send to you for approval before starting Fabrication
30.	Total Qty of **7.5m^2 CONDENSER SS 304)**	:	**1 Nos.**

4. SPECIFICATION FOR 150 LTR RECEIVERS.		
Model	:	Vertical Cylindrical, Both Dish end Tank.
Gross Volume in liters	:	150 Ltr
Tank Size	:	ID 470 mm X 850 mm Ht TL to TL. X 6 mm Thk
Top & Bottom Dish	:	ID 470 X 6 mm Thk (10 % Torispherical)
MOC for Tank Shell & Both Dish ends	:	SS304
Lifting Lugs	:	2 nos. equispaced at 180 deg apart (On Top Dish)
Thickness of the lifting lug	:	10 mm Thk
Contact Parts MOC	:	SS304
Non Contact Part MOC	:	MS
Support	:	Leg support (MS), 50 NB 4 Nos.
Nozzle pipe	:	All Nozzle pipes are in Seamless sch 40
Earthing bush	:	2 Nos
Light Glass & Side Glass	:	Provided.
Surface Finish (SS 304)	:	Acid
Surface Finish (MS)	:	2 Coat Epoxy Painting
GA drawing	:	GA drawing will be send to you for approval before starting Fabrication.

Required Quantity of the **150 LTR RECEIVERS.**	:	1 Nos.

5. SPECIFICATIONS FOR VACUUM PUMP			
SR.NO	**DESCRIPTION**		**SPECIFICATIONS**
1.	Capacity	:	2 HP, FLP.
2.	Qty	:	1 Nos

6. SPECIFICATIONS FOR PIPING			
SR.NO	**DESCRIPTION**		**SPECIFICATIONS**
1.	Size	:	Suitable Layout
2.	MOC	:	SS304

30. AHU and related civil works (Total : 02 +03 no.s) : Diagrams/ Specifications are enclosed in Appendix- IX, X, XI & XII

a) Codeine phosphate (AHU. 02no.s)

A) AIR HANDLING UNITS
1 RECIRCULATION TYPE AHU FOR UNCLASSIFIED AREA
Supply, delivery, installation, testing and commissioning of floor mounted horizontal type Air Handling unit.
Sheet metal sectionalised cabinet type air handling unit in double skin construction fabricated from Aluminium extruded section frame structure. The inner skin 0.6 mm Plain G.I & outer skin 0.6 mm Precoated GI construction with 40±2mm thick PUF insulation panel in thermal break construction complete with following section. Extruded Aluminium Aerofoil blade low leakage manual Fresh air damper Flange type washable Pre filter 10 micron EU4 Grade at Fresh air inlet
PRE FILTER SECTION
Flange type washable Pre filter 10 micron EU4 Grade with frame
CHW TYPE COOLING COIL SECTION
6 row deep CHW type coil (Cu tubes & Al fins)
SS 304 Insulated drain pan with Nitrile rubber Insulation.
BLOWER SECTION
PLUG type backward curved fan with suitable static pressure. Motor and Fan are mounted on common base frame. Canvass connections at the outlet of the fan. Motor shall be IE2 type. There will be opening for cable entries in motor section
BLEED FILTER SECTION
Flange type washable Bleed filter 3 micron EU7 Grade at Bleed air outlet with Extruded
Aluminium Aerofoil blade low leakage manual Bleed air damper
FINE FILTER SECTION
Flange type washable Fine filter 3 micron EU7 Grade with frame. Magnehelic gauges along with powder coated MS box and 18G SS304 cover plate & sensing probes for measuring pressure differential across AHU Filters. Silicon tubes, necessary fixing
accessories, screws etc.
SUPPLY SECTION WITH Extruded Aluminium Aerofoil manual volume control dampers at Supply & Return air outlet Heaters will be duct mounted
1.1 AHU-01 Nos 1
Fan Capacity (CFM) 8400, Fan static Pressure in mm of WC 80, Cooling Capacity (TR) 19.50, Heating Capacity (KW) 21
1.2 AHU-02 Nos 1

Fan Capacity (CFM) 7100, Fan static Pressure in mm of WC 80, Cooling Capacity (TR) 21.10, Heating Capacity (KW) 24
2) EXHAUST INLINE FAN (FOR CHILLER AREA -FLP TYPE)
Supply, installation of Inline type Fan with 10 Micron EU4 Grade Filter
2.1 1200 CFM Nos 1
3) DUCT MOUNTED HEATERS
Supply, installation, testing & commissioning of Duct mounted Heaters
3.1 21 KW Nos 1, 3.2 24 KW Nos 1
B SHEET METAL & ALLIED WORKS
4) DUCTING & INSULATION
GALVANISED SHEET (GI) DUCTING
Supply, Fabrication and Installation of Galvanized Sheet (GI) Ducting with proper duct sealing with RTV duct Sealant, complete with MS Angle flanges & supports, Ducting shall be site fabricated in L shape and assembled at site.
4.1 24 Gauge SQMT 580, 4.2 22 Gauge SQMT 145
5) INSULATION
5.1 INDOOR THERMAL INSULATION
Supply and Installation of Cross Linked Polyethylene Foamed insulation with metalized foil of below thickness (Class-1)
5.1.1 19 mm thick SQMT 432, 5.1.2 13 mm thick SQMT 432, 5.1.3 6 mm thick (For Duct Flange Only) SQMT 102
6 VOLUME CONTROL DAMPER
6.1 Supply and Installation of GI Opposed blade volume control dampers along with gradation indicating percent area of opening. SQMT 2
7 FIRE DAMPER
Supply and Installation of Fire Control Damper suitable for Fusible link operation made out of 1.6 mm GSS with limit switch.
7.1 Fire Dampers SQMT 1.5, 7.2 Fusible link with Limit switch NOS 2
8) FOUR WAY DIFFUSERS
Supply and Installation of Extruded Aluminum powder coated 4 way diffuser with collar
damper for supply & return air, 8.1 375 X 375 (Neck Size:300 x 300) Nos 15, 8.2 525 X 525 (Neck Size:450 x 450) Nos 34.
9) CHILLED WATER MANIFOLD
Supply, Installation, Testing & Commissioning Insulated Valve manifold for Chilled water coils, comprising of following valves, 6 Nos Isolation valves, 1 Nos Y-Strainer, 1 Nos, Manual balancing valve,, 3-way control valve with actuators, MS 'C' class piping upto 12 Rmt length for connection with main header. Including necessary flanges, nut-bolts, supports with Wooden block, Dial type pressure gauge (4" dial) in supply & return connection of manifold, Dial type Temperature gauge (4" dial) in supply & return connection of manifold, 1 Nos drain valve. 1 Nos Auto Air Vent.,9.1 65 mm Nos 1, 9.2 50 mm Nos 1.
10) MAGNEHELIC GAUGES FOR AHU
Supply and Installation of Magnehelic gauges along with powder coated MS box and 18G
SS304 cover plate & sensing probes for measuring pressure differential across AHU Filters. Silicon tubes, necessary fixing accessories, screws etc. to be included in cost.
10.1 0-25mm for AHU Pre filter SET 2, 10.2 0-50mm for AHU Fine filter SET 2
11 DRAIN PIPING
Supply and Installation of PVC drain piping complete with fittings for 'U' traps, supports etc.
Note: Connection from Drain line to U trap in clients scope, 11.1 50 NB Dia Nos 2
C ELECTRICAL AND INSTRUMENTATION

12) ELECTRICAL PANEL & CABLING FOR AHU WITH NECESSARY ACCESSORIES
Design, supply, installation, testing and commissioning of Electrical panel for AHU. The Panel should consist of Incomer MCCB, Contactors, DOL/Star-Delta starters, Relays,

Push button (On/Off/Reset), Indicating Lamps (Start/Stop/Trip) etc. with necessary instrument cooling fan, inlet louvers & Filters, necessary relays & contactor, interlocks etc. for AHU motors, Heaters etc.
-Panel shall have Controller for Temperature & Heaters operation. HVAC series VFD for AHU motors, Duct mounted Temperature and RH Sensor, Duct mounted Airstat for Heaters, DPT for VFDs, Power & control cabling for AHUs

13) HVAC TESTING, ADJUSTING & BALANCING with DOCUMENTATION: DQ, IQ, OQ IN APPROVED FORMATS
To conduct performance testing as mentioned below
1) Temp Monitoring. 2) Air velocity and uniformity test.
1) MODULAR WALL PANELS
Double skin self supporting sandwich type modular wall panel system and connection with floor using C type base track and GI Interconnecting Profiles for reinforcement along the periphery made air tight with Silicone sealant Sheet Thickness: 0.5 mm thick, Finish: PPGI (Pre-Coated) on both sides, Infill: PUF (Polyurethane Foam), density of Infill: 40 kg/m3, 1.1 Panel Thickness: 50 mm Sqmt 235
2) NON WALKABLE FALSE CEILING PANEL
Double skin self supporting modular ceiling panel system with GI Interconnecting Profiles for reinforcement along the periphery and hanged with Hanging Rod with turnbuckle System and joints made air tight with Silicone sealant, Sheet Thickness : 0.5 mm thick
Finish: PPGI (Pre-Coated) on both sides, Infill: PUF (Polyurethane Foam)
Density of Infill: 40 kg/m3, 2.1 Panel Thickness: 50 mm Sqmt 125
3) CLEANROOM FLUSH METAL DOORS
Clean Room Flush Metal GMP Doors with following Specifications
Leaf Thickness: 46 mm thick, Leaf Sheet Thickness: 0.8 mm thick, Door frame sheet thickness: 1.2 mm thick, Frame Thickness: 50 mm, Finish: PCGI (Powder- Coated)
Infill: PUF (Polyurethane Foam), density of Infill: 40 kg/m3
Accessories for Doors are as follows:
-SS 304 ball bearing Hinges, SS D-type 304 handle - one side, Door closer, Double glazed view glass panel of size 300*600 mm with 5 mm thick toughened glass, 3.1 1200 x 1500 mm (Hatch Door) Nos 1, 3.2 900 x 2100 mm Single Leaf door Nos 12, 3.3 1200 x 2100 mm Double Leaf door Nos 7
4 ALUMINUM COVING
4.1 R50 Extruded Aluminum covings for connection between Wall to ceiling + wall to wall approx. Rmt 210, 4.2 3D corner pieces for internal coving between corner joints Nos 50
4.3 External Corner Pillar (50 MM Wall Panel) Rmt 9, 4.4 2D corners (Corner piece for external Piller) Nos 3.
5) CUTOUTS IN PANELS
5.1 CUTOUTS CEILING Nos 100, Cleanroom Partition BOQ, 5.2 CUTOUTS WALLS Nos 70
6) CONDUIT INSIDE PANELS
6.1 25 mm size PVC Coonduit Pipe Rmt 95

List of Makes
1 Air Handling Unit Citizen Or Eq, 2 Flow fan Kruger Or Eq, 3 G.I. sheets Jindal / Essar/ AM-NS Or Eq, 4 Duct insulation Aerofoam / Supreme Or Eq, 5 Grilles / Diffusers / VCD Cosmos Or Eq, 6 Fire Dampers Cosmos Or Eq, 8 MS Pipe Jindal Or Eq, 9 Pipe Insulation Armaflex Or Eq, 10 Ball Valve Castle Or Eq, 11 Butterfly Valve Castle Or Eq, 12 Pressure Guage Baumer or Eq, 13 Temperature Guage Baumer or Eq, 14 Y-Strainer Sant or Eq, 15 Air Vent Anergy, 16 Manual Balancing valve Castle Or Eq, 17 VFD Danfoss or Eq, 18 Temperatur & RH Sensor Aerosense Or Eq, 19 Air velocity sensor Aerosense Or Eq, 20 Cables Polycab Or Eq, 26 Accessories for Doors Gizo, Apar, or Equivalent.

* Chiller & Centrifuge to be installed outside AHU system.

b) Nascopine & Thebine:

A) AIR HANDLING UNITS
1) RECIRCULATION TYPE AHU FOR UNCLASSIFIED AREA
Supply, delivery, installation, testing and commissioning of floor mounted horizontal type Air Handling unit. Sheet metal sectionalized cabinet type air handling unit in double skin construction fabricated from Aluminium extruded section frame structure. The inner skin 0.6 mm Plain G.I & outer skin 0.6 mm Precoated GI construction with 40±2mm thick PUF insulation panel in thermal break construction complete with following section.
Extruded Aluminium Aerofoil blade low leakage manual Fresh air damper
Flange type washable Pre filter 10 micron EU4 Grade at Fresh air inlet
PRE FILTER SECTION
Flange type washable Pre filter 10 micron EU4 Grade with frame
CHW TYPE COOLING COIL SECTION
6 row deep CHW type coil (Cu tubes & Al fins), SS 304 Insulated drain pan with Nitrile rubber Insulation.
BLOWER SECTION
PLUG type Backward curved fan with suitable static pressure. Motor and Fan are mounted on common base frame. Canvass connections at the outlet of the fan. Motor shall be IE2 type, There will be opening for cable entries in motor section
BLEED FILTER SECTION
Flange type washable Bleed filter 3 micron EU7 Grade at Bleed air outlet with Extruded
Aluminium Aerofoil blade low leakage manual Bleed air damper
FINE FILTER SECTION
Flange type washable Fine filter 3 micron EU7 Grade with frame, Magnehelic gauges along with powder coated MS box and 18G SS304 cover plate & sensing, probes for measuring pressure differential across AHU Filters. Silicon tubes, necessary fixing
Accessories, screws etc.
SUPPLY SECTION WITH
Extruded Aluminium Aerofoil manual volume control dampers at Supply & Return air outlet
Heaters will be duct mounted
1.1 AHU-01 Nos 1
Fan Capacity (CFM) 8400, Fan static Pressure in mm of WC 80, Cooling Capacity (TR) 19.50, Heating Capacity (KW) 21.
1.2 AHU-02 Nos 1
Fan Capacity (CFM) 7100, Fan static Pressure in mm of WC 80, Cooling Capacity (TR) 21.10, Heating Capacity (KW) 24
2. EXHAUST INLINE FAN (FOR CHILLER AREA -FLP TYPE)
Supply, installation of Inline type Fan with 10 Micron EU4 Grade Filter
2.1 1200 CFM Nos 1
3 DUCT MOUNTED HEATERS
Supply, installation, testing & commissioning of Duct mounted Heaters
3.1 21 KW Nos 1, 3.2 24 KW Nos 1,
B. SHEET METAL & ALLIED WORKS
4 DUCTING & INSULATION
GALVANISED SHEET (GI) DUCTING
Supply, Fabrication and Installation of Galvanized Sheet (GI) Ducting with proper duct sealing with RTV duct Sealant, complete with MS Angle flanges & supports, Ducting shall be site fabricated in L shape and assembled at site.
4.1 24 Gauge SQMT 580, 4.2 22 Gauge SQMT 145
5. INSULATION
5.1 INDOOR THERMAL INSULATION
Supply and Installation of Cross Linked Polyethylene Foamed insulation with metalized foil

of below thickness (Class-1)
5.1.1 19 mm thick SQMT 432, 5.1.2 13 mm thick SQMT 432, 5.1.3 6 mm thick (For Duct Flange Only) SQMT 102

6 VOLUME CONTROL DAMPER
6.1. Supply and Installation of GI Opposed blade volume control dampers along with gradation indicating percent area of opening.- SQMT 2

7 FIRE DAMPER
Supply and Installation of Fire Control Damper suitable for Fusible link operation made out of 1.6 mm GSS with limit switch.
7.1 Fire Dampers SQMT 1.5, 7.2 Fusible link with Limit switch NOS 2 ₹ 3,115 ₹ 6,230
8 FOUR WAY DIFFUSERS
Supply and Installation of Extruded Aluminum powder coated 4 way diffuser with collar damper for supply & return air

8.1 375 X 375 (Neck Size: 300 x 300) Nos 15, 8.2 525 X 525 (Neck Size: 450 x 450) Nos 34
9) CHILLED WATER MANIFOLD
Supply, Installation, Testing & Commissioning Insulated Valve manifold for Chilled water coils, comprising of following valves, 6 Nos Isolation valves, 1 Nos Y-Strainer,
1 Nos Manual balancing valve,
3-way control valve with actuators,
MS 'C' class piping upto 12 Rmt length for connection with main header. Including necessary Flanges, nut-bolts, supports with Wooden block,
Dial type pressure gauge (4" dial) in supply & return connection of manifold,
Dial type Temperature gauge (4" dial) in supply & return connection of manifold,
1 Nos drain valve.
1 Nos Auto Air Vent.
9.1 65 mm Nos 1, 9.2 50 mm Nos 1
10) MAGNEHELIC GAUGES FOR AHU
Supply and Installation of Magnehelic gauges along with powder coated MS box and 18G SS304 cover plate & sensing probes for measuring pressure differential across AHU Filters.
Silicon tubes, necessary fixing accessories, screws etc. to be included in cost.
10.1 0-25mm for AHU Pre filter SET 2, 10.2 0-50mm for AHU Fine filter SET 2
11) DRAIN PIPING
Supply and Installation of PVC drain piping complete with fittings for 'U' traps, supports etc.
Note: Connection from Drain line to U trap in clients scope
11.1 50 NB Dia Nos 2
C ELECTRICAL AND INSTRUMENTATION
12) ELECTRICAL PANEL & CABLING FOR AHU WITH NECESSARY ACCESSORIES
Design, supply, installation, testing and commissioning of Electrical panel for AHU. The Panel should consist of Incomer MCCB, Contactors, DOL/Star-Delta starters, Relays, Push button (On/Off/Reset), Indicating Lamps (Start/Stop/Trip) etc. with necessary instrument cooling fan, inlet louvers & Filters, necessary relays & contactor, interlocks etc. for AHU motors, Heaters etc.
-Panel shall have Controller for Temperature & Heaters operation, HVAC series VFD for AHU motors, Duct mounted Temperature and RH Sensor, Duct mounted Airstat for Heaters, DPT for VFDs, Power & control cabling for AHUs
12.1 AHU - 01 Nos 1, 12.2 AHU - 02 Nos 1
13) HVAC TESTING, ADJUSTING & BALANCING with DOCUMENTATION: DQ, IQ, OQ IN APPROVED FORMATS
To conduct performance testing as mentioned below
1) Temp Monitoring, 2) Air velocity and uniformity test.

1 MODULAR WALL PANELS
Double skin self supporting sandwich type modular wall panel system and connection with floor using C type base track and GI Interconnecting Profiles for reinforcement along the periphery made air tight with Silicone sealant Sheet Thickness: 0.5 mm thick
Finish: PPGI (Pre-Coated) on both sides, Infill: PUF (Polyurethane Foam), Density of Infill: 40 kg/m3
1.1 Panel Thickness: 50 mm Sqmt 235, 2) NON WALKABLE FALSE CEILING PANEL
Double skin self supporting modular ceiling panel system with GI Interconnecting Profiles for reinforcement along the periphery and hanged with Hanging Rod with turnbuckle System and joints made air tight with Silicone sealant, Sheet Thickness : 0.5 mm thick
Finish: PPGI (Pre-Coated) on both sides, Infill: PUF (Polyurethane Foam), density of Infill : 40 kg/m3,
2.1 Panel Thickness : 50 mm Sqmt 125
3) CLEANROOM FLUSH METAL DOORS
Clean Room Flush Metal GMP Doors with following Specifications
Leaf Thickness: 46 mm thick, Leaf Sheet Thickness: 0.8 mm thick, Door frame sheet thickness: 1.2 mm thick, Frame Thickness: 50 mm, Finish: PCGI (Powder- Coated)
Infill: PUF (Polyurethane Foam), density of Infill: 40 kg/m3
Accessories for Doors are as follows:
-SS 304 ball bearing Hinges, SS D-type 304 handle - one side, Door closer, Double glazed view glass panel of size 300*600 mm with 5 mm thick toughened glass
3.1 1200 x 1500 mm (Hatch Door) Nos 1, 3.2 900 x 2100 mm Single Leaf door Nos 12
3.3 1200 x 2100 mm Double Leaf door Nos 7
4) ALUMINUM COVING
4.1 R50 Extruded Aluminum covings for connection between Wall to ceiling + wall to wall approx. Rmt 210, 4.2 3D corner pieces for internal coving between corner joints Nos 50 ₹ 348, 4.3 External Corner Pillar (50 MM Wall Panel) Rmt 9, 4.4 2D corners (Corner piece for external Piller) Nos 3
5) CUTOUTS IN PANELS
5.1 CUTOUTS CEILING Nos 100
Cleanroom Partition BOQ
5.2 CUTOUTS WALLS Nos 70
6) CONDUIT INSIDE PANELS
6.1 25 mm size PVC Coonduit Pipe Rmt 95

List of Makes

1 Air Handling Unit Citizen Or Eq, 2 Flow fan Kruger Or Eq, 3 G.I. sheets Jindal / Essar/ AM-NS Or Eq, 4 Duct insulation Aerofoam / Supreme Or Eq, 5 Grilles / Diffusers / VCD Cosmos Or Eq, 6 Fire Dampers Cosmos Or Eq, 8 MS Pipe Jindal Or Eq, 9 Pipe Insulation Armaflex Or Eq, 10 Ball Valve Castle Or Eq, 11 Butterfly Valve Castle Or Eq, 12 Pressure Guage Baumer or Eq, 13 Temperature Guage Baumer or Eq, 14 Y-Strainer Sant or Eq, 15 Air Vent Anergy, 16 Manual Balancing valve Castle Or Eq, 17 VFD Danfoss or Eq, 18 Temperatur & RH Sensor Aerosense Or Eq, 19 Air velocity sensor Aerosense Or Eq, 20 Cables Polycab Or Eq, 26 Accessories for Doors Gizo, Apar, or Equivalent.

c) Morphine Sulphate: Removal of existing AHU structure and SITC of New AHU System.

A) AIR HANDLING UNITS
1) RECIRCULATION TYPE AHU FOR UNCLASSIFIED AREA
Supply, delivery, installation, testing and commissioning of floor mounted horizontal
type Air Handling unit. Sheet metal sectionalised cabinet type air handling unit in double skin construction fabricated from Aluminium extruded section frame structure. The inner skin 0.6 mm
Plain G.I & outer skin 0.6 mm Precoated GI construction with 40±2mm thick PUF
insulation panel in thermal break construction complete with following section.
Extruded Aluminium Aerofoil blade low leakage manual Fresh air damper
Flange type washable Pre filter 10 micron EU4 Grade at Fresh air inlet

PRE FILTER SECTION
Flange type washable Pre filter 10 micron EU4 Grade with frame
CHW TYPE COOLING COIL SECTION
6) Row deep CHW type coil (Cu tubes & Al fins), SS 304 Insulated drain pan with Nitrile rubber Insulation.
BLOWER SECTION
PLUG type backward curved fan with suitable static pressure. Motor and Fan are Mounted on common base frame. Canvass connections at the outlet of the fan.
Motor shall be IE2 type
There will be opening for cable entries in motor section
BLEED FILTER SECTION
Flange type washable Bleed filter 3 micron EU7 Grade at Bleed air outlet with Extruded Aluminium Aerofoil blade low leakage manual Bleed air damper
FINE FILTER SECTION
Flange type washable Fine filter 3 micron EU7 Grade with frame
Magnehelic gauges along with powder coated MS box and 18G SS304 cover plate & sensing probes for measuring pressure differential across AHU Filters. Silicon tubes, necessary fixing accessories, screws etc.
SUPPLY SECTION WITH
Extruded Aluminium Aerofoil manual volume control dampers at Supply & Return air outlet
Heaters will be duct mounted
1.1 AHU-01 Nos 1
Fan Capacity (CFM) 7500, Fan static Pressure in mm of WC 80, Cooling Capacity (TR) 20.10 Heating Capacity (KW) 24
2) EXHAUST INLINE FAN (FOR CHILLER AREA -FLP TYPE)
Supply, installation of Inline type Fan with 10 Micron EU4 Grade Filter
2.1 1100 CFM Nos 1
3) DUCT MOUNTED HEATERS
Supply, installation, testing & commissioning of Duct mounted Heaters
3.1 24 KW Nos 1
B SHEET METAL & ALLIED WORKS
4) DUCTING & INSULATION
GALVANISED SHEET (GI) DUCTING
Supply, Fabrication and Installation of Galvanized Sheet (GI) Ducting with proper duct sealing with RTV duct Sealant, complete with MS Angle flanges & supports, Ducting shall be site fabricated in L shape and assembled at site.
4.1 24 Gauge SQMT 250, 4.2 22 Gauge SQMT 75
5) INSULATION
5.1 INDOOR THERMAL INSULATION
Supply and Installation of Cross Linked Polyethylene Foamed insulation with metalized foil of below thickness (Class-1)
5.1.1 19 mm thick SQMT 216, 5.1.2 13 mm thick SQMT 240, 5.1.3 6 mm thick (For Duct Flange Only) SQMT 102
6) VOLUME CONTROL DAMPER
6.1 Supply and Installation of GI Opposed blade volume control dampers along with gradation indicating percent area of opening.
SQMT 1
7) FIRE DAMPER
Supply and Installation of Fire Control Damper suitable for Fusible link operation made out of 1.6 mm GSS with limit switch.
7.1 Fire Dampers SQMT 1, 7.2 Fusible link with Limit switch NOS 1
8) FOUR WAY DIFFUSERS

Supply and Installation of Extruded Aluminum powder coated 4 way diffuser with collar damper for supply & return air, 8.1 525 X 525 (Neck Size:450 x 450) Nos 22
9) CHILLED WATER MANIFOLD
Supply, Installation, Testing & Commissioning Insulated Valve manifold for Chilled water coils, comprising of following valves
6 Nos Isolation valves, 1 Nos Y-Strainer,1 Nos Manual balancing valve, 3-way control valve with actuators, MS 'C' class piping upto 12 Rmt length for connection with main header. Including necessary flanges, nut-bolts, supports with Wooden block,
Dial type pressure gauge (4" dial) in supply & return connection of manifold,
Dial type Temperature gauge (4" dial) in supply & return connection of manifold,1 Nos drain valve.
1 Nos Auto Air Vent.
9.1 65 mm Nos 1
10) MAGNEHELIC GAUGES FOR AHU
Supply and Installation of Magnehelic gauges along with powder coated MS box and 18G SS304 cover plate & sensing probes for measuring pressure differential across AHU Filters. Silicon tubes, necessary fixing accessories, screws etc. to be included in cost.
10.1 0-25mm for AHU Pre filter SET 1, 10.2 0-50mm for AHU Fine filter SET 1
11) DRAIN PIPING
Supply and Installation of PVC drain piping complete with fittings for 'U' traps, supports etc.
Note: Connection from Drain line to U trap in clients scope
11.1 50 NB Dia Nos 1
C ELECTRICAL AND INSTRUMENTATION
12) ELECTRICAL PANEL & CABLING FOR AHU WITH NECESSARY ACCESSORIES
Design, supply, installation, testing and commissioning of Electrical panel for AHU.
The Panel should consist of Incomer MCCB, Contactors, DOL/Star-Delta starters, Relays, Push button (On/Off/Reset), Indicating Lamps (Start/Stop/Trip) etc. with necessary instrument cooling fan, inlet louvers & Filters, necessary relays & contactor, interlocks etc. for AHU motors, Heaters etc.
-Panel shall have Controller for Temperature & Heaters operation.
-HVAC series VFD for AHU motors
-Duct mounted Temperature and RH Sensor,
-Duct mounted Airstat for Heaters
-DPT for VFDs
-Power & control cabling for AHUs
12.1 AHU - 01 Nos 1
13) HVAC TESTING, ADJUSTING & BALANCING with DOCUMENTATION: DQ, IQ, OQ IN APPROVED FORMATS
To conduct performance testing as mentioned below
1) Temp Monitoring.
2) Air velocity and uniformity test. LOT 1
1 MODULAR WALL PANELS
Double skin self supporting sandwich type modular wall panel system and connection with floor using C type base track and GI Interconnecting Profiles for reinforcement along the periphery made air tight with Silicone sealant
Sheet Thickness: 0.5 mm thick
Finish: PPGI (Pre-Coated) on both sides
Infill: PUF (Polyurethane Foam)
Density of Infill: 40 kg/m3
1.1 Panel Thickness: 80 mm Sqmt 95
2 NON WALKABLE FALSE CEILING PANEL
Double skin self supporting modular ceiling panel system with GI Interconnecting Profiles for reinforcement along the periphery and hanged with Hanging Rod with

turnbuckle System and joints made air tight with Silicone sealant
Sheet Thickness : 0.5 mm thick
Finish : PPGI (Pre-Coated) on both sides
Infill : PUF (Polyurethene Foam)
density of Infill : 40 kg/m3
2.1 Panel Thickness : 50 mm Sqmt 70 3 CLEANROOM FLUSH METAL DOORS
Clean Room Flush Metal GMP Doors with following Specifications, Leaf Thickness : 46 mm thick Leaf Sheet Thickness : 0.8 mm thick, Door frame sheet thickness : 1.2 mm thick, Frame Thickness : 50 mm, Finish : PCGI (Powder- Coated), Infill : PUF (Polyurethene Foam), density of Infill : 40 kg/m3, Accessories for Doors are as follows: SS 304 ball bearing Hinges, SS D-type 304 handle - one side, Door closer, Double glazed view glass panel of size 300*600 mm with 5 mm thick toughened Glass, 3.1 900 x 2100 mm Single Leaf door Nos 3, 3.2 1200 x 2100 mm Double Leaf door Nos 8
4) ALUMINUM COVING
4.1 R50 Extruded Aluminum covings for connection between Wall to ceiling + wall to wall approx. Rmt 185, 4.2 3D corner pieces for internal coving between corner joints Nos 30
4.3 External Corner Pillar (50 MM Wall Panel) Rmt 5, 4.4 2D corners (Corner piece for external Piller) Nos 4
5) CUTOUTS IN PANELS: Cleanroom Partition BOQ, 5.1 CUTOUTS CEILING Nos 50, 5.2 CUTOUTS WALLS Nos 50
6) CONDUIT INSIDE PANELS
6.1 25 mm size PVC Coonduit Pipe Rmt 40

List of Makes

1 Air Handling Unit Citizen Or Eq, 2 Flow fan Kruger Or Eq, 3 G.I. sheets Jindal / Essar/ AM-NS Or Eq, 4 Duct insulation Aerofoam / Supreme Or Eq, 5 Grilles / Diffusers / VCD Cosmos Or Eq, 6 Fire Dampers Cosmos Or Eq, 8 MS Pipe Jindal Or Eq, 9 Pipe Insulation Armaflex Or Eq, 10 Ball Valve Castle Or Eq, 11 Butterfly Valve Castle Or Eq, 12 Pressure Guage Baumer or Eq, 13 Temperature Guage Baumer or Eq, 14 Y-Strainer Sant or Eq, 15 Air Vent Anergy, 16 Manual Balancing valve Castle Or Eq, 17 VFD Danfoss or Eq, 18 Temperatur & RH Sensor Aerosense Or Eq, 19 Air velocity sensor Aerosense Or Eq, 20 Cables Polycab Or Eq, 26 Accessories for Doors Gizo, Apar, or Equivalent
d) All civil work specifications for 04 no.s AHUs are mentioned in Appendix-XII.

Note: AHU specifications and dimensions (as per GMP Norms) are approximate, actual dimensions and drawings to be measured and prepared by contractor and submit to Engineer incharge, GOAW, Neemuch for approval.

Important Note :-

i) The Bidder/ contractor is recommended to visit this works to acquantain with the existing system as well to measure/ access the quantum of work/ supply of material, before submission of E- Tender (Technical & Price Bids)

ii) All tools & tackles i.e. heavy/ medium/ small etc. are in the scope of contractor for execution of the work on turnkey basis.

iii) All types of welding machines/ rectifier, with consumables like S.S./ C.S. electrodes and gas cutting machine including gas & argon gas with flux, electrodes etc. are entirely in the scope of contractor.

iv) The shut Down of the Plant/ Works for the execution of the above works shall be 90 days only. Accordingly the contractor shall deploy the manpower and execute the work. If required the contractor after award of the work order may carried out the pre- fabrication activities at the work shop of this works. The contractor may be allowed to work on all Sundays and gazette holidays.

v) Work has to start form 07:00 hrs. in the morning till 22:00 hrs. in the night.

vi) Qualified/ Experienced technical manpower (i.e. MECH/ELECT/ Instrumentation etc.) shall be deployed by contractor along with supervisor for successful completion of the work on turnkey basis.

vii) All men will be searched at different entry points of this Works/ Plant.

viii) All necessary safety measures shall be adopted by the contractor while execution of the work. Any accident, due to this loss of life or severely/ moderately/ minor injuries of the workforce of the contractor in this case the Govt. Opium & Alkaloid Works, neemuch (M.P.) shall not be responsible for the above. Such act shall be entirely in the scope of contractor only.

ix) Damage/ Loss to the property of Government i.e. govt. opium & alkaloid works, Neemuch (M.P.) by contractor while execution of the work (turnkey).The same shall be made good/ rectified by the contractor only.

x) All material dismantled /removed from the plant shall be shifted to backside of the workshop at this works or as desired by engineer incharge.

Attested
GOAW, Neemuch (M.P.)

Accepted

Signature of the contractor
With name, designation,
Seal and date

Appendix 'I'

VACUUM SYSTEM (SRM, SC, NCT & VAP)

S. N	NAME OF MATERIAL	SPECIFICATION	LENGTH	*QTY.*	*Remarks*
01	*S.S. SEAMLESS PIPE – 150 MM DIA*	SS-304, SCH-40	6 METER	16 Nos	
02	*S.S.SEAMLESS BEND - 150 MM DIA*	90^0 LONG RADIUS BEND SS-304; SCH-40	-	10 Nos	
03	*C.S. FLANGE –150MM DIA*	SORF, IS – 2062; CL -150	-	50 Nos	
04	*S.S.SEAMLESS PIPE – 100 MM DIA*	SS-304, SCH-40	6 METER	08 Nos	
05	*S.S. SEAMLESS BEND - 100 MM DIA*	90^0 LONG RADIUS BEND SS-304; SCH-40	-	12 Nos	
06	*C.S. FLANGE – 100 MM DIA*	SORF, IS – 2062; CL -150	-	20 Nos	
07	*S.S. SEAMLESS PIPE – 80MM DIA*	SS-304, SCH-40	6 METER	26 Nos	
08	*S.S. SEAMLESS BEND - 80MM DIA*	90^0 LONG RADIUS BEND SS-304; SCH-40	-	30 Nos	
09	*C.S. FLANGE – 80 MM DIA*	SORF, IS – 2062; CL -150	-	80 Nos	
10	*S.S. SEAMLESS PIPE – 40MM DIA*	SS-304, SCH-40	6 METER	25 Nos	
11	*S.S. SEAMLESS BEND - 40MM DIA*	90^0 LONG RADIUS BEND SS-304; SCH-40	-	25 Nos	
12	*C. S. FLANGE – 40MM DIA*	SORF, IS – 2062; CL -150	-	50 Nos	
13	*S.S. SEAMLESS PIPE – 25MM DIA*	SS-304, SCH-40	6 METER	20 Nos	
14	*S.S. SEAMLESS BEND - 25MM DIA*	90^0 LONG RADIUS BEND,SS-304; SCH-40	-	35 Nos	
15	*C. S. FLANGE – 25MM DIA*	SORF, IS – 2062; CL -150	-	50 Nos	
16	*S.S. SEAMLESS PIPE – 200 MM DIA*	S.S. - 304, SCH – 40	6 METER	01 Nos.	
17	*C.S. FLANGE – 200 MM DIA*	SORF, IS – 2062 CL - 150	-	06 Nos.	

Appendix II

CHILLING WATER SYSTEM

S. N	NAME OF MATERIAL	SPECIFICATION	LENGTH	*QTY.*	*Remark*
01	*C.S. SEAMLESS PIPE – 65MM DIA*	ASTM A-106;GR- B; SCH-40	6 METER	45 NOS.	
02	*C.S. SEAMLESS BEND - 65MM DIA*	90^0 LONG RADIUS BEND SCH-40	-	50 NOS.	
03	*C.S. FLANGE – 65MM DIA*	SORF, IS – 2062; CL-150	-	90 NOS.	
04	*C.S. SEAMLESS PIPE – 25MM DIA*	ASTM A-106;GR- B; SCH-40	6 METER	35 NOS.	
05	*C.S. SEAMLESS BEND - 25MM DIA*	90^0 LONG RADIUS BEND SCH-40	-	40 NOS.	
06	*C.S. FLANGE – 25MM DIA*	SORF, IS – 2062; CL-150	-	70 NOS.	
07	*C.S. SEAMLESS PIPE – 40MM DIA*	ASTM A-106;GR- B; SCH-40	6 METER	40 NOS.	
08	*C.S. SEAMLESS BEND - 40MM DIA*	90^0 LONG RADIUS BEND SCH-40	-	40 NOS.	
09	*C.S. FLANGE – 40MM DIA*	SORF, IS – 2062; CL-150	-	50 NOS.	

Appendix III

COOLING WATER SYSTEM

S.N	NAME OF MATERIAL	SPECIFICATION	LENGTH	*QTY.*	*Remarks*
01	*C.S. SEAMLESS PIPE – 150MM DIA*	ASTM A-106;GR- B; SCH-40	6 METER	07 Nos	
02	*C S. SEAMLESS BEND - 150MM DIA*	90^0 LONG RADIUS BEND , SCH-40	-	10 Nos	
03	*C.S. FLANGE – 150MM DIA*	SORF, IS – 2062; CL-150	-	20 Nos	
04	*C.S. SEAMLESS PIPE – 100MM DIA*	ASTM A-106;GR- B; SCH-40	6 METER	35 Nos	
05	*C.S. SEAMLESS BEND - 100MM DIA*	90^0 LONG RADIUS BEND SCH-40	-	25 Nos	
06	*C.S. FLANGE – 100MM DIA*	SORF, IS – 2062; CL-150	-	70 Nos	
07	*C.S. SEAMLESS PIPE – 80 MM DIA*	ASTM A-106;GR- B; SCH-40	6 METER	35 Nos	
08	*C.S. SEAMLESS BEND - 80 MM DIA*	90^0 LONG RADIUS BEND SCH-40	-	20 Nos	
09	*C.S. FLANGE – 80 MM DIA*	SORF, IS – 2062; CL-150	-	50 Nos	
10	*C.S. SEAMLESS PIPE – 50MM DIA*	ASTM A-106;GR- B; SCH-40	6 METER	08 Nos	
11	*C.S. SEAMLESS BEND - 50MM DIA*	90^0 LONG RADIUS BEND SCH-40	-	10 Nos	
12	*C.S. FLANGE – 50MM DIA*	SORF, IS – 2062; CL-150	-	30 Nos	
13	*C.S. SEAMLESS PIPE – 40MM DIA*	ASTM A-106;GR- B; SCH-40	6 METER	20 Nos	
14	*C.S. SEAMLESS BEND - 40MM DIA*	90^0 LONG RADIUS BEND SCH-40	-	20 Nos	
15	*C.S. FLANGE – 40MM DIA*	SORF, IS – 2062; CL-150	-	60 Nos	
16	*C.S. SEAMLESS PIPE –*	ASTM A-106;GR- B;	6 METER	20 Nos	

	25MM DIA	SCH-40			
17	*C.S. SEAMLESS BEND - 25MM DIA*	90^0 LONG RADIUS BEND SCH-40	-	30 Nos	
18	*C.S. FLANGE – 25MM DIA*	SORF, IS – 2062; CL-150	-	50 Nos	
19	*C.S. SEAMLESS PIPE – 65 MM DIA*	ASTM A – 106;GR – B SCH – 40	6 METER	22 Nos.	
20	*C.S. SEAMLESS BEND – 65 MM DIA*	90^0 LONG RADIUS BEND SCH – 40	-	20 Nos.	
21	*C.S. FLANGE – 65 MM DIA*	SORF, IS – 2062; CL – 150	-	50 Nos.	

Appendix IV&V

DETAIL OF 24 V DC / 230 AC SUPPLY TEMPRETURE INDICATORS (T.I. / T.I.C.) IN PRODUCTION BUILDING

SRM SECTION

DATE – 23/06/2020

S.NO.	LOCATION	T.I. 24V / DC	T.I. 230 V/ AC	T.I. POSITION	THERMOWEL	REMARKS
1	EX- 02	OK	-	Available	Available	Not working
2	EX-1A	N.A.	-	Not Available	Not Available	-
3	EX-2A	OK	-	Available	Available	Not working
4	EX- 06	OK	-	Available	Available	Not working
5	EX- 07	N.A.	-	Not Available	Available	-
6	EX- 08	OK	-	Available	Available	Not working
7	EX- 09	N.A.	-	Not Available	Available	-
8	EX-10	OK	-	Available	Available	Working
9	EX-11	OK	-	Available	Available	Not working
10	EX-17	N.A.	-	Not Available	Available	-
11	DC UNIT	OK	-	Available	Available	Working not proper

24 V DC SUPPLY TI

S.C. SECTION

S.NO.	LOCATION	T.I. 24V / DC	T.I. 230 V/ AC	T.I. / TIC POSITION	THERMOWEL	REMARKS
01	RCT- 1D	-	OK	TIC Available	Available	Not working
02	RCT - 4S	-	OK	TIC Available	Available	Not working
03	RCT – 1S	-	OK	TIC Available	Available	Not working
04	EX – 2S	-	OK	TIC Available	Available	Not working

24 V DC SUPPLY TI

V.A.P. SECTION

S.NO.	LOCATION	T.I. 24V / DC	T.I. 230 V/ AC	T.I. / TIC POSITION	THERMOWEL	REMARKS
01	RCT-2	-	OK	TIC Available	Available	Not working

24 V DC SUPPLY TI

Note :- All instruments is (T.I. & T.I.C.) either 230 V /AC or 24V / DC needs experts assistance in instrumentation , also requires calibration as per approved standards .

APPENDIX-VI

S. No. 16 of Schedule-A
Pultruded FRP Double Cross flow Cooling Tower - 225m3/hr
REMOVAL OF THE EXISTING OLD COOLING TOWER,

Supply, installation, testing and commissioning of Induced Draft Counter flow PULTRUDED FRP cooling tower, custom designed to be field erected and supplied reinforced concrete basin with all internal materials, equipment and appurtenances in accordance with the project specifications, drawings and design conditions. The cooling tower shall have three cells. The tower manufacturer shall take into consideration all limitations shown on the contract drawings and specifications for the various designs offered including cooling capacity and performance, fan capability and tower energy consumption. All exceptions or clarifications to the bid documents shall be clearly identified in the Cooling Tower Manufacturer's proposal.

Engineering Information
The following documents are required to be included with the Cooling Tower Proposal:

- General Arrangement Drawings
- Load Drawing and Connection Point Details
- Detailed Product Specifications
- Fan Performance Data
- Thermal Performance Rating Data Complete Tower and Fan Sound Data
- CTI Performance Curves
- Power Requirements

Reference Specifications

ASTM D-570	Test Method for Water Absorption of Plastics
ASTM E-84	Test Method for Surface Burning Characteristic of Burning Materials (Flame Spread Rating)
ASTM D-638	Test Method for Tensile Properties of Plastic
ASTM D-695	Test Method for compressive Properties of Rigid Plastics
ASTM D-790	Test Method for Flexural Properties of Un reinforced and Reinforced Plastics and Electrical Insulating Materials
ASTM D-2343	Test Method for Tensile Properties of Glass Fiber Strands, Yarn Sand Roving's used in Reinforced Plastics
ASTM D-3917	Specification for Dimensional Tolerance of Thermosetting Glass Reinforced Plastic Pultruded shapes
ASTM D-4357	Specifications for Plastic Laminates made from Woven Roving and Woven-yarn Glass Fabrics
CTI Bulletin STD 137 (94)	Fiberglass Pultruded Structural Products for use in Cooling Towers
Eurocomp Design of Code And Handbook (Clarke 1996)	The Structural Design of Polymer composites
CTI Bulletin STD 131(86)	Fiberglass-Reinforced Plastic Panels for Application of Industrial Water-Cooling Towers

Tower Structure
The tower structure shall be field erected from pultruded fiber glass structural members that are designed specifically for cooling tower application. The FRP members shall be constructed of a fire-retardant, self-extinguishing resin system with a flame spread rating of 25 or less.

Tower Structure Design
The tower structure shall be designed in accordance with applicable local or national building codes to withstand dead and live loads as per the following (The tower shall be designed to meet all minimum loads per CTI Guidelines):

1) Wind Load: Per applicable building code. Wind load is to be applied to tower wall and fan stack. Tower casing shall not be considered as sacrificial when calculating tower structure loads.

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2) Seismic Load: Per applicable building code, to be applied to total operating weight of the tower.

3) Deck Load: Deck Dead Load-Weight of deck materials .Deck Live Load-60PS Equally distributed load over entire usable roof deck (add ice/snow loads).

4) Fill Support Dead Load: Dry weight of fill material plus water hold up weight plus 15% additional allowance for fill clogging.

5) Fill Support Live Loads: 300lbs. of concentrated load for Temporary maintenance foot traffic.

6) Eliminator Dead and Live Load: Dry weight of drift eliminators.

Connection Design
The minimum service factor for dead loads that shall be allowed for a connection is 4.0. The service factor for connections with temporary loads due to wind, seismic, etc. may be reduced to 2.5. Either a mechanically bolted joint or combination of mechanical and adhesive (epoxy) joints may connect the union of two or more FRP components. Either joint is acceptable when properly designed and installed.

Pultruded Structural Members
The pultruded FRP members to be used in the construction of this tower shall be classified, defined and specified as a minimum per CTI STD 137 (94) "Fiber glass Pultruded Structural Products for use in Cooling Towers".

Structure Hardware
The column anchor plates shall be fabricated from 300 series stainless steel and all structure connectors and fasteners shall be 300 series stainless steel.

COOLING TOWER DESIGN

Tower Design
Design Flow Rate/Per Cell: 225m^3/hr
Hot Water Temperature: 38° C
Cold Water Temperature: 32°C
Wet Bulb Temperature: 28°C
Maximum Motor HP: BIDDER TO SPECIFY – (50 H.P preferably or as designed by contractor)

PUMP:

01 no horizontal split casing centrifugal pump of water, capable of delivering 225 m^3 / hr head – 115 mtr, with pump casing of a cast iron, parts like impeller, shaft sleeve, wearing ring of non corrosive metal like bronze / gun metal and shaft of stainless steel including minimum pressure of 3.15kg/cm^2 at the farthest, top most out let & minimum delivery pressure of 07 k. g/cm^2 at pump out let.

To minimize that the tower water does not flow or splash outside the basin, all cooling tower perimeter columns are to be designed to structurally connect inside of the basin curbline and the connection point must be a minimum of 250mm (10 inches) below the basin curb elevation.

Air Inlet Louvers:
The air inlet louvers shall be fabricated for a minimum of 12oz. FRP casing and supported with pultruded FRP and stainless-steel structural members.

Exterior Casing:
Exterior casing shall be corrugated machine made out of FRP manufactured from fire Retardant and self extinguishing resin systems with a flame spread of 25 or less per ASTME 84. The panels shall be light gray in color and weigh not less than 32oz./ft.2.

All exterior and interior tower wall casing shall be attached to the tower structural members by Series 300 stainless steel screw sand heads backed with neoprene washers.

Wind Walls:
A center wind wall partition shall extend the full longitudinal length of the tower to stop wind blow through and the accompanying water carry out of the basin in high wind conditions and when the fans are in the off or low speed positions. The wind wall shall extend from the bottom of the fill support beams to150-mm (6 inches) minimum below the normal tower operating water level. The wind wall shall be constructed from the same material thickness as the tower exterior casing.

End Walls:
If the tower design includes end walls, the end walls shall extend down a minimum of 305-mm (12 inches) below the basin curb elevation. The end walls shall be constructed of the same material thickness as the tower exterior casing.

Fan Deck:
The cooling tower fan deck shall be pultruded FRP deck panels. The panels shall be fire retardant and self-extinguishing with a flame spread of 25 or less perASTME-84. The deck shall contain UV protection as per CTISTD 137(88) Grade1or 3. The top surface of the deck shall have a non-skid surface applied for added operator safety. The FRP fan deck shall be attached to structural members by 304 stainless steel fasteners.

Fill Media:

The fill media shall be perforate PVC V bar of 35x35mm splash fill of thickness 1mm stacked with SS 304 wire mesh of 16 gauge that are designed specifically for cooling tower service and is UV protected. The media modules shall be resistant to rot, fungi, bacteria and inorganic / organic acids and alkalis commonly found in cooling towers. The fill design shall be high performance PP optic film fill suspended with SS304 wires a minimum flute size to be specified. The fill should be

resistant to fill fouling by incorporating off set vertical flutes that provide directional changes in air and water. The fill pack is to be designed for a maximum operating temperature of 120° F or 50° C without damage.

The thickness of the SS304 material shall be10 mils minimum after forming to provide long structural life of the fill packs and to resist erosion from water spray.

Hot water distribution system:
The hot distributed on the cooling tower through HDG Steel or FRP Piping and 2 Nos CI Flow control valves. The water is sprayed on the hot water basin through 2 Nos Splash Boxes made out of Pultruded FRP and FRP materials. The water is uniformly distributed through the gravity PP spray nozzle fitted on hot water basin. The hot water basin shall be of pultruded FRP AND SIDE walls shall be of FRP. The tower distribution system shall be designed to evenly distribute the inlet hot water over the fill media based on the flows specified. The distribution header shall be fabricated from FRP pipe with a flange connection size of 600 mm extending a minimum of 12 inches from the tower side wall on each tower cell. The distribution laterals shall be fabricated from PVCSDR-35 pipe and the laterals shall be restrained in both the horizontal and vertical directions. The nozzles shall be non-clogging low pressure type with large orifices to minimize plugging. The nozzle adapters shall be mechanically fastened to the PYC laterals by stainless steel hardware.

Drift Eliminator System:
The drift eliminators shall be of the 3-pass design utilizing a series of sinusoidal shaped corrugations bonded to mating sinusoidal waves to form closed cells that force the air to make three distinct changes in direction. Or-spectra in profile form black in colour along with PP spacer.

The cellular design shall be fabricated from PVC corrugated sheet 15mil (0.38 mm) and stiffener sheet 15mil (0.38mm) thickness. The drift eliminator packs should be designed to nest together to eliminate air by-pass. An FRP hatch frame and removable eliminator section shall be provided for access to the distribution system in each cell through the drift eliminator level.

Maximum guaranteed drift rate shall not exceed 0.0015% of the tower flow rate.

Mechanical Equipment Support:
The mechanical equipment support shall be a single piece welded steel assembly, hot dipped galvanized after fabrication and designed to maintain alignment of rotating parts during tower operation.

Direct Driven Fan:
The fans shall be adjustable pitch, multi-blade, axial flow, propeller type selected to deliver the required design air flow at a maximum efficiency and provide long life when handling saturated air at high velocities. The blade material shall be fiberglass-reinforced polyester of vinyl ester resin. An FRP air seal disc shall be provided to prevent recirculation of the air at the fan hub. The fan hub shall be hot dipped galvanized after fabrication. The fan hardware shall be galvanized bolts, nuts, and washers. The leading edges of the fan blades shall include a leading edge protection system to prevent erosion from entrapped water and solid particles in the airflow. The fan shall be designed with a maximum tip speed of 11,000feet per minute to minimize fan noise.
3 PHASE, FAN MOTOR (Drip Proof) H.P = 05 H.P.; RPM - TO BE DECIDED BY CONTRACTOR

Safety/Shutdown Controls:
The tower fan drive equipment shall be provided with the following safety shutdown control devices. Matrix Vibration Switch Model 5550-013-12 (SPDT contacts) with Remote Electrical Reset Switch. The vibration switch

shall be mounted on the fan motor on vibration levels above set point (if applicable).

Fan Stack:
The fan stacks shall be manufactured from high quality hand laid FRP and shall provide a minimum of 17mils UV gel coat protection all surfaces. The fan stacks shall be fabricated from fire retardant, self extinguishing resin systems with a flame spread rating of 25 or less per ASTME 84. The stack profile shall have a curved bell inlet to minimize fan inlet losses and a velocity recovery exit profile to reduce fan energy.

The fan stack shall include a bolted-in-place removable access panel for inspection of the mechanical drive equipment from the deck level. The stack shall also provide an observation port above the fan blade path. Fan hardware shall be 300 series stain less steel. The stacks shall be bolted to the FRP deck on 460mm (18 inch) centers maximum, and also to tower fan deck structural member in at least one place per fan stack section.

Tower Access and Safety:
The perimeter of the tower fan deck shall be provided with FRP posts and FRP Handrails including an FRP toe board and knee rail. AFRP caged ladder shall be provided for access to the tower deck level at one end of the tower.

If required a separate FRP double-
Back stair way, with minimum stair width of 30 inches (762 mm) and a 12" rise, shall be installed at the opposite end of the ladder and cage. This stair shall be provided by the Cooling Tower Manufacturer.

Reinforced Concrete Cold Water Basin and Pump House

The Bidder should design and construct RCC basin with Suction Sump with required fittings like HDG Steel Puddle pipe, SS 304 Strainer screens (1 coarse + 1 fine).

The basin shall be above the pump house at an elevation.
The internal height of Pump house shall be 3 meter
The pump house shall have 1 no door, 1 no louvered window.
The walls of the pump house can be made out of Brick wall duly plastered.
The pump house has to be properly painted from inside and outside.

The Reinforced cement concrete work shall be designed by working stress method in accordance with **IS 456-1978** plain and reinforced cement concrete. All hydraulic structures shall be designed as un-cracked sections as per **IS 3370**

Electrical:

Total electrical work consist of following

1. Wall mounted MCC panel suitable with incomer, star delta starter for Pump, dual starter for the cooling tower fan. The connection for electrical lighting inside the Pump house and on the cooling tower
2. All the aluminum armored suitable cable between MCC panel and Pump and cooling tower. Armored cable for electrical lighting inside the Pump house and on the cooling tower.
3. Earthlings suitable for between MCC panel and Pump and cooling tower motor along with required cable tray etc.

Hot water and cold water piping:

The Bidder should supply and fabricate and commission the following piping with valves etc.

1. From cooling tower basin to pump suction along with Cl butterfly valve of reputed make (L&T) and outlet piping from the pump to the nearest pipe available which goes to the plant
2. The hot water on the cooling tower piping should be connected to the nearest hot water pipe which is coming from the plant.
3. Make up water piping with quick fill valve and float valve to be provided connected to the nearby water source piping.

APPENDIX-VII

Sr. No. 17 of Schedule-A

TECHNICAL SPECIFICATIONS FOR CHILLED WATER PLANT

1. SCOPE OF WORK

The scope of work for the contractor is to design, supply of equipments and allied materials at site, carry out installation, testing & commissioning of 40-45 TR chiller package unit on turnkey basis & inter connection of existing old chiller with new Brine solution chilling plant based on the technical data furnished in the specifications. The Bidder will also have to undertake incidental civil, electrical engineering work and plumbing work as per this specification.

2. Basic data for designing, Brine Solution chilling plant and selection equipments:

a) Total quantity of Brine Solution to be chilled (i.e. in one kg of Brine Solution, 855 gms of water & 145 gms of Ethylene Glycol)	90-95USGPM
b)Temperature of water at the inlet of chiller	8.5°C
c) Temperature of Water at the outlet of chiller	3°C
d) Refrigerant	Freon-22
e) Fouling factor for condenser and chiller	0.001

3. Description of plant & Equipment required: Estimated capacity of chilled water plant asked in the specifications works out to be about 35-40 TR considering certain margin for various unaccounted losses. The plant is to be located inside the room called as refrigeration and vacuum compressor within the space of 5 MTR X 3 MTR X 4 MTR H.

1.1 **Compressor:-** The plant should be complete with multi-cylinder reciprocating semi-hermetic type refrigeration compressor suitable for freon-22 refrigerant and driven by adequate capacity TEFC sq. cage induction/semi-hermetically sealed motor suitable for operation 3pH 50 c/s 415 V.A.C. supply through proper drive in complete. The motor should also be provided with automatic operated star/delta starter. The compressor should be equipped with hydraulic system to give an automatic unloaded start and the automatic capacity regulation arrangement. Compressor should be provided with accessories like suction strainer, safety valve, suction and delivery service stop valve, suction oil and delivery pressure gauge, crank case heater etc. The compressor should be provided with safety controls like HP/LP cut out and oil safety switch. Provision of common base plate for compressor and motor along with slide rails for the motor. The base plate should be fabricated from adequate size M.S. channels and it should be suitably braced from strength and rigidly point of view. The contractor should clearly describe the method to be adopted for unloading the cylinders and the capacity regulations, along with the stops in which the capacity regulations can be achieved.

MAKE OF THE COMPRESSOR: M/s. BOCK:

3.2 **Condenser:** The condenser should be of water cooled shell and tube type design suitable for freon-22 refrigerant. The design of the condenser should provide for an overloading capacity due to the scaling effect. The condenser should be designed considering scale fouling factor of 0.001. The condenser should have shell of M.S. plate of adequate thickness of welded construction. The shell should be designed as per the rules and regulations followed by pressure vessels design as per ASME, sec-VIII unfired pressure vessel code. The condenser should be provided with fusible plug or safety release valve, hand shut off valve at the liquid refrigerant outlet and the mounting legs and the liquid indicator. The condenser should also be provided with

copper tubes with aluminum fins of extended type to increase the heat transfer area and efficiency. The copper tubes should be of thickness not less than 18 SWG. The ends of the copper tube should be expanded into the groves of tube sheets with the help of tube: expander. The joint between the tube sheets and the tube should be perfectly water-tight. Baffles may be provided at proper spacing inside the shell to deviate the path of hot gas. The water heads may be fabricated from M.S. sheets of adequate thickness with partitions depending on the number of passes on water side. The water heads should be securely fastened with the shell of the condenser. Tube sheets should be held between the water head and shell ends. Gaskets should be used with the water heads to prevent the leakage of water. The condenser should be pressure tested at 20.5 kg/cm^2 in the factory and thoroughly checked for leakage of refrigerant through the joints at various places, The condenser should be of multi-pass type on water side and the shell should be provided with inlet connection for hot gas and outlet connections for liquid refrigerant. The number of hot gas inlets at the top of the shell at one end. The water header of size 5" Dia should be provided with connections for cooling water inlet, hot water outlet and the air vent with valves. The condenser should be designed with adequate capacity to store the liquid refrigerant to meet the demands of the chillier during peak load conditions and also it should be able to store the entire charge of the refrigerant inside the system during pump down cycle. This is very essential as there is no provision for the separate receiver in the system. The pressure drop on the water side and on the refrigerant side inside the condenser should be clearly specified by the Bidders in their offer. The condenser should also be provided with purge valve which is an essential accessory. Condenser should be designed for water temperature of 35°C & 40°C respectively at its inlet and outlet.

3.3 **Chiller:-** The chiller to be provided for the plant should be of D.X. type (Direct Expansion) suitable for freon-22 refrigerant and shell and tube design. The design of chiller should be based on the fouling factor of 0.001. Chiller should consist of shell fabricated from adequate thickness M.S. plate in welded construction and plain copper tube supported at the extreme and between the tube sheet. The ends of the copper tubes should be expanded with the tube expander in the sheets properly to ensure the watertight joint between the tube sheets and the tubes. The copper tube should be of thickness not less than 20 SWG.
The chiller should be designed considering the codes adopted by the pressure vessels design, as per ASME Sect-VIII. The chiller should be thermally insulated and should be provided with connections for water inlet and outlet. The chiller should have shell ends fabricated from M.S. sheet of adequate thickness. The refrigerant should pass through the copper tubes taking into account the proper number of circuits depending on the design adopted by the manufacturers. Water to be chilled should be filled inside the shell around the Copper tubes.
The contractor should clearly indicate the pressure drop on water side and refrigerant side for the chiller.

3.4 **Controls:-** The contractor should incorporate a set of refrigerant controls and safety controls such as thermostatic expansion valve, solenoid valve, liquid line strainer-cum-DRYER, liquid sight glass etc. Provision of safety controls like thermostats including one number for antifreeze duty should be made for the water chiller. The electrical safety control such as under-voltage protection, overload release and single phasing prevention, phase reversal etc. should be incorporated in the starters to be used for various electric motors.
3.5 **Piping:**- The design of interconnecting refrigerant piping should keep in view the various bends and loops necessary to prevent the flow of liquid refrigerant into the compressor and to separate the oil efficiently from the hot gas line and feed it back to the case. The suction lines should be thermally insulated. The interconnecting refrigerant piping should be properly supported to ensure the rigidity and vibration damping effect. Hand shut off valves should be used at proper places to isolate a particular part of piping or equipment for servicing purpose. The material for the pipe lines should be commercial quality solid drawn seamless copper tubes normally adopted by the refrigeration engineers, M.S. tubes seamless quality or welded construction. In case of copper tubes the joints should be hard brazed using the flux with the 15% silver contents as minimum. The interconnecting refrigerant piping should be pressure tested with dry inert gas to check the leakages of refrigerant gas. Further the piping should be completely evacuated by the vacuum pump before charging the system with the refrigerant gas.

3.6 **Insulation:**- The chilled water piping, chiller and the chilled water pump set should be thermally insulated (preferably 50mm thick). The surface for the insulation should be thoroughly cleaned with wire brush and insulation material should be pasted with bitumen compound on the surface. Finally the insulation should be provided with chicken wire-mesh laced with the binding wire and provided with vapour barrier and ½" thick cement plaster. The insulation material for the pump set and piping and chiller should be in rigid section in two-halves as normally supplied by fiber glass pilkington or equivalent. In case of valves, they should be covered with sheet metal boxed and finally these boxes are to be insulated with flat insulation as per the specifications given earlier.
In this connection the contractor should visit this works and take exact dimensions before quoting the value.

3.7 **External Plumbing:**- The contractor undertake should incidental water piping including chilled water and cooling water for the condenser of water chilling plant from & upto the point indicated. The chilled water piping should be covered to interconnect existing and new chiller, chilled water pump sets and the Thermal Storage Tank (at present in working condition & existing), Re-circulation pumps and the point of limitation. Water piping should be of heavy class M.S. complete with fittings and isolating valves at the proper places to isolate part of piping or equipment for maintenance and repair purpose.

3.8 **Electrical Engineering Work:-** The contractor should undertake all incidental electrical engineering work in their offers connected with the erection of water chilling plant. All electrical work should be in conformity with the rules and regulation laid down by the State Electricity Board and it should be carried out by the licensed "A" class electrical contractor. The contractor should get approved all electrical engineering work from the concerned electrical authority before commissioning the equipment. The electrical engineering work should include inter-connecting electrical wiring enclosed in metal conduits or PVC cables from main power supply panels to various electric equipment through the distribution board incorporating isolating switches, fuses and starters. The control panels should also be provided for the water chilling plant. It should incorporate the start/stop push button and the indicating lamp for all the equipments, main electrical measuring instruments such as volt meters and ameter at a point where the main power supply is fed to the panel. The control panel /microprocessor should be of wall mounted type/unit mounted and a cover should be manufactured from 16 gauge MS Sheets painted with two coats of B.S. gray paint over a coat of primer. The contractor should clearly indicate the detailed wiring diagram along with the brief description of interlocking arrangement provided for the safe operation of the equipment. The contractor should indicate the wiring diagram and the control circuit along with the start/stop push buttons and nomenclature of equipment clearly on the control panel. The contractor should provide interlocking arrangement for various equipment, so that the compressor does not operate before the chilled water pump and the condenser water pump.

3.9 **Civil Engineering work**:- The contractor should undertake all incidental civil engineering work such as foundations for various equipment, making holes in the walls/floor for water piping and sealing the gaps. The contractor should provided necessary vibration damping material in case of foundations for rotating machinery.

3.10 **Compliance with the BIS Specification:** - All the material used for the manufacture of various equipment and allied material should be in conformity with relevant specifications laid down by BIS.

3.11 **Inspection of Equipment & Material:** The contractor should submit a detailed list of equipment and allied material related with the erection of plant so that the same can be pre-inspected and approved at his work before dispatch of the same to our site GOAW, Neemuch. Test certificates for all material shall be submitted.

3.12 **Inspection of work:-** The installation of chilled water plant will be supervised by the Engineer-in-charge in stages from time to time.

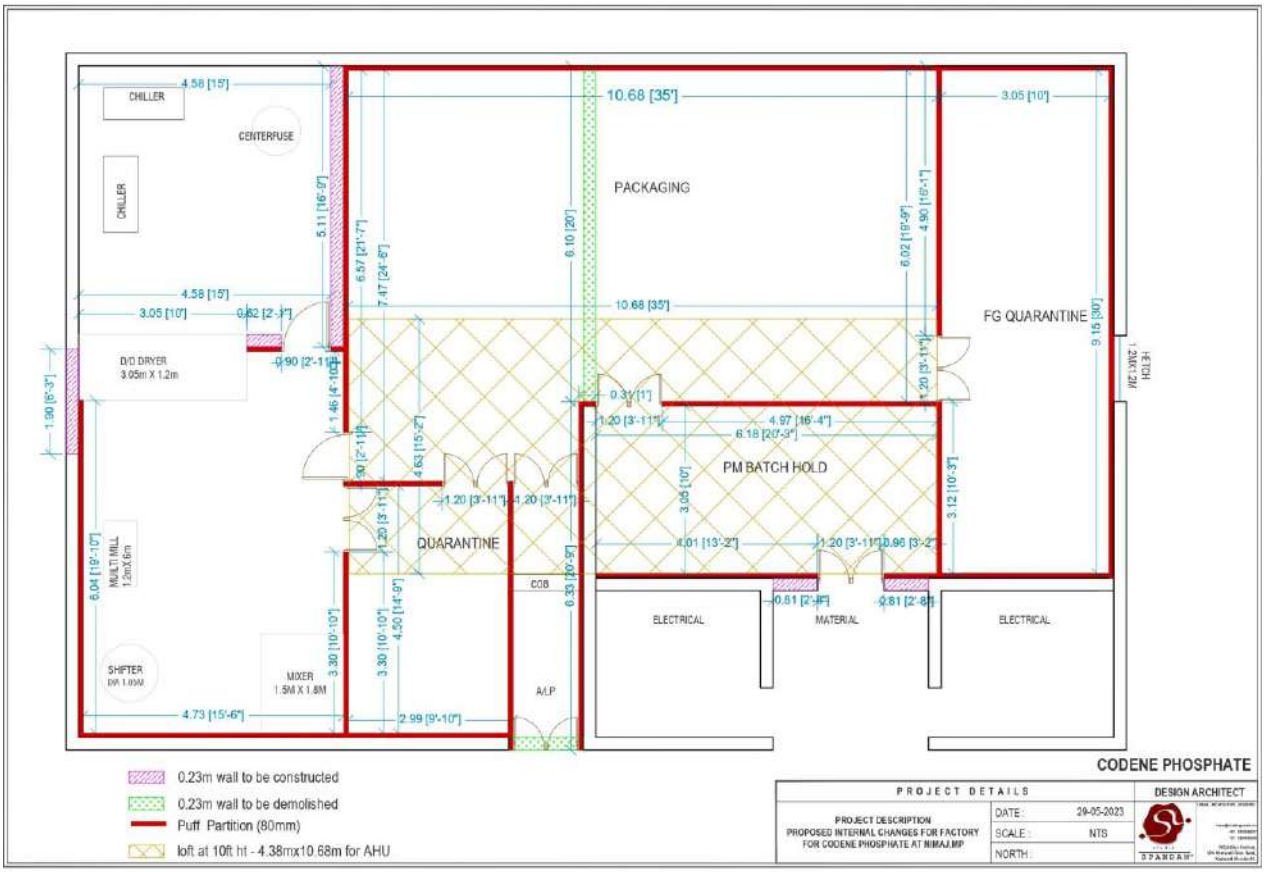
3.13 **Literature & Drawings and manuals:-** The contractor should enclose all relevant literature giving the salient features of various equipments offered for the plant along with the drawings and technical specification, capacity ratings and selection chart etc. in support of the equipment selected by him. Further contractor will have to supply instruction manuals for the operation, maintenance and servicing of the plant in the event of order. List of Spares and tools for the operation and maintenance of the plant should also be supplied by the contractor.

3.14 **Testing & Performance Guarantee:-** The contractor will have to undertake full responsibility to give all relevant tests in support of the capacity and performance indicated for various equipment of the plant. The contractor should make his own arrangement to bring all necessary testing instruments at the site. The testing including the pressure and leak test, will be witnessed by the Engineer-in-charge. Further the contractor will have to give the guarantee for 12 months for the satisfactory performance of the equipment and the entire plant and the contractor will be fully responsible to replace the parts due to bad workmanship or use of sub-standard material at his own cost during warranty period.

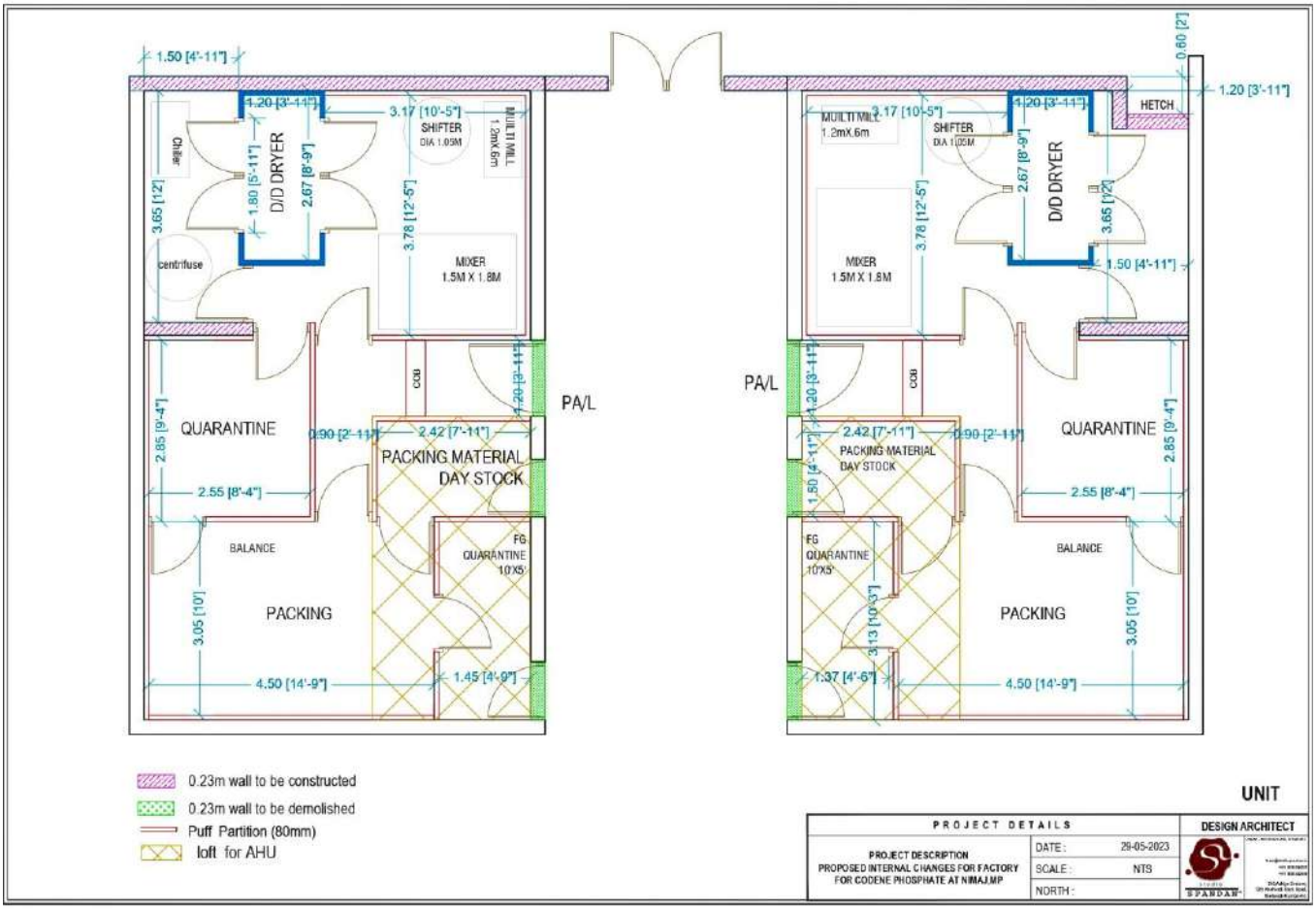
Schematic Sketch (Tentative)

S.No.	Description	Qty
1.	S.S. 316 Nozzle with Flg, CL-150, RF, 25mm NB, Sch-40	2 Nos
2.	S.S. 316 Ball Valve, 3 Pc, Class-150	2 Nos
3.	Tubular level Indicator	1 No
4.	25mm NB screwed end, SS 316 Ball Valve, CL-150	4 Nos

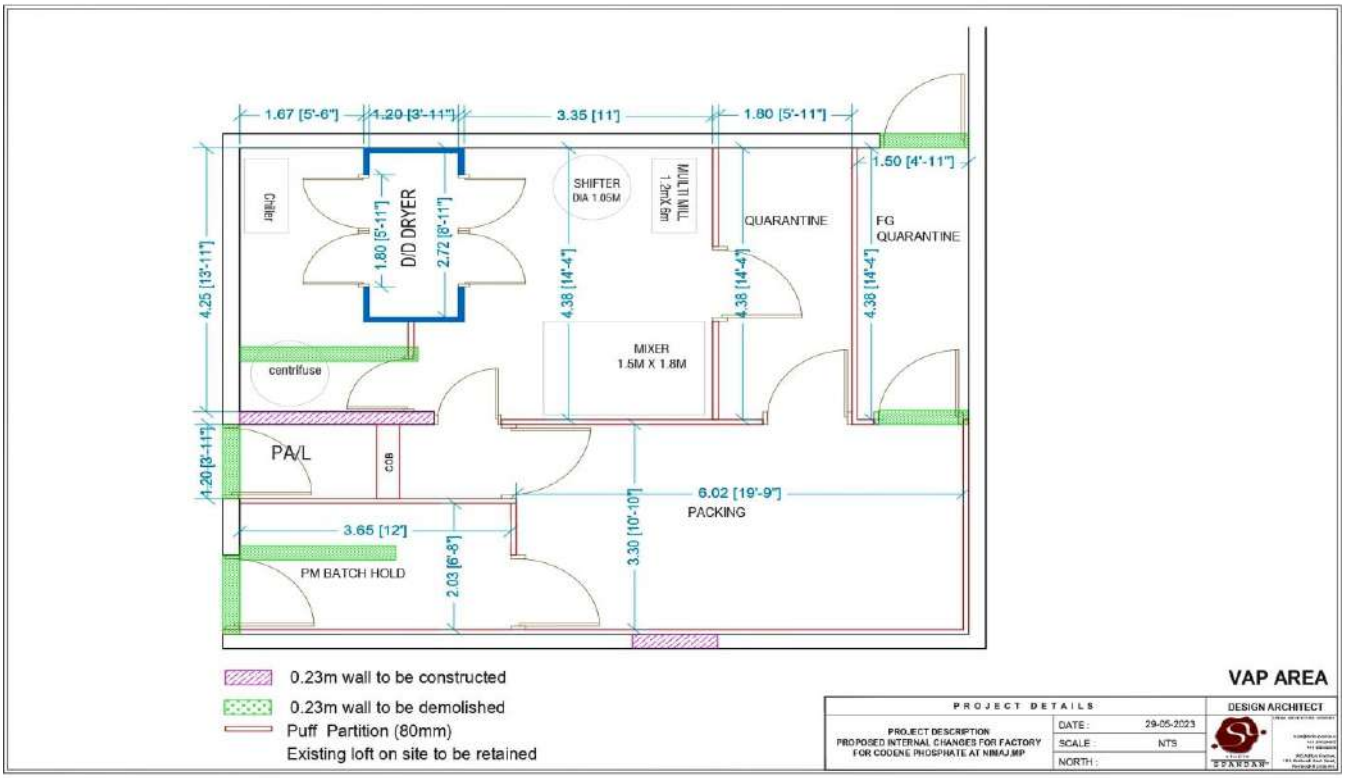
CODEINE PHOSPHATE (SC SECTION)



NASCOPINE & THEBINE (NCT SECTION)



MORPHINE SULPHATE (VAP SECTION)



CIVIL WORKS FOR AHU OF CODEINE PHOSPHATE AT GOAW, NEEMUCH (MP)

1 Removing cement tiles, or marble or polished shahabad floor or dado without bed concrete including stacking thematerials as directed with all leads, lifts etc. complete

1	1.90	0.60		1.14
1	0.62	0.60		0.37
1	9.23	0.60		5.54
1	2.82	0.60		1.69
1	4.93	0.60		2.96
				11.70 m^2

2 Removing lime or lean cement concrete including stacking the spoils as directed with all leads, lifts etc, complete.

1	1.90	0.60	0.10	0.11
1	0.62	0.60	0.10	0.04
1	5.11	0.60	0.10	0.31
1	2.82	0.60	0.10	0.17
1	4.93	0.60	0.10	0.30
				0.92 m^3

3 Dismantling brick masonry in Cement mortar & stacking the materials as directed with all leads, lifts etc.complete.

1	6.10	0.23	3.05	4.28
1	1.20	0.23	3.05	0.84
4	1.50	0.23	0.23	0.32
				5.44 m^3

5 Excavation for foundation in earth, soil of all types, sand, gravel and soft murum, including removing the excavated material up to a distance of 50m. beyond the building area & stacking and spreading as directed, dewatering, preparing the bed for the foundation and necessary back filling, ramming, watering including shoring & strutting etc. complete. (Liftup to 0.00 to 1.50 m.) By Manual Means

1	1.90	0.60	0.60	0.68
1	0.62	0.60	0.60	0.22
1	9.23	0.60	0.60	3.32
1	2.82	0.60	0.60	1.02
1	4.93	0.60	0.60	1.77
				7.02 m^3

6 Excavation for foundation in hard murum including removing the excavated material upto distance of 50 metres beyondthe building area and stacking and spreading as directed, dewatering, preparing the bed for the foundation and necessary back filling, ramming, watering including shoring and strutting etc. complete.

1	1.90	0.60	0.60	0.68
1	0.62	0.60	0.60	0.22
1	9.23	0.60	0.60	3.32
1	2.82	0.60	0.60	1.02
				5.25 m^3

7 Providing and laying Cast in situ/Ready Mix cement concrete in M-10 of trap metal for foundation and bedding including bailing out water, Steel centering, formwork, laying/pumping, compacting, roughening them if special finish is to be provided, finishing if required and curing complete, with fully automatic micro processor based PLC with SCADA enabled reversible Drum Type mixer/concrete Batch mix plant (Pan mixer) etc. complete. With fine aggregate (Crushedsand VSI Grade)

1	1.90	0.60	0.10	0.11
1	0.62	0.60	0.10	0.04
1	9.23	0.60	0.10	0.55
1	2.82	0.60	0.10	0.17
1	4.93	0.60	0.10	0.30
				1.17 m^3

8 Providing second class Burnt Brick masonry with conventional/ I.S. type bricks in cement mortar 1:6 in supers structure including striking joints, raking out joints, watering and scaffolding etc. Complete

1	1.90	0.35	1.10	0.73
1	0.62	0.35	1.10	0.24
1	9.23	0.35	1.10	3.55
1	2.82	0.35	1.10	1.09
1	4.93	0.60	1.10	3.25
				8.86 m^3

9 Providing second class Burnt Brick masonry with conventional/ I.S. type bricks in cement mortar 1:6 in supers tructure including striking joints, raking out joints, watering and scaffolding etc. Complete

1	1.90	0.23	3.05	1.33
1	0.62	0.23	3.05	0.43
1	5.11	0.23	3.05	3.58
1	2.82	0.23	3.05	1.98
1	4.93	0.60	3.05	9.02
-4	1.20	0.23	2.10	-2.32
				14.03 m^3

10 Providing and fixing in position TMT - FE - 500 bar reinforcement of various diameters for R.C.C. slabs, as per detailed designs, drawings and schedules. including cutting, bending, hooking the bars, binding with wires or tackwelding and supporting as required complete.

6.15 m^3	@	65 Kg/m^3	0.40
2.64 m^3	@	200 Kg/m^3	0.53
			0.93 mt.

11

Providing and laying Cast in situ/Ready Mix cement concrete M-20 of trap metal for R.C.C. beams and lintels as per detailed designs and drawings or as directed including steel centering, formwork, cover blocks, laying/ pumping, compactionand roughening the surface if special finish is to be provided and curing etc. complete. (Excluding reinforcement and structural steel). with fully automatic micro processor based PLC with SCADA enabled reversible Drum Type mixer/ concrete Batch mix plant (Pan mixer) etc. complete. With fine aggregate (Crushed sand VSI Grade)

2	11.20	0.23	0.45	2.32
4	1.50	0.23	0.23	0.32
				2.64 m^3

12 Providing & laying Cast in situ/Ready Mix cement concrete M-20 of trap metal for R.C.C. slabs & landings as per detailed designs and drawings including steel centering, formwork, cover blocks, laying/pumping, compac tion finishingthe formed surfaces with cement mortar 1:3 of sufficient minimum thickness to give a smooth and even surface or roughening if special finish is to be provided and curing etc. complete, (Excluding reinforcement and structural steel).with fully automatic micro processor based PLC with SCADA enabled reversible Drum Type mixer/concrete Batch mix plant (Pan mixer) etc. complete. With fine aggregate (Crushed sand VSI Grade)

	1	11.20	4.39	0.13	6.15 m^3

13 Providing internal cement plaster 12mm thick in single coat in cement mortar 1:5 without neeru finish to concrete or brick surfaces, in all positions including scaffolding and curing etc. complete.

	2	1.90	3.05	11.59
	2	0.62	3.05	3.78
	2	5.11	3.05	31.17
	2	2.82	3.05	17.20
	2	4.93	3.05	30.07
	-4	1.20	2.10	-10.08
				83.74 m^2

14 Providing sand faced plaster externally in cement mortar using approved screened sand, in all positions includ ing base coat of 15 mm thick in cement mortar 1:4 using waterproofing compound at 1Kilogramper cement bag curing the same for not less than 2 days and keeping the surface of the base coat rough to receive the sand faced treatment 6 to 8 mm thick in cement mortar 1:4 finishing the surface by taking out grains and curing for fourteen days scaffolding etc.complete.

	2	1.90	3.05	11.59
	2	0.62	3.05	3.78
	2	5.11	3.05	31.17
	2	2.82	3.05	17.20
	2	4.93	3.05	30.07
	-4	1.20	2.10	-10.08
				83.74 m^2

15 Providing and applying Two coats of wall care Putty on plastered surface and Ceiling and Walls to prepare surface even and smooth of approved make, etc complete.

	1	11.20	4.39	49.17 m^2

16 Providing and applying epoxy paint primer with middle coat and top coat to superstructure including scaffolding etc complete.

	1	4.58	3.05	13.97
	1	4.88	3.05	14.88
				83.74
				112.59 m^2

17 Providing and laying machine cut machine Polished Kota stone flooring 25mm to 30mm thick and required width in plain/diamond pattern on bed of 1:6 C.M. including cement float, filling joints with neat cement slurry, curing, polishing and cleaning etc. complete.

CHILLER	1	4.58	4.88		22.35
	1	4.73	7.01		33.16
	1	10.68	6.02		64.29
	1	3.05	9.15		27.91
	1	6.18	3.05		18.85
	1	4.35	6.33		27.54
					194.09 m^2

1	Removing cement tiles, or marble or polished shahabad floor or dado without bed concrete including stacking thematerials as directed with all leads, lifts etc. complete						
2				2.70	0.60		3.24
1				16.93	0.60		10.16
1				0.37	0.60		0.22
		for Slab Support	1	5.01	0.60		3.01
							16.63 m^2
2	Removing lime or lean cement concrete including stacking the spoils as directed with all leads, lifts etc, complete.						
2				2.70	0.60	0.10	0.32
1				16.93	0.60	0.10	1.02
1				0.37	0.60	0.10	0.02
		for Slab Support	1	5.01	0.60	0.10	0.30
							1.66 m^3
3	Dismantling brick masonry in Cement mortar & stacking the materials as directed with all leads,lifts etc.complete.						
2				1.20	0.23	2.10	1.16
2				0.90	0.23	2.10	0.87
2				0.92	0.23	2.10	0.89
2				1.50	0.23	0.23	0.16
2				1.20	0.23	0.15	0.08
2				1.22	0.23	2.10	1.18
							4.34 m^3
5	Excavation for foundation in earth, soil of all types, sand, gravel and soft murum, including removing the excavated material up to a distance of 50m. beyond the building area & stacking and spreading as directed, dewatering, preparing the bed for the foundation and necessary back filling, ramming, watering including shoring & strutting etc. complete. (Liftupto 0.00 to 1.50 m.) By Manual Means						
2				2.70	0.60	0.60	1.94
1				16.93	0.60	0.60	6.09
1				0.37	1.60	0.60	0.36
		for Slab Support	1	5.01	0.60	0.60	1.80
							10.20 m^3
6	Excavation for foundation in hard murum including removing the excavated material upto distance of 50 metres beyond the building area and stacking and spreading as directed, dewatering, preparing the bed for the foundation and necessaryback filling, ramming, watering including shoring and strutting etc. complete.						
2				2.70	0.60	0.60	1.94
1				16.93	0.60	0.60	6.09
1				0.37	1.60	0.60	0.36
		for Slab Support	1	5.01	0.60	0.60	1.80
							10.20 m^3
7	Providing and laying Cast in situ/Ready Mix cement concrete in M-10 of trap metal for foundation and bedding including bailing out water, Steel centering, formwork, laying/pumping, compacting, roughening them if special finish is to be provided, finishing if required and curing complete, with fully automatic micro processor based PLC with SCADA enabled reversible Drum Type mixer/concrete Batch mix plant (Pan mixer) etc. complete. With fine aggregate (Crushed sand VSI Grade)						
2				2.70	0.60	0.10	0.32
1				16.93	0.60	0.10	1.02
1				0.37	1.60	0.10	0.06
		for Slab Support	1	5.01	0.60	0.10	0.30
							1.70 m^3

8 Providing second class Burnt Brick masonry with conventional/ I.S. type bricks in cement mortar 1:6 in supers tructure including striking joints, raking out joints, watering and scaffolding etc. Complete

2			2.70	0.35	1.10	2.08
1			16.93	0.35	1.10	6.52
1			0.37	0.35	1.10	0.14
	for Slab Support	1	5.01	0.60	1.10	3.31
						12.05 m^3

9 Providing second class Burnt Brick masonry with conventional/ I.S. type bricks in cement mortar 1:6 in supers tructure including striking joints, raking out joints, watering and scaffolding etc. Complete

2			2.70	0.23	3.05	3.79
1			16.93	0.23	3.05	11.88
1			0.37	0.35	3.05	0.39
	for Slab Support	1	5.01	0.60	3.05	3.01
		-1	1.83	0.23	2.10	-0.88
		-2	0.90	0.23	2.10	-0.87
						17.31 m^3

10 Providing and fixing in position TMT - FE - 500 bar reinforcement of various diameters for R.C.C. slabs, as per detailed designs, drawings and schedules. including cutting, bending, hooking the bars, binding with wires or tackwelding and supporting as required complete.

3.48 m^3	@	65 Kg/m^3	0.23
0.11 m^3	@	200 Kg/m^3	0.02
			0.25 mt.

11

Providing and laying Cast in situ/Ready Mix cement concrete M-20 of trap metal for R.C.C. beams and lintels as per detailed designs and drawings or as directed including steel centering, formwork, cover blocks, laying/ pum ping, compactionand roughening the surface if special finish is to be provided and curing etc. complete. (Exclu ding reinforcement and structural steel). with fully automatic micro processor based PLC with SCADA enabled reversible Drum Type mixer/ concrete Batch mix plant (Pan mixer) etc. complete. With fine aggregate (Crushed sand VSI Grade)

	Lintel beam	1	2.10	0.23	0.23	0.11
2			1.20	0.23	0.15	0.08
2			1.50	0.23	1.15	0.79
2			1.22	0.23	1.15	0.65
						1.63 m3

12 Providing & laying Cast in situ/Ready Mix cement concrete M-20 of trap metal for **R.C.C. slabs** & landings as per detailed designs and drawings including steel centering, formwork, cover blocks,laying/pumping,compac tion finishing the formed surfaces with cement mortar 1:3 of sufficient minimum thickness to give a smooth and even surface or roughening if special finish is to be provided and curing etc. complete, (Exclud ing reinforcement and structural steel).with fully automatic micro processor based PLC with SCADA enabled reversible Drum Type mixer/concrete Batch mix plant (Pan mixer) etc. complete. With fine aggregate (Crushed sand VSI Grade)

	Slab	2	2.78	5.01	0.125	3.48 m^3

13 Providing internal cement plaster 12mm thick in single coat in cement mortar 1:5 without neeru finish to concrete or brick surfaces, in all positions including scaffolding and curing etc. complete.

4		2.70		3.05	32.94
1		16.93		3.05	51.64
2		5.01		3.04	30.46
	-2	0.90		2.10	-3.78
	-1	1.83		2.10	-3.84
					107.41 m^2

14 Providing sand faced plaster externally in cement mortar using approved screened sand, in all positions includ- ing basecoat of 15 mm thick in cement mortar 1:4 using waterproofing compound at 1Kilogramper cement bag curing the samefor not less than 2 days and keeping the surface of the base coat rough to receive the sand faced treatment 6 to 8 mm thick in cement mortar 1:4 finishing the surface by taking out grains and curing for fourteen days scaffolding etc. complete.

1			16.93	3.05	51.64
		-1	1.83	2.10	-3.84
					47.79 m^2

15 Providing and applying Two coats of wall care Putty on plastered surface and Ceiling and Walls to prepare surface even and smooth of approved make, etc complete.

107.41 m^2

16 Providing and applying epoxy paint primer with middle coat and top coat to superstructure including scaffolding etc complete.

1			16.93	3.05	51.64
2			5.01	3.05	30.56
		-1	1.83	2.10	-3.84
					78.35 m^2

17 Providing and laying machine cut machine Polished Kota stone flooring 25mm to 30mm thick and required width in plain/diamond pattern on bed of 1:6 C.M. including cement float, filling joints with neat cement slurry, curing, polishing and cleaning etc. complete.

Centrifuse+Mixer	2	6.10	9.91	120.90
Door sills	2	1.20	0.25	0.60
Door sills	2	0.90	0.25	0.45
				121.95 m^2

	1 Removing cement tiles, or marble or polished shahabad floor or dado without bed concrete including stacking thematerials as directed with all leads, lifts etc. complete					
1		3.52	0.60			2.11
1		1.15	0.60			0.69
						2.80 m^2
	2 Removing lime or lean cement concrete including stacking the spoils as directed with all leads, lifts etc, complete.					
1		3.52	0.60	0.10		0.21
1		1.15	0.60	0.10		0.07
						0.28 m^3
	3 Dismantling brick masonry in Cement mortar & stacking the materials as directed with all leads, lifts etc.complete.					
1		3.52	0.23	2.10		1.70
1		1.15	0.23	2.10		0.56
						2.26 m^3
	5 Excavation for foundation in earth, soil of all types, sand, gravel and soft murum, including removing the excavated material up to a distance of 50m. beyond the building area & stacking and spreading as directed, dewatering, preparing the bed for the foundation and necessary back filling, ramming, watering including shoring & strutting etc. complete. (Liftupto 0.00 to 1.50 m.) By Manual Means					
1		3.52	0.60	0.60		1.27
1		1.15	0.60	0.60		0.41
						1.68 m^3
	6 Excavation for foundation in hard murum including removing the excavated material upto distance of 50 metres beyond the building area and stacking and spreading as directed, dewatering, preparing the bed for the found ation and necessaryback filling, ramming, watering including shoring and strutting etc. complete.					
1		3.52	0.60	0.60		1.27
1		1.15	0.60	0.60		0.41
						1.68 m^3
	7 Providing and laying Cast in situ/Ready Mix cement concrete in M-10 of trap metal for foundation and bedding including bailing out water, Steel centering, formwork, laying/pumping, compacting, roughening them if special finish is to be provided, finishing if required and curing complete, with fully automatic micro processor based PLC with SCADA enabled reversible Drum Type mixer/concrete Batch mix plant (Pan mixer) etc. complete. With fine aggregate (Crushed sand VSI Grade)					
1		3.52	0.60	0.10		0.21
1		1.15	0.60	0.10		0.07
						0.28 m^3
	8 Providing second class Burnt Brick masonry with conventional/ I.S. type bricks in cement mortar 1:6 in supers tructure including striking joints, raking out joints, watering and scaffolding etc. Complete					
1		3.52	0.35	1.10		1.36
1		1.15	0.35	1.10		0.44
						1.80 m^3

9 Providing second class Burnt Brick masonry with conventional/ I.S. type bricks in cement mortar 1:6 in supers tructure including striking joints, raking out joints, watering and scaffolding etc. Complete

1		3.52	0.23	3.05	2.47
1		1.15	0.23	3.05	0.81
					3.28 m^3

10 Providing and fixing in position TMT - FE - 500 bar reinforcement of various diameters for R.C.C. slabs, as per detailed designs, drawings and schedules. including cutting, bending, hooking the bars, binding with wires or tackwelding and supporting as required complete.

0.08 m^3 @ 200 Kg/m^3 0.02

11

Providing and laying Cast in situ/Ready Mix cement concrete M-20 of trap metal for R.C.C. beams and lintels as per detailed designs and drawings or as directed including steel centering, formwork, cover blocks, laying/ pum ping, compactionand roughening the surface if special finish is to be provided and curing etc. complete. (Exclu ding reinforcement and structural steel). with fully automatic micro processor based PLC with SCADA enabled reversible Drum Type mixer/ concrete Batch mix plant (Pan mixer) etc. complete. With fine aggregate (Crushed sand VSI Grade)

1		1.45	0.23	0.23	0.08 m^3

12 Providing internal cement plaster 12mm thick in single coat in cement mortar 1:5 without neeru finish to concrete or brick surfaces, in all positions including scaffolding and curing etc. complete.

2		3.52		3.05	21.47
1		1.15		3.05	3.51
					24.98 m^2

13 Providing sand faced plaster externally in cement mortar using approved screened sand, in all positions includ- ing basecoat of 15 mm thick in cement mortar 1:4 using waterproofing compound at 1Kilogramper cement bag curing the samefor not less than 2 days and keeping the surface of the base coat rough to receive the sand faced treatment 6 to 8 mm thick in cement mortar 1:4 finishing the surface by taking out grains and curing for fourteen days scaffolding etc. complete.

1		1.15		3.05	3.51 m^2

14 Providing and applying Two coats of wall care Putty on plastered surface and Ceiling and Walls to prepare surface even and smooth of approved make, etc complete.

24.98 m^2

15 Providing and applying epoxy paint primer with middle coat and top coat to superstructure including scaffolding etc complete.

1		1.15			1.15 m^2

16 Providing and laying machine cut machine Polished Kota stone flooring 25mm to 30mm thick and required width in plain/diamond pattern on bed of 1:6 C.M. including cement float, filling joints with neat cement slurry, curing, polishing and cleaning etc. complete.

	Centrifuse+Mixer	1	9.83	7.83	76.97
	Door sills	2	1.22	0.25	0.61
	Door sills	1	1.20	0.25	0.30
	Door sills	1	1.28	0.25	0.32
					78.20 m^2